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THE PEOPLE'S UNIVERSITY

Indira Gandhi
National Open University
School of Social Sciences

**BLI-223**
**Organising and**
**Managing Information**

Block

# 1

## LIBRARY CLASSIFICATION

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# BLOCK 1    LIBRARY CLASSIFICATION

**Introduction**

Classification is practised in all walks of life. It results into efficiency in working. We all use classification to varying degrees in different activities that we undertake. Library classification has an important role to play in information access. It helps us to organise the sources of information systematically so that these can be retrieved later. Fundamentals and theories of classification are important for a student of library and information science to understand. This Block aims at imparting basic understanding of classification and its application in information retrieval.

There are four Units in this Block.

**Unit 1** introduces the concept of classification. It is titled **Basic Concepts**. It discusses the different definitions of classification. The nature, scope and uses of classification have been explained at length in the Unit. Applications of classification in library and knowledge have also been discussed in the unit.

**Types of Classification** is the title of **Unit 2**. There are different types of classification, fixed and relative; enumerative and faceted; general and special; broader and depth; print and electronic versions; and classification on the web and ontologies. All these have been differentiated and explained with examples in Unit 2.

**Postulational Approach,** the subject of **Unit 3**, gives a scientific basis to classification. Ranganthan divided the work of classification in three planes of work, idea, verbal and notational. He gave canons, principles and postulates for all the planes of work. These have been discussed at length in the Unit.

**Unit 4** is **Comparative Study of Schemes of Classification**. We have discussed the different types of schemes of library classification in Unit 2. A comparative analysis of some of the more used prominent schemes of classification is presented in Unit-4. These include DDC (Dewely Decimal Classification), UDC (Universal Decimal Classification), LCC (LIbrary of Congress Classification) and CC (Colon Classification).

# UNIT 1    BASIC CONCEPTS

**Structure**

## 1.0    OBJECTIVES

After reading this Unit, you will be able to:

- define classification and know its various meanings;

- understand that it pervades every activity of life;

- explain the process of classification;

- discuss the various manifestations of library classification;

- state how it is vital to library management and services;

- understand classification as foundation study of library management, and also its limitations; and

- explain the basic concepts of classification.

# 1.1    INTRODUCTION

Classification is a process of making classes. A class is a set or group of entities (both abstract and concrete) having at least one similarity/ commonality. This similarity is called characteristic and is the basis of grouping or sub-grouping of entities. For example, all the students of BLIS class, whether male or female, of any religion and caste, coming from different states or regions, speaking different languages, having different political ideologies, have one characteristic in common, that is all of them are candidates for BLIS degree. A class can be of any size. All human beings make one class called *homo sapiens* by scientists. All Indians make one class. Similarly, all Christians make one class, Roman Catholics make another class, Indian Roman Catholics make yet another class, or Keralitie Roman Catholics may make yet another class. There seems no end to making classes and subclasses of people or of any other entity. A class may be of even a single entity.

# 1.2    MEANINGS OF CLASSIFICATION

Classification is a process of grouping of similar or like entities. It may be noted that there can be no grouping without division, as there can be no shadow without light, or no parting without meeting. Therefore, grouping implies division. Grouping and division are two sides of the same coin. We add a member to a group by separating it from other in the process of grouping and regrouping. Therefore, grouping and division are the basic processes of classification. But classification is more than endless grouping and sub-grouping. After grouping starts the process of ranking that is arranging the members of the group in a sequence. Even a small family can be divided further by status or age of its members. This is ranking. For example, say all the twenty students of a class may be further arranged in a row by age, height, educational merit or even alphabetically by name. Let us take the case of candidates appearing in IAS examination. The final result by UPSC divides them into two groups: successful and unsuccessful. Successful candidates are further ranked according to the marks obtained. That ranking is very vital. All this is classification. Classification is a systematic and predictable order. A group of chemical elements is a class by itself. Their grouping into Group 0, Group 1,2,3,….8 is further classification. Their further arrangement according to their atomic number is classification and ranking. In the third sense, assigning each ranked entity a code or symbol to preserve their ranking is classification. For example, a class of 25 students may be first arranged according to educational merit then each students may be ranked 1, 2, ….. 25 or A to Y in order of merit for convenience of handling. This allocation of codes will mechanise and fix their ranking and consequent sequence.

**Various manifestations of classification**

Grouping and division seem primitive or elemental processes of classification. Looking at the bottom, classification is co-relation or discovering relations between entities. All members of a group are related to one another by some commonality. When we admit an entity into a group, a relation between that entity and group is discovered or created. For example, Potassium is not only a member of the class 'inorganic substances', but also bears relation to sodium on its left and copper on its right. Sodium, potassium and copper are related to one another. In a family, which is always a class by itself, all members are related by blood. Hence classification is relation.

## 1.2.1    Classification and Organisation

Since grouping and inter-group ranking are acts of organisation, thus classification is organisation. In fact classification and organisation are inseparable. Now classification

is considered as a tool for organising in every sense of the word. So classification is structuring and mapping. Difference between a heap of bricks and a mansion is classification. In a mansion every brick is positioned in an organised way.

In an organisation all members are related and coordinated, so classification is co-ordination and control. Difference between a disciplined army and a chaotic mob is classification. Army men are coordinated and controlled while a mob is uncontrolled, though both the groups comprise of men.

Classification is matching and pairing which is implied in grouping of entities brought together. When we are ranking and arranging we are sorting and tabulating. So, tabulating and sorting are acts of classification.

## 1.3    USES OF CLASSIFICATION

Classification is a mental act and logical process of association and relation. It goes on every moment of life knowingly or unknowingly deliberately or unconsciously. Any system be it biological (man), social (government, libraries, institutions) or mechanical (computers, machines) has to classify for successful functioning. All human beings, what ever they do, have to classify in every sense of the word. More sophisticated and intelligent a person, better his/her sense of classification.

A postman classifies postal items for efficient and timely delivery. For quick, efficient and easy delivery, a postal item is sorted (classified) many times at different stages between posting and delivery. A fruit seller sorts his fruits into categories, say, oranges, apples, grapes, and so on. Further each group, say, of apples is further sorted into species say Kashmiri apples, Simla apples, Golden apples, Green apples, etc. An astute vendor may further sort each species by quality and price. At every step of grouping sorter is adding value to the items. Thus classification is value addition.

Record files in an office are arranged in some order, and within each file letters and memos are arranged in some known order. Without such an arrangement the previous record cannot be located and used. Books and other reading material in libraries are arranged, no doubt to increase their usability.

## 1.4    SCOPE OF CLASSIFICATION

There is no act of life where classification is not used. It is applied everywhere. It is a basic process to learn. Opposite of classification is disorder and chaos. Classification can be done of all objects entities, actions, thoughts and concepts. We can classify people, countries, natural phenomena, plants, flowers, animals, libraries, philosophies, literature, artifacts, automobiles – what not. It is a universal constant. It is the only method to simplify, understand and comprehend a complex universe to discover its structure and impose some order over the otherwise chaotic world.

## 1.5    PROCESS OF CLASSIFICATION

Classification is a process of co-relation. It is a way of thinking – thinking systematically and purposefully. It is an aid to memory and reasoning power. Nothing can be identified without it. It means to define an entity is to classify it first. For example, a gun is a firearm; a chair is a piece of furniture, a car belongs to the class of vehicles, and so on.

All thought and reasoning contains some process of classification.

English philosopher J.S Mill (1806-1873) says that classification facilitates the operation of the mind in clearly conceiving and retaining in the memory the nature of the entity or phenomena.

Someone has aptly and axiomatically defined empirical science as "a systematic classification of experiences". Therefore classification is training of the mind. It is often said that to learn to classify is itself an education. "Sharpness in thinking, clarity in expression, exactness in communication depend ultimately on classification", says Ranganathan (*Prolegomena*, X B2).

A group is divided or a member is included into a group on the basis of some characteristic. A characteristic is an attribute, quality or property of an entity which relates it with, or separates it from a group. For example, a group of people may be divided into males and females. Here "gender" is the characteristic of division. All the students of a university may be divided into under-graduate, postgraduate and research degree students. Here level of education is the characteristic. Books in a library may be arranged on the basis of their subject content. Thus a characteristic is the basis of division. Successive application of right and relevant characteristics produces deeper and finer classification.

## 1.5.1    Genus-Species Relation

A class or group is logically called a genus, and the characteristic is the difference we add to produce species:

Genus + Difference = Species

Eg., Tables + Material = Glass tables, Wooden tables, Plastic tables, Metal tables, etc. Here material is the characteristic to divide the universe of tables.

Here table is genus, material is the difference, and glass tables, wooden tables, etc. are species of table. Ancient philosophers applied dichotomous method to divide the universe into two groups at every step. Greek philosopher Porphyry (232-304 AD) used this method and the resulting groups and subgroups are known as tree of porphyry. This method, however is artificial, as every phenomena is not dichotomous in the universe: there are many shades between white and black. Modern method is to divide by genus – species, or by whole-part methods.

**Division by Dichotomy**
**Universe of Entities**

Concrete           Abstract

Inorganic       Organic

Living       Non-Living

Plants       Animals

Vertebrates       Invertebrates

Humans       Animals

Males       Females

Children       Adults

Young       Old
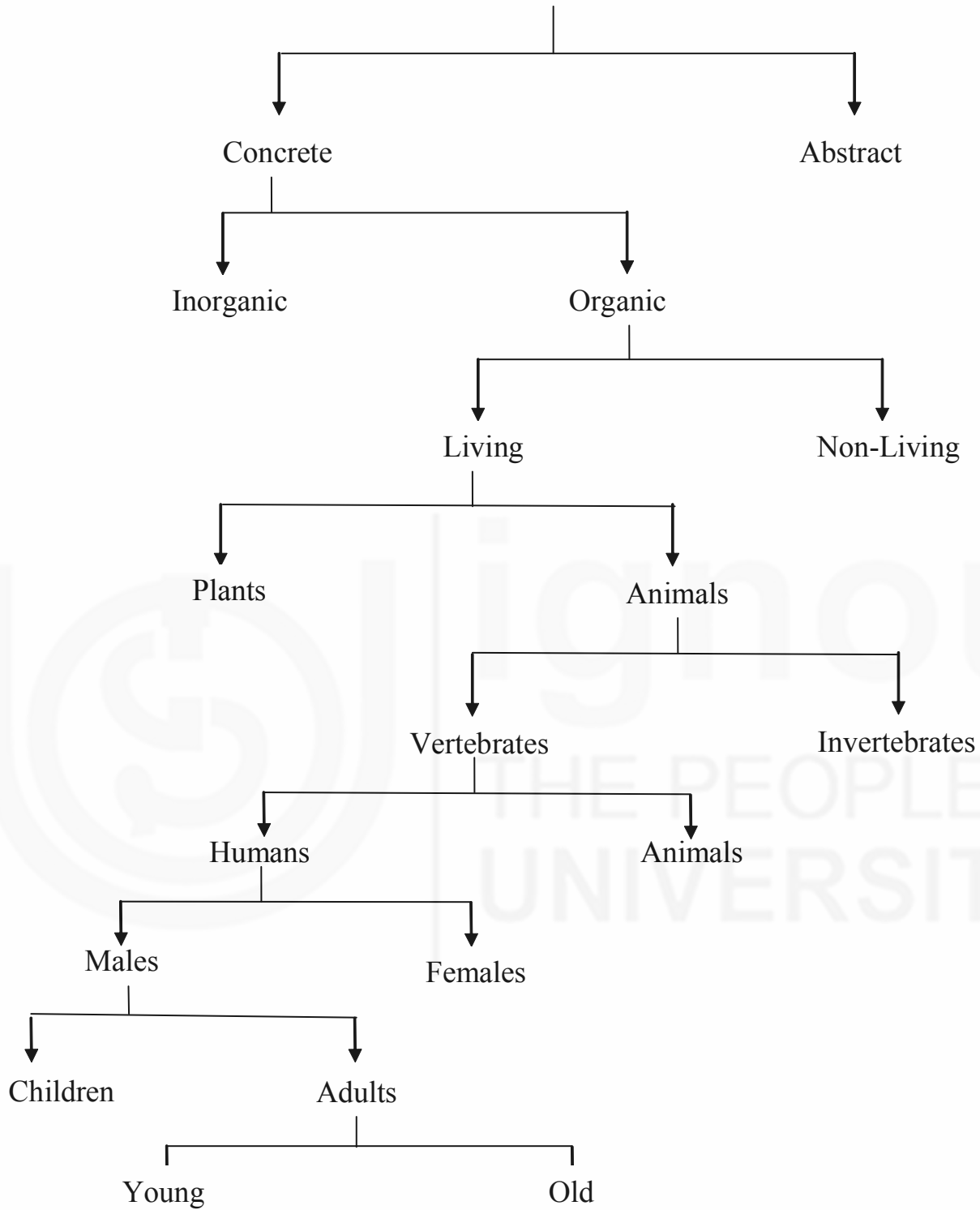
Let us apply genus-species to literature by applying characterstics:

Literature

By Language

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                    English    French    German    Spanish    Others
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By form

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                    Poetry    Drama    Fiction    Essays    Others
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By species

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            Lyrical      Ballads      Epic      Others
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By period

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            Ancient      Medieval      Modern
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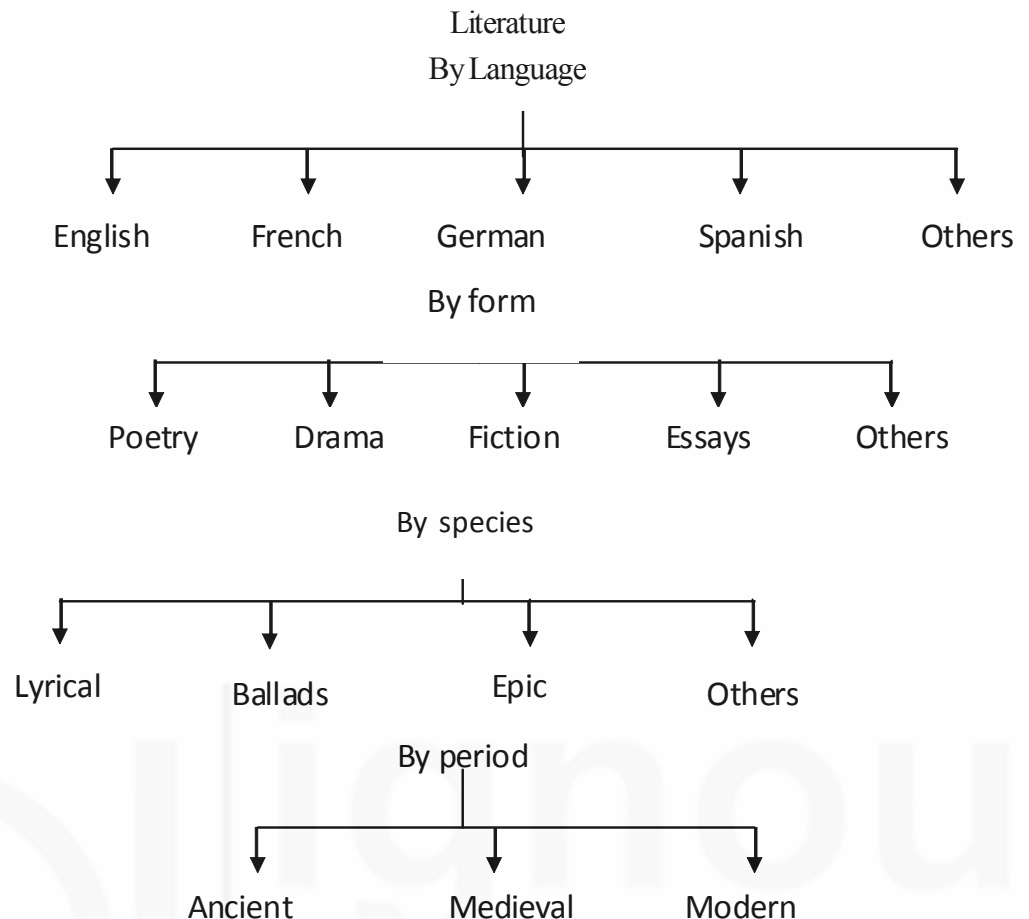
We proceed from broader to narrower classes by applying respectively the characteristics of language, form, species, and period. Nature, quality and mode of application of these characteristics is very important. (You will read more about the characteristics in Unit 3A: Postulation Approach to Classification.)

To classify an entity we must have some knowledge of it. A guitar cannot be classified unless we know it is a stringed musical instrument. To classify cricket (game) we must know it is an out-door game played with a bat and ball.

**Self Check Exercise**

**Note:** i)    Write your answer in the space given below.

ii)    Check your answer with the answer given at the end of this Unit.

1)    Explain the scope and methods of classification.

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## 1.6    NATURE OF CLASSIFICATION

Logically speaking classificatory groups are not absolute; classifications are relative as something is classified with reference to others. An entity cannot be classified or ranked in itself. It takes two to create a classification. It means a unique entity cannot be classified. It is a class of its own. No classification is absolute also means that classifications are not permanent. Classifications are not real even. No classification exists in nature. All

classifications are man-made, and made for a purpose. No classification is good or bad; these are helpful or unhelpful to a varying degree. It all depends upon the purpose of classification. A classification which serves its purpose well is best, whether logical or not. Logic of classification depends upon the characteristic chosen and the order in which these are applied. A large group of persons could be divided by age, gender, religion, race, nationality, mother tongue or colour of skin, hair or eyes, and many more characteristics. Each time it will result in different grouping. Choice of characteristics and the order in which these are applied one after the other will depend upon the purpose of classification. For example, a farmer would place birds, rats, insects and monkeys in one group as enemies of his crop. A scientist may laugh at such a classification. Both are correct, as their purpose is different. A farmer produces food while a scientist produces knowledge. A child or layman thinks that birds, butterflies and bats belong to the same class as all these can fly, while for a scientist all the three belong to different classes, each of its own. Different classifications produce different maps or depict different structure of knowledge depending upon the society and time of its origin. Classifications are not neutral. These are mirrors that reflect their time, place and society. Vedic classification is different from the one produce by Aristotle. Classification of knowledge by English philosopher Francis Bacon (1561-1626) is quite different of the two. No two classifications are similar.

## 1.6.1 Classification as a Tool

According to Aristotle (384-322 BC) classification is theoretical, practical and productive science. As the saying goes theory is the most applied knowledge, we can arguably say that classifications are always practical and designed for some purpose. As already said, classification is a tool for simplification, understanding and organisation. Without organisation nothing works. All the uses of classification may be summed up as: management; aesthetics and knowledge creation.

Organisation is for better management. Classification organises anything and everything: life to a shoe store; knowledge to libraries. A library, archive, postman, grocery shop all use classification to save time. It ultimately leads to economy of time, money and manpower.

Aesthetics is the science of beauty. An arranged store appeals visually to the visitors. Classification was also described as pairing and matching. So a housewife matching the colour of her room curtains with other items in the room is essentially doing an act of classification. A gentleman matching the colour of his tie with the suit he is wearing is an act of classification, too. Here the purpose is purely aesthetic to feel good and look good.

Philosophers, scientists and researchers classify to study and understand the growth and structure of knowledge. It is to outline and map the vast sea of knowledge. Without this map it will not be possible to navigate and further explore this boundless sea. A formal researcher has to select, tabulate and co-relate data to create new information. All the three stages are acts of classification. Hence classification underlies research also.

Classification is pattern making and pattern recognition. Computer retrieves information by patterns recognition and comparison, hence works by classifying; so does our brain which always works by association, grouping (integration) and pattern recognition.

Selecting a life partner for marriage involves a series of classification acts. Marriage is selection and pairing – both are manifestation of classification. Characteristic selected for marriage are: age, religion, caste, physique, looks, job, financial status, values and attitudes, educational qualification, and many more. In which order you apply these

characteristics depends upon your need and values. Marriage is selection, and every selection is classification.

## 1.7    KNOWLEDGE CLASSIFICATION

As said earlier, classification can be of any object, phenomena, concept or acts. Classification and categorisation of knowledge *per se* is called knowledge classification. From time to time philosophers, scientists, educationists and the likes have formally categorised entire known knowledge to outline its boundaries and show the structure of knowledge. For example, Hindu Vedas (1500 BC) divided knowledge into four categories in the order: Dharam, Arth, Kam, and Moksh. Aristotle (3$^{rd}$ century BC) divided knowledge into three parts: theoretical, practical and productive, and further divided entire knowledge into ten categories. A propedia is classification of knowledge and vice-versa. Knowledge is defined as sum total of ideas, theories, experiences, history, feelings, values, sciences, symbols, arts, facts, fiction, myths conserved by a society. Classification of knowledge is essential for its simplification, understanding and progress. Without its organisation no further growth and progress can be made. For example, a new idea or a discovered fact will not become knowledge until it is related and integrated with the existing knowledge. Therefore, it has aptly been said that all knowledge is classification.

## 1.8    LIBRARY CLASSIFICATION

Libraries are established to house and preserve books and other documentary heritage of mankind. Books and other information sources are knowledge objects and can also be classified like other physical objects. Since antiquity librarians have classified books to produce convenient groupings and to facilitate their location at the time of need. An unarranged collection is a heap of books, not a library by definition. To find a book from such a library will be like locating a needle from a huge heap of hay. In earlier times books were grouped and arranged on the basis of their language, size, colour of binding, authorship or broad subject categories. Those methods were perfectly useful in those times as the main aim of libraries was to store and preserve documents rather them to serve them to the scholars. Access to knowledge was the preserve of the privileged few.

### 1.8.1   Modern Library Classification

In the then emerging industrial society of the late nineteenth century there was an attitudinal shift in the values of education and libraries. Importance of literacy was recognised for aware and responsible citizens. In a democracy access to education was democratised and opened to all. "Education for all" became the objective of the welfare state. To meet the needs of the society not only many new libraries were established by law, the doors of libraries were open to all and sundry — scholars, students, neo-literatures, poor, children, housewives, old and challenged, and other marginalised sections of the society without any discrimination. Further to maximise their use books were placed in free stacks and users were allowed open and direct access to the books. That open access policy required new and better arrangement of books for the browsers. Then Melvil Dewey (1851-1931) designed his Decimal Classification which divided knowledge by academic disciplines of study and used decimal notation to denote subjects. Latter provided almost infinite capacity for expansion and insertion of new subjects at proper places. Since then the books are being classified predominantly on the basis of their subject content that is knowledge. Thus library classification is knowledge classification as applied in libraries. In other words library classification is applied knowledge classification. But library classification is lot more than knowledge

classification as it has also to take into account the physical aspects of the documents, the way knowledge has been formatted and presented in them, as well as the viewpoint of the author. It includes aspects such as language, media, form, format, viewpoint and many more such things. Formally and traditionally, library classification has been defined as the arrangement of books and other reading material in a way that is helpful to the users. Today's libraries are arranged by subject though different types of collections are arranged in different ways. For example, government documents, patents or standards are arranged by their own official codes. Current periodicals are arranged alphabetically by title. Maps, CDs, pamphlets, photographs indeed require different and separate arrangements. Making of library classification systems is also classification. Designer of a classification scheme is known as a classificationist. Operating a classification system to assign class numbers to documents in a library is also classification; such a person is called a classifier.

## 1.8.2 Uses of Classification in a Library

Classification is vital to library services. In fact classification is implied in definition of a service library. In supports all library services. Classification is to a library as skeleton is to human body on which all the body organs rest. Classification of a library collection is like map of a city. In a library, classification serves all the functions given above, namely it is a tool of management, aesthetics and knowledge creation. All the Five Laws of Library Science (1931, 1957) formulated by Ranganathan support library classification and have specific implications to design quality classification systems. Without classification a library is an unorganised dump of books. Therefore, without it the full value of a library collection cannot be obtained. However, its specific uses can be broadly listed as:

● It brings together books on the same subject. Thus a user gets all the books at one place which is much more convenient to the users.

● It facilitates the browsing function of a library. Browsing is to look at library collections without any specific purpose – a sort of window shopping. Browsing is a habit with the scholars. It is only possible fruitfully in a library organised by subjects. Browsing always leads to incidental discovery of long needed and valuable information. This accidental discovery is known as serendipity. Not only this, the general to specific order of arrangement with some notational maneouvering has been turned into pedagogical order in schemes like the CC. Ranganathan calls it APUPA pattern on the shelves. It is quite helpful for the self-learners. Thus systematic arrangement of books in open access libraries is helpful in self learning.

● It is a location tool; without it the library catalogue will not be able to function properly. It is also used for preparing shelf lists.

● Classification is the basis of all information retrieval systems and methods both in manual and electronic systems.

● It helps to replace the books at their correct places when the books are returned to the stacks after the home use or use within the library.

● It has been claimed that a library classification has three functions, namely, cognitive, information retrieval and shelf arrangement. Cognitive function is to represent the structure of knowledge and intra-relation of subjects. That is to produce a map of knowledge. Many library classifications, e.g., Ranganathan's CC, Bliss BC and BSO have emphasised this function.

● Many bibliographies, catalogues etc. are classified for better use. UDC was created to arrange entries in a universal bibliography.

- It has been found useful in reference service for facet-analysis of users' questions in reference interviews. It is useful for arrangement of circulation record.

- It helps in building a balanced collection of documents in a library.

*Uses in Electronic Environment*

Classification can be easily used to arrange and retrieve records in electronic databases. Online Public Access Catalogues (OPACs) function far better when class numbers are provided as another access point. In fact, in the electronic information era it has found so many new uses that it is rightly said that we are witnessing the second golden age of classification. Conventional classification systems such as the DDC, UDC, LCC have been used to organise and search information on the world wide web (WWW) . Search engines like Yahoo, Google, AltaVista use broad classification methods for organising their information. Eccellio (http://science.eccellio.com) is a search engine which uses faceted classification to return precise information. It uses Google database but adds an extra level of classification to refine search. They have defined it as Google[++]. In the web environment at least seven functions have been identified by Professor Lois Mai Chan. These are location, browsing, hierarchical searching, retrieval, identification, sub-grouping (partitioning) and profiling. It has aptly been called mathematics of librarianship.

There are many day to day routine uses of classification in a library so much so that it will be impossible for a library to function properly and achieve its objectives without a sound classification. It has aptly been said that a book is the foundation of a library but classification is foundation of librarianship. Indeed there is no escape from, nor any substitute to it in libraries, or life.

**Self Check Exercise**

**Note:** i)    Write your answer in the space given below.

ii)    Check your answer with the answer given at the end of this Unit.

2)    State the uses of classification in a library.

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## 1.9    LIMITATIONS OF CLASSIFICATION

Classification was described as mathematics of librarianship, yet like the value of $x$(pi) it is never exact. Classifications are social, not natural. These do not satisfy the needs of all the library users. Only majority are served while some users with specialised needs require different arrangement. Classification, especially library classification has many limitations and problems. It is a costly process and subjective, too. Two classifiers may differ widely on the correct classification of a given book. Not only this, a classifier may class a given book differently at different times. No classification can comprehensively represent the total subjects dealt in a book. Even a monograph may deal with more than one subject at a time. In classification only the dominant subject is represented. A textbook on algebra and geometry is either placed at algebra, or geometry, not both. Further, let us say a textbook in cataloguing may have a very valuable chapter on history of cataloguing or on the life of C A Cutter. These side topics will not be represented by the class number, and may remain hidden from needy users. Classification by discipline also scatters subjects. For example, a book on "Family life" may be placed in different main classes such as Ethics, Sociology, Anthropology, Social Welfare, and

Medicine. Hence it also results into scattering. It is not incorrect to say that classification suppresses and scatters more than it reveals and collocates. A classification may not satisfy all the users as they have invidual needs. Classifications are not based on the survey of the needs of library users. A nineteenth century English philosopher W.S. Jevons (1835-1882) had criticised classification as a logical absurdity. This is no less true of library classification of which there is no substitute. We have to work with imperfect tools.

## 1.10  SUMMARY

Classification is a universal constant. It is an activity that goes on every moment of life. It is no exaggeration to say that we live by classifying. Broadly speaking, classification is the process of making classes or set of entities on the basis of their similarities. Grouping also implies separating as selection also implies de-selection or rejection. The criterion or basis of grouping is called a characteristic. Quality of final classifications will depend upon the right choice of characteristics and the right order of their successive application to produce subsequent sub-grouping. Ultimately classification is co-relation between two entities. It has numerous manifestations like sorting, grouping, ordering, arranging, ranking, structuring, coordinating, matching, mapping and pattern making. Classification can be made of all entities under the sun. Philosophers, scientists, librarians, shopkeepers, postmen, housewives all do classification for different purposes. The four broader uses of classification are organisation, economy, aesthetics and productivity. Many philosophers right from Aristotle have done classification of the entire universe of knowledge. Scientists have produced taxonomies of plants, animals and chemical substances. In libraries we apply knowledge classification to organise our books, databases and other reading material both in print and electronic form. In fact in computerised databases and network information searches classification has found new but powerful uses. Classification is so much the basis of all library services that it has been described as foundation study of librarianship. Yet classification has its own limitations.

## 1.11  ANSWERS TO SELF CHECK EXERCISES

1)   Classification is universal. It applies to daily life routines and work. It is method of organisation, and can organise any object, phenomena and entity. It is a logical process of grouping and division. Ultimately it is to co-relate one entity with another. Grouping or division is done on the basis of characteristics i.e. dividing genus into species by adding a difference. Human beings can be divided into males and females by adding the characteristic/difference of gender to the genus of human beings.

2)   Classification is basic to a library. A collection of books which is not classified cannot be called a library.  It brings at one place all the books on a given narrow topic which helps in easy location and browsing. It arranges books in a pedagogical order which is useful for self learners. It also arranges records in catalogues and bibliographies. It helps in building a balanced collection. Its methods are useful in reference service. It can be very useful in searching electronic data basis and web. It is rightly said that it is the foundation of librarianship.

## 1.12    KEYWORDS

**Characteristic**                         :   It is basis or criterion of division or grouping. If a group is divided into Hindus, Muslims, Christians, Sikhs then religion is the characteristic. Quality

of the characteristic will determine the quality and aptness of classification.

| | | |
|---|---|---|
| **Class** | : | A set of entities having at least one characteristic in common. |
| **Classifier** | : | A person who classifies books in a library by operating a classification system. |
| **Classificationist** | : | A person who designs a classification system. |
| **Classification** | : | It is a process of grouping entities on the basis of likeness or some underlying relation. Ultimately, classification is organisation and co-relation. It is grouping, selecting, sorting, ordering, tabulating, ranking, mapping, preparing classification schedules and operating classification systems. |
| **Knowledge Classification** | : | The process of outlining, structuring and mapping the entire knowledge or some part of it. It helps to study the nature and growth of knowledge. It is also the basis of modern library classification. |
| **Genus and Species** | : | Genus is any original universe to be divided into species by adding some characteristic to the genus. These are relative terms. A father is a genus for the children; when children become father/mother they will be genus for their own children. |
| **Library Classification** | : | Arrangement of books and other reading material of a library in a way useful to the users. It is knowledge classification as applied to books and other packages of information. |
| **Porphyry Tree** | : | Dichotomous method of classification invented by the Greek philosopher Porphyry (232-304AD). It divides the universe into two antithetical groups at every step of division. |

## 1.13   REFERENCES AND FURTHER READING

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# UNIT 2    TYPES OF CLASSIFICATION

**Structure**

## 2.0    OBJECTIVES

After reading this Unit, you will be able to discuss different types of classifications by:

- history, i.e. fixed and relative location systems;

- methodology, i.e. enumerative and faceted Systems;

- areas of application, i.e. general and special systems;

- depth of details, i.e. broader and depth classifications;

- media, i.e. print and electronic versions; and

- environment, i.e. classifications for the web and ontologies.

## 2.1    INTRODUCTION

Classification of documents and other reading materials is indispensable for any library. Various standard and local methods for arranging library materials, ranging from clay tablets, papyrus rolls, monographs and other print documents, audio-video material,

CDs, multimedia and now web sources, have been employed from time to time by librarians to organise their collections. Their classification has varied from home-made or *ad hoc* systems to somewhat adapted from some universal knowledge classification systems. Since the late nineteenth century librarians have developed many standard classification systems pioneered by the Dewey Decimal Classification in 1876.

## 2.2    FIXED AND RELATIVE LOCATION SYSTEMS

### 2.2.1   Fixed Location Systems

These systems of Pre-Dewey era assigned a fixed place to a book on the shelves. The "call number" indicated the shelf ground on which the book was stacked. For example, a call number, say, 2.4.6.25 meant that it was the $25^{th}$ book on the $6^{th}$ shelf of $4^{th}$ almirah in the $2^{nd}$ room of the library. Thus a book could be located even by a blind person. Its advantage was saving of shelf space, as such systems require vacant place only at the end of the shelf or almirah. (Present day systems called Relative Location systems require space for intercalation of new books at every point on the shelves.) In fixed location, maintenance of subject grouping was difficult. New books could be accommodated at the end of the shelf. Whenever the books had to be shifted to another place their call number had also to be changed frequently. That involved lot of labour and wastage of time and money. Melvil Dewey (1876-1931) while working in the library of Amherent College (Massachusetts) could not tolerate this wasteful task of reclassification, too often. He invented a relative classification system to solve this problem. His question was : "How to give permanent call numbers to books in a library?"

### 2.2.2   Relative Location Systems

In relative systems class number refers to the intrinsic subject of the book rather than the shelf place. Decimal notation used by Melvil Dewey provided a neat technique for dividing knowledge and by denoting each division and subdivision by decimal fraction numbers. Call number indicated the subject rather than any fixed places on the shelves. It was a master stroke which brought a paradigm shift in library classification. The new books could be accommodated at their proper places without disturbing the relative location of the existing books. In the new method, the shelf location of books changes with addition of more books. Books on the shelves keep shifting to the right side, but their relative location of the document remains the same: on its right and left it will always have the same subject as its neighbours.  Its great advantage was maintenance of strict and finely divided subject collocations. For example, a new book on geometry could be placed with earlier books on geometry without any problem. Not only this, Geometry could be further divided into Euclidean Geometry, Plane Geometry, Solid Geometry, Trigonometry, etc. Earlier a new book could only be placed at the end of the almirah containing books on mathematics. Fixed location systems are now a dead history as now all library classification systems are relative location systems.

## 2.3    BY DESIGN METHODOLOGY

### 2.3.1   Enumerative Systems

A classification is a map of knowledge which lists every subject and its subdivisions in a top-down approach. Each subdivision is given a notational mark to denote it. Known as class number, this notation, or a cluster of digits, is assigned to a document having that topic as its specific subject. These are also known as 'mark and park' systems. Enumerative classifications are pre-defined and frozen lists of subjects of the past, present and of near future. These only provide readymade pigeon holes for documents

rather than finally individualising them according to their subjects and their various documentary aspects. Most of the time these prove square holes for round pegs. These are now considered rather old fashioned classification systems.

## 2.3.2 Faceted Systems

An enumerative system produces systematic but linear lists of subjects. Knowledge is multi-dimensional and growing dynamically. An enumerative classification can represent only one aspect of the specific subject at a time. Many aspects have to be left out. For example, in the earlier editions of the DDC a simple subject like "Anatomy of Dogs" could either be classified as "Zoology of Dogs" or "Anatomy of Animals". Both aspects could not be taken together. Thus such systems fail to classify co-extensively the present day knowledge, not to speak of the subjects to emerge later. By the beginning of the 20th century these enumerative models were not very effective, yet no other model was available, though the UDC (1895+) had made some improvements in the DDC to denote some more auxiliary aspects of a document.

S.R. Ranganathan (1892-1972) after a long study and experimentation in late 1920s developed a different method to classify multidimensional knowledge thrown by the 20th century industrial society. These are now known as faceted systems. A facet is any of the many sides of a cut diamond. Ranganathan used this term in classification to designate different aspects of a specific subject. Instead of making a long list of subjects in some systematic order he divided a subject horizontally into various categories and then vertically into different subdivisions known as facets and isolates respectively. For example, the subject of library science could be divided into 'Kind of Library' Facet, 'Kind of Document' Facet, 'Kind of Operation' Facet, and 'Kind of Service' Facet. The kind of service facet could be detailed as circulation services, reference services, current awareness services, reprographic services, and so on. Space and time facets are kept as common facets applicable to all classes of subjects. Later Ranganathan developed a theory of "Five and only Five Fundamental categories." These categories are Personality, Matter, Energy, Space and Time. His postulate is that any subject comprises of some or all of these categories. A subject is always made of any of these categories. Nothing is beyond them. These facets are converted into digits and then combined in some postulated order to produce unique class numbers to suit specific subject of the document. Thus a class number can be tailored to exactly fit the document instead of assigning a class number to a book from the long list of readymade class numbers as in an enumerative classification. From a small list of facets numerous class numbers can be produced by their combinations and permutations. It started a new revolution in library classification.

This faceted system was later refined and developed into a very dynamic and effective model based on postulates and principles for which Ranganathan developed a theory in his famous book *Prolegomena to Library Classification*, (Madras Library Association, 1937). Its advanced version is called Analytico-synthetic classification. Such classifications have proved useful for the growing universe of knowledge, for information retrieval, and later have proved basis of designing all indexing languages. These are equally efficient at the traditional role of shelf arrangement. Indeed these have become popular methods of modern knowledge organisation. All the new library classification systems are faceted, while old systems like the Dewey Decimal Classification, or the Bibliography Classification (BC) and UDC are getting faceted through revision.

## 2.3.3 Synthesis Grafted on an Enumerative Base

It is a mix of the two systems. These basically enumerative systems have later developed

some special tables of documentary aspects to be combined with the base number. First such example is of the Universal Decimal Classification (UDC) which started simply as enhancement of the DDC in 1895. To the DDC base a multiplicity of auxiliary subdivisions were added to make a class number multifaceted. As survival approach, some additional internal tables are devised and many more provisions of number synthesis have been invented to make them more hospitable and faceted to combat the dynamically growing knowledge. The DDC in its 18th edition (1971) introduced five more tables and made many more provisions for number synthesis through instructions and special tables here and there. Being added quite late such a structure is not regular or uniform. It is an add-on provision which has its own problems.

## 2.4 KNOWLEDGE CLASSIFICATION AND LIBRARY CLASSIFICATION

Classification is a process, a logical visual method of simplification and understanding. No phenomena or object can be understood without classifying it. It organises all sorts of entities and depicts their due place in the universe. Classification can be both of abstract and concrete entities; of ideas and things. It is essentially a life process of learning, doing and living successfully. Human civilisation progressed as primitive humans learnt to classify the visible phenomena around. Let us say man learnt of edible and non-edible things; divided animals into useful and harmful groups. It was another (more sophisticated) act of classification when man related clouds with rain, and rain with growth of vegetation and life; and related certain herbs with certain diseases. All that became knowledge by and by. It has rightly been said that all knowledge is classification. Knowledge is defined as sum total of facts, beliefs, experience, memories, expressed feelings, arts, sciences, fiction and myths conserved by the society. Thinkers in all ages have tried to categories knowledge to understand its nature, categories, boundaries and growth. That became knowledge classification. Knowledge classification is outlining and mapping to depict its structure and boundaries. It leads to better understanding of its history, nature, kinds, properties, growth and also gaps in it. It becomes guide for the educationists, scientists and librarians. Knowledge classification is both speculative and empirical, and is a province of philosophers and scholars. One example of knowledge classification is Vedic categories (1500 BC) of knowledge in Dharma, Artha, Kam and Moksh.

Library classification is book or document classification. Documents are nothing but carriers of knowledge and information. In modern libraries documents are classified on the basis of their knowledge contents. Therefore, knowledge classifications have become basis of library classifications. But knowledge is abstract and fluid and takes the shape of its container and carrier. Books on the other hand are physical and solid entities to be arranged on shelves. Documented knowledge has some non-subject aspects such as language, viewpoint of the author, format, media, etc. All these have to be accounted for in a library classification. Library classifications are in fact more detailed, have notations/symbols to be assigned to documents, separate common tables for physical aspects, and have also a detailed index of subjects. Therefore library classifications are more formal and complex than the knowledge classification on which these are based.

**Self Check Exercise**

**Note:**  i)  Write your answer in the space given below.

ii)  Check your answer with the answer given at the end of this Unit.

1)  Make a comparative study of the features of faceted and enumerative systems of classification.

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## 2.5    WEB CLASSIFICATION: ONTOLOGIES

Ontology is a powerful classification tool for the semantic web which describes and represents an area of knowledge. It specifies description for classes, relationships that exists among entities and properties that entities have. Ontology characterises well defined concepts, their taxonomy and many sided relationships. It is a hierarchical collection of concepts arranged in categories combined with multidimensional relations in order to reflect vocabulary of that area of knowledge. It is a web of connections. An ontology which is used for knowledge organisation and retrieval in an electronic environment has the power of traditional hierarchical classifications, subject headings lists and thesauri. It combines elements of all the three. Ontologies are sources of controlled and standardised terms which help to organise information in a more precise and multidimensional ways. They yield better search results by using new search techniques and natural language processing. Some examples:

Biogen Idec: Using semantics in drug discovery research

www.bio-itworld.com/issues/2006/oct/biogen-idec.

MINDSWAP: Using ontologies to aid terrorism intelligence gathering

http://mindswap.org/papers/Terrorntology.final.pdf.

## 2.6    BY AREAS OF APPLICATIONS

Another division of library classifications can be by the subject area covered. There are general classification systems which cover the entire universe of knowledge; the other categories are special classifications covering a specified subject or limited area of knowledge. These by default are broader and depth classifications, respectively.

### 2.6.1   Special Classifications

A classification for specific area of knowledge, for example, Economics, even Banking, Occupational Safety, Diamond Technology, Women Studies, Indology, etc. are examples of special classification. Some examples of special classification schemes are:

Uniclass: Unified Classification for the Construction Industry (London: RIBA, 1997)

London Education Classification, University of London, 1974.

London Classification of Business Studies, (London Business School, 2000)

Thesaurus of Psychological Index Terms (Washington: American Psychological Association)

Special Classifications inevitably are depth classifications used for classifying and indexing micro literature in the form of journal articles, research reports, theses, etc. These are eminently useful for information retrieval in special libraries and information centers. Ranganthan calls it depth classification.

**Kinds of Special Systems**

Special classifications usually do not exist alone. Every special library has documents on its special area and also on related subjects. Evan a nuclear science library may have books on fiction, sociology, management, etc. A special classification such as classification of business studies may require another general classification for classifying documents in other areas such as political science, sociology, psychology, mathematics. For classifying in related and other areas usually a standard system is adopted. On the other hand a special classification may be a mere extension of certain class of a general classification system. For example, in India many local made detailed extensions exist of the DDC class numbers like 954 Indian History, 294 Indic Religions, 181.4 Indian Philosophy to adequately classify such subjects in Indian libraries.

### 2.6.2 Users' Interest Classification

The ultimate function of a lending library is to serve its users to their satisfaction. A classification is a tool to manage a library. By definition it is an arrangement of information material in a way useful to the majority of the users. In other words it is a rational sequence of maximum utility. Convenience of library users is a weighty consideration, if not the overriding one in a classification. It is always advised to put a book at the most useful place. Practical utility must govern all arrangements, feel many librarians and classifiers.

But this is a utopian thought, or an ivory tower theory. In fact this logical or systematic arrangement is forced on the library users. We have assumed without much research that shelf arrangement is useful, meets the needs of, and matches with the habits of the users. Certainly, it is based on the theory of one-size-fits-all. Here we are certainly living in our make - believe world that the inverted Baconian arrangement or its like are useful and logical.

In fact different user communicates and organisations need different arrangements transcending the traditional division by orthodox disciplines. A user oriented library classification need not be overly logical. The essence of reader interest arrangement is to classify material in a bold and utilitarian way which cuts across traditional groupings. The aim is to group library materials the ways which coincide with the user's thinking, interest, activity and needs. It is not a cognitive classification of a field of knowledge, but a contrived arrangement to serve local needs. A group of housewives may prefer all reading and information material on domestic chores such as child rearing, cookery, home-remedies, laundry work, interior decoration, pet care and personal body care arranged together, close by. In a junior college the students of commerce may need at one place books and other documents on elementary economics, accountancy, office management and mercantile law. In such situations the librarian may well adopt a shelf arrangement influenced by curriculum than by logic. It is called utilitarian arrangement and is not any negation of classification.

For this, we can have a broken order. If using the DDC we can place 400 languages together with 800 Literature. Similarly 320 Political science may be followed by 350 Public Administration. We may use some artificial digit in the call numbers to show this contrived proximity. Some libraries adapt their classification in such ways. If supported by adequate shelf guides it has high potential of satisfying users' needs. Arthur Maltby is of the opinion that the user interest arrangement needs more attention and research. It may provide a real step forward a in shelf arrangement which is waiting for an innovation for long.

### 2.6.3 General Classifications

A classification of the entire universe of knowledge is known as general classification. These are also known as universal classifications. Dewey Decimal classification (DDC), Universal Decimal Classification (UDC) Colon Classification (CC) and Library of Congress Classification (LCC) are some outstanding examples of this category.

**By Levels of Details**

Universal classifications are further of two kinds known as full and abridged editions, depending upon their level of details and use in a kind of library.

**Full and Abridged Editions**

These are the standard editions having full details and generally aim at large general libraries, say a university library, or large public library. Historically speaking till 1980s the UDC was available in three versions of details, namely, Full, Medium and Abridged editions having about 2,30,000, 70,000 (70% of the full), and 20,000 (10%) entries respectively. Abridged edition was meant for small libraries whereas Medium edition was adequate for general libraries. Full edition was available in many small fascicules which were meant for highly special libraries. At present UDC has two official versions: the Standard version of 70,000 entries and the Pocket/Abridged edition meant for teaching and shelf arrangement of small collection in libraries. Similarly, the DDC is also available in full version of four volumes and one volume abridgement. The latter is now in 15th edition (2012). The Abridged Dewey Decimal Classification is useful for a small library of about 20,000 titles. This simplified edition is a good model of a broader classification. It is quite popular in small public and school libraries. This trend of varied versions goes back to the Expansive Classification (1893) by C.A. Cutter (1837-1903) who planned to design his system in a series of seven schedules of successive increasing details. The first version was suitable for, say village libraries, the final version was meant for large libraries of the magnitude of national libraries having huge collection in all areas of knowledge. Abridged versions being comparatively inexpensive are also popular in developing countries. Abridged DDC is also very useful for teaching. It may also be used in conjunction with some special classification to cover remaining general areas of knowledge.

## 2.7 BY FORM OF LITERATURE

Apart from subject specialisation, special forms of documents such as, official reports, patents, standards, maps, CDs and videos are arranged by different methods. Some official documents such as reports, patents and standards bear some special code number. These are arranged by that official number. Pamphlets are usually arranged by title. Popular fiction is mostly arranged alphabetically by author. There is also what is called user oriented system. These are local even *ad hoc* arrangements to place together all books at one place likely to be required by a single group of users. J. Mills has listed the following sections or form of documents which may require a different type of arrangement in a library:

1)   Age and grade of the reader.

2)   Books for short loan or those for reference.

3)   Current and reserve stock.

4)   Size of documents.

5) Other physical considerations, i.e. films, cassettes, CDs , etc.

6) Factual and imaginative literature.

7) Language of the documents.

8) Documents of temporary significance.

9) Value of documents, like manuscripts, rare materials, special editions, etc.

10) Form of presentation, like bound periodicals etc.

11) Date of printing, incunabula.

12) Documents for abnormal readers, such as the blind.

## 2.8 PRINT AND ELECTRONIC VERSIONS

Traditional classifications are not only being used for classifying electronic and web documents, the IT itself has been used as a tool and medium for designing and publishing classification systems. As a result many classification systems are now available in electronic form. The 21st edition (1996) of the DDC available on a CD was known as Dewey for Windows (DfW) which has many more useful features over and above the print version. The electronic and much enhanced version of the DDC-23 (2011) known as Web Dewey 2.0 is now available only through "OCLC Connexion" on the Internet to the licensed users. Abridged Web Dewey is also available in the same way. Electronic versions are updated monthly. Electronic version of the Library of Congress Classification is available on the www as Classification Web (www.loc.gov/cds/classesweb). The website includes both the LCC number and LC subject headings with links between many of the class numbers and their LCSH equivalent. It also displays co-relations among LCC, LCSH and WebDewey. On the extreme, Broad System of Ordering (BSO, rev. ed. 1991) is now available only as machine readable form on disk and on the web at (www.classbso.demon.co.uk). All these electronic versions are easy to use, versatile with many more features including expert systems for number building, and are easily updated. Unlike the print or CD versions web versions cannot be pirated or duplicated.

**Self Check Exercise**

**Note:** i) Write your answer in the space given below.

ii) Check your answer with the answer given at the end of this Unit.

2) Explain the special features of the electronic version of the DDC.

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## 2.9 SUMMARY

In the universe of classifications there are three types of them: Classification as such of any entity which also includes the process and methods of classification. It is applicable to all phenomena, objects and entities whether abstract or concrete. We can classify all living things, human beings, mammals, dogs, languages, chemicals, fruits, plants, everything and anything.

The second category is, taxonomies, that is classification of animals and plants to study their evolution and group them in families. It is essential for simplification, understanding and for living with sanity and success. As human beings we are classifying every moment unconsciously. Classified abstract knowledge becomes knowledge classification which is a field of philosophers, educationalists and scientists. These range from Indian Vedas (1500 BC), Greek philosophers (Aristotle, Plato, 300 BC), Muslim scholars of Medieval ages to Conrad Gesner, Francis Bacon, and August Comte.

Third category is of library classifications which are applications or adoption of knowledge classification to classify and arrange books and other reading materials in libraries. For individualised arrangement of documents and to display the internal and external features of the documents (media, viewpoint, form and language) a library classification has some additional features over the knowledge classification. Modern library classifications which originated in late 19th century can be divided into various categories and types. Since the beginning we have traditional enumerative systems which are long systematic lists of past and present subjects along with their class numbers. Also known as "mark and park" systems, these are bit old fashioned and out of favour of the librarians. Though easy to use indeed these are not effective to classify and index dynamically growing multi dimensional knowledge. These have given way to faceted systems which first divide knowledge into traditional main classes and then each main class into various categories, facets and other aspects of the subjects. These facets are combined to tailor the fitting class number for the specific subject of the book. There is nothing readymade. Some advanced faceted systems also termed as analytico-synthetic classifications are quite useful for depth classification and indexing for information retrieval. S R Ranganathan is the father of faceted systems which have been much improved by his disciples and the Classification Research Group, London. By all account faceted system are basis of all information retrieval and have a bright future in knowledge organisation. But to organise and retrieve information on the semantic web we need ontologies which are hierarchical systems showing deep hidden and multiple relations. General classifications are available in various versions of details such as full, medium and abridged editions to suit large and small libraries. General classifications such as the DDC, CC, LCC meant for general libraries cover entire universe of knowledge, while there are numerous special subject classifications delving into much more details suitable for depth classification and information retrieval in a specified area of knowledge. These range from a narrow subject, say Indian History to a multidisciplinary subject like Indology or Women Studies. However, Library of Congress Classification, spread over to 41 volumes, and also being available as an outline with sufficient details, serves both as general and special classification. S R Ranganathan was of the opinion that a general classification like the CC can serve as both. He compared his system to a trunk of an elephant which can pick a heavy log of wood and a light leaf with equal ease. But broad and depth classifications are relative, even subjective, terms. For some even the full versions of UDC and LCC may prove broader, and such libraries may resort to special or super special depth versions to serve their needs. These classification systems are available both in print and electronic versions, latter are now termed as vocabulary management systems. The electronic versions of DDC and LCC are much more enhanced, versatile, multi functional and remain always updated. For researching the semantic web ontologies have been developed which are classifications with myriads of deep links.

## 2.10 ANSWERS TO THE SELF CHECK EXERCISES

1) Enumerative classifications are old systems which provide readymade class

numbers. Their schedules are long and frozen. They usually fail to provide co-extensive class numbers for the subject of the document. They are also less hospitable to the new subjects. Faceted systems have slim schedules. Here subject of the document is first analysed into facets which are arranged in a citation order. Then a class number is constructed which fits the subject of the document. They provide solutions to the problems of enumerative systems. Faceted systems are also better for database design and retrieval in computerised databases.

2)   www.oclc.org/dewey

## 2.11   KEYWORDS

| | | |
|---|---|---|
| **Enumerative Classification** | : | These are long and systematic lists of subjects of past and present along with their class numbers. Also called as 'Mark and Park Systems', these create pigeon holes for the subjects to fill in which usually prove to be square pegs in round holes and vice-versa. |
| **Facet** | : | A group of entities obtained by applying a single characteristic, e.g., kind of libraries facet in library science. |
| **Faceted classification** | : | A system in which a main class is first divided into various facets and the facets are combined in a specified order to tailor a class number according to the specific subject of the document. |
| **Fixed location systems** | : | The pre-Dewey systems which only indicated shelf ground of a book just like the house number in a street and sector of a city. |
| **Knowledge classification** | : | Systematic outline of knowledge known at a time to study its growth and structure. It is knowledge mapping. |
| **Ontologies** | : | Hierarchical and multi-relational classifications for the semantic web. |
| **Special classification** | : | Depth classification for limited and narrow area of knowledge used for information retrieval and classifications of micro subjects like theses, journal articles, patents, research reports, etc. |
| **Taxonomy** | : | Scientific classification of animals and plants. |

## 2.12   REFERENCES AND FURTHER READING

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# UNIT 3   POSTULATIONAL APPROACH

**Structure**

## 3.0   OBJECTIVES

After reading this Unit, you will be able to:

- discuss the evolution of the theory of library classification;

- describe and differentiate the descriptive and dynamic theories of classification;

- understand the work of designing library classifications in the different planes; and

- explain the applications of canons in these planes of work.

# 3.1 INTRODUCTION: HISTORICAL PERSPECTIVES

Modern library classification started in the late nineteenth century. Initially, classification systems such as DDC, UDC and the LCC were developed without much theory to guide the technical work. Classification design was the field of a few geniuses who were guided mostly by their intuition and flair. W.C.B. Sayers (1881-1960), a respected teacher in the University College, London derived theory of classification in the form of canons in his famous books. Other two pioneering names are of E.W. Hulme (1859-1951) of UK and E.C. Richardson (1860-1939) of USA. Their work on the theory of classification was mostly descriptive of the existing schemes. It was a descriptive phase of the theory of library classification. Then came H.E. Bliss (1870-1955), *a par* excellence philosopher and designer of classification. He spent his life in designing his classification entitled *Bibliographic Classification* (1940-1953). But prior to that he delved deep and long into the theoretical foundations of library classification based on the empirical foundations of knowledge and its organisation in his two famous books:

- *Organizing of Knowledge and System of Sciences (1929)*

- *Organization of Knowledge and Subject Approach to Books in Libraries (1933, 2nd ed 1939).*

Bliss formulated many canons and principles of classification to guide the designing of classifications. But that was a phase of descriptive theory.

# 3.2 POSTULATIONAL APPROACH

Postulational approach means going about the work of classification making by a pre-mediated theory in the form of Laws, Canons, Principles and Postulates. When Ranganathan designed his Colon Classification between (1924, 1928-1933), ironically he did it without any formulated theory. Indeed he had learnt some canons of classification in the classification classes of his most revered teacher W.C.B Sayers. After the publication of his CC in 1933 Ranganathan started thinking about the theory behind it that lay in his unconscious mind while designing the CC. That theory was so comprehensive and objective that it became theory of classification in general. He formulated objective even mechanical methods to design a classification system. Apart from the Five (Normative) Laws, he formulated 55 Canons, 22 Principles, 13 Postulates and 10 Devices for synthesis of class numbers and for evaluation of classification systems. For this he divided the whole work into three planes of work, namely, Idea, Verbal plane and Notational plane. He neatly divided the work to be carried out in each plane. Ranganthan thus liberated classification design from the elusive flair and intuition, and raised it to the status of a science.

# 3.3 IDEA PLANE

Idea plane is a plane of foremost importance where core intellectual work is done. Mostly the work here pertains to the choice of the model, defining the subject, its scope and sources of terms and concepts. Core classificatory work is the choice of characteristics and order of their application to produce categories of concepts called facets and isolates.

Further, it is to arrange the isolates into arrays and chains. Ranganathan has given following five sets of canons for the work in the Idea Plane.

1) Canons of Characteristics

2)   Canons for Succession of characteristics.

3)   Canons for Formation of Arrays of Classes.

4)   Canons for Formulation of Chains of Classes

5)   Canons for Filiatory Sequence.

### 3.3.1   Canons of Characteristics

The terms are collected on small slips from the identified standard sources of the subject. This mass of terms is broken into smaller groups called facets of the subject by choosing suitable characteristics. A characteristic is an attribute to divide a group into smaller group. It is a sort of hammer. It is a basis of division. The choice of characteristics, amongst many attributes, of an entity is vital and momentous. The ultimate quality of the final classification will depend very much on the chosen characteristics. The three Canons of Characteristics are:

● Canon of Differentiation

● Canon of Ascertainability

● Canon of Permanence

The canon of differentiation means that the characteristics that we chose should be able to divide the group into at least two sub-groups. A group of entities cannot be further subdivided or differentiated on the basis of a characteristics common to all (Canon of Differentiation). For example, bicycles cannot be divided on the basis of number of wheels, as all of them have two wheels. But they can be differentiating into subgroups on the basis of kind of rider like gent's bicycles, ladies bicycles, and children bicycles. Further, the differentiated characteristics that we chose should not itself be unverifiable or uncertain (Canon of Ascertainability). For example, a group of living people cannot be divided on the basis of their previous birth, or the date of their death. Date of death of living persons is uncertain, so is our previous birth. But living people may be divided on the basis of gender or nationality or colour of their skin; all these are ascertainable characteristics. Further the chosen characteristics should be of permanent nature, not transitory or changing (Canon of Permanence). Chameleons cannot be grouped on the basis of their colour as it is changeable. Political parties hopper Ganga Charan Rajput cannot be classified on the basis of his party. People should not be classified on the basis of the colour of their clothes, as these can easily change. Canon of Relevance means the division should be relevant to the purpose of classification. For example, a class of foreign language learners should not be divided on the basis of skin colour or gender or body weight or height, as these have no relation with the language learning ability of a person. Similarly, a class of wrestlers or boxers can be divided by age or weight, but not on the basis of their religion, mother tongue or colour of skin.

There may be too many relevant characteristics. Their choice must be on the basis of being most helpful for the purpose of ultimate classification. This question is further linked to the users of classification and their needs. Ranganathan warns that it is not easy to determine the ultimate purpose of classification.

### 3.3.2   Canons for Succession of Characteristics

There may be many relevant and permanent characteristics for dividing a group. All may be needed to divide and subdivide a group. But the order in which these are applied one after the other is very important for the kind, quality and ultimate value of classification. Therefore, this set of canons is concerned with the sequence in which the various characteristics are applied. These are:

- Canon of Concomitance

- Canon of Relevant Succession

- Canon of Consistent Succession

Concomitant means happening at the same time. Therefore, this canon means that two characteristics applied to a class should not produce the same sub-classes. For example, (in 2009) a class can be divided into two groups by applying the characteristics of below 20 years and above 20 years of age. Then to apply the characteristics born in or before 1989, and born after 1989 will result in the same grouping. The 20 years of age or 1989 born are concomitant characteristics. Similarly, if the first characteristic is the bird, then we should not apply the characteristics of having feathers, as all birds have feathers, and it will again produce the same group of animals. It also means that the characteristics applied should be in order of broader to narrower – narrower to broader will not work. For example, a group of people can be divided on the basis of Brahmins and Non-Brahmins. There will be two groups. But to apply the characteristics of "Hindus" to Brahmins will make no further divisions as all Brahmins are Hindus. *Relevant succession* means that the sequence in which these characteristics are applied should be relevant to the purpose. To cite an example, literature has four relevant characteristics, namely, Language, Form, Period /Author, and Name of the literary work. These characteristics can be applied in different sequences:

- Literature – Language – Form – Author – Work

- Literature – Form – Language – Author – Work

- Literature – Period – Form – Language – Work

All of them are different classifications. The suitability of any order of citation will depend upon the purpose of classification. But which sequence should be chosen? It depends upon the need of library users. One sequence of facets may not be useful to all, as library users have individual needs. Scholars who are interested in one language literature may prefer the first order, while scholars who are interested in poetry irrespective of the language may prefer the second sequence, and the third will be useful to historians of literature. Similarly, in a library devoted to area studies the first division should be by area rather than the subject. Lastly, the Canon of Consistent Succession only advises that the order of application of characteristics once chosen should be followed consistently, until unless the purpose of classification itself changes.

As a result of successive applications of characteristics we obtain numerous individual concepts. These concepts have to be arranged in what is called Arrays and Chains.

## 3.4 CANONS FOR ARRAYS

An array is a long line of entities of equal rank arranged in some systematic order. For example, all the children of a father make an array. In the same vein, all the continents of earth make an array. States of India make an the array, and further all the district towns of a state make another array. Ranganathan has prescribed the following Canons for their formation:

- Canon of Exhaustiveness

- Canon of Exclusiveness

- Canon of Helpful Sequence

- Canon of Consistent Sequence

Exhaustiveness means, an array should be all inclusive of its eligible members. See the following array of men by colour:

- Whites
- Blacks
- Brown

This array is not exhaustive as it does not include other colours such as pale yellow, fair, wheatish. Hence while forming an array every member should be included, otherwise classification will not be comprehensive. On the other hand, Exclusiveness means that a entity should belong to one and only one array; in other words a member should not be included into two groups at the same time. For example, in classification of dogs either they should be kept under mammals or under pets, not under both, as it will result in what is called cross classification. But in computerised databases and OPACs cross classification is a boon as it provides an extra access points and increases the probability of retrieval.

Helpful sequence demands that entities should be arranged in some logical predictable and helpful order. For example, all the children of a father can be arranged by age. As another example, all the students of a class can be arranged by merit or alphabetically by name. There are numerous ways for the systematic and helpful arrangement of entities in an array. Lastly, consistent sequence means that if a set of entities occurs at different places then their arrangement should be the same everywhere. For example, the terms male, female and child occur in main classes Psychology, Education, and even Law. Their sequence should be the same in all these classes. As another example, names of countries occur in the main classes Geography and History. According to this canon the sequence of countries in the above main classes should be the same.

### 3.4.1  Principles of Helpful Sequence

As already said, 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 chose their sequence which is helpful to the majority of the users and also logical. Entities in an array may be arranged in a chronological or historical sequence. A group of boys and girls may be arranged by age; Kings of a country may be arranged according to their period of rule. Indian Prime ministers may be arranged in the order: Nehru, Shashtri, Indira Gandhi, Morarji Desai… Vajpayee, Manmohan Singh. Extending this analogy a bit, a queue waiting for a bus or before a booking window is also according to this order. It is an order which may be called "First come-first-served". Related principle is of "Later in Evolution." Some entities can be arranged as they have evolved: animals can be arranged from amoeba to mammals; plants are arranged from Thallophyta to Dicotyledons. Society can be arranged: Hunting society, Agriculture Society, Industrial Society, and Information society. Another Principle is of geographical proximity or Spatial Contiguity. If the entities exist in space their arrangement should be near to one another. We can arrange Indian states in the order: J & K, Punjab Himachal, Haryana, Delhi, UP, and so on. Planets in space may be arranged like: Mercury, Venus, Mars, Jupiter, and Pluto. Principle of Quantitative Measure means that if entities are associated with some quantity, then these may be arranged in the order of their increasing quantity. For example, Indian currency notes may be arranged in the order: one rupee, two rupee, five rupee, twenty rupee, fifty rupee, hundred rupee, five hundred rupee and one thousand rupee.

In Town Planning we can arrange like: Village Planning, Town Planning, City Planning, and Metropolitan Planning. Principle of Increasing Complexity means the entities may

be arranged in the order of their increasing complexity, e.g., Linguistic elements can be arranged as: syllable, word, phrase, clause, sentence, paragraph, and so on. Algebraic equations can be arranged as 1st order, 2nd order, 3rd order equations, etc. Further, entities can be arranged according to their popularity of use, e.g., we can arrange food seeds in the order: Rice, Wheat, and Rye. Further if there is any traditional sequence of entities then it may be followed as we traditionally say Radhe-Shaam, Sita-Ram, Algebra-Geometry and so on. We never say Ram-Sita. It is known as Principle of Canonical Sequence. Lastly if no other principle applies then the entities may be arranged in alphabetical order. All the UN member states are arranged in alphabetical order. Long list of names of persons is better arranged in alphabetical order. Words in a dictionary are arranged in alphabetical order – also called dictionary order. Alphabetically arranged entities can be easily located. Ranganathan advices to use this as a least preferred method. He even thought it as opposite of classification, yet many systems prefer it for ease of its use, and later for easy operation. In nutshell, for arrangement of members in an array use any systematic predictable method that you think will be helpful to majority of the library users.

## 3.5    CANONS FOR CHAIN OF CLASSES

As a result of successive application of characteristics to a group not all members will be of equal rank. This could be wholes, their parts, kinds and various species and subspecies of an entity. Such whole and their parts should be kept together to form a chain of classes. A Chain is a sequence of entities in successive subordination. For example, Grandfather, father, sons, grandchildren make a chain. There are two canons for arranging entities in a chain:

- Canon of Decreasing Extension
- Canon of Modulation

The first canon means that the entities should be arranged in a broader to narrower or general to specific, or whole to parts order. For example, Asia, South Asia, India, North India, Punjab, Amritsar makes a chain of classes in decreasing extension. Social Sciences – Economics – Financial Economic – Money – Banks make another chain of broader to narrow classes. Modulation means that no intervening link should be missed in the classes arranged in decreasing extensions: no jumping; no snapping. In the first example, we should not directly jump from North India to Amritsar omitting Punjab. Though this snapped chain will satisfy the canon of decreasing extension, but will violate the canon of modulation.

In this way in the Idea plane we will have a network of discrete facets and isolates arranged and laid out in arrays and chain. But these are still concepts without specific and **pucca** names. An idea without a **pucca** name cannot be classified properly.

**Self Check Exercise**

**Note:**    i)    Write your answer in the space given below.

ii)    Check your answer with the answer given at the end of this Unit.

1)    State the Principles of Helpful Sequence in an Array.

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# 3.6   VERBAL PLANE

In this phase of classification work we give standardised names to the concepts arranged in arrays and chains in the Idea plane. Ideas are something airy in the mind. They cannot be well expressed and communicated without having a proper name. In this phase we dress the airy ideas in proper and visible garments of language to make them standard terms to handle. It is important as ideas need some media for expression and communication. It is rightly said an idea in words is worth thousands in the mind. No idea can be communicated without apt words. In the field of sciences and all other technical subjects like accountancy or literary criticism these names for concepts are known as "terms". And science of assigning terms to ideas is called terminology. Verbal plane deals with terminology.

## 3.6.1   Nature of Language

No doubt language is a vehicle of thought; without it there could be no civilisation, no progress, perhaps no art or science. Without a developed language we will not be able to think even. Without language there will be only animal living. But any language spoken by any community is both rich and poor. It is rich in the sense that usually it has many words for a single concept, e.g., wages, pay, salary mean the same thing. Similarly, in Indian languages Suraj, Surya, Shashi, Dinkar, Prabhakar, Aditya all mean the sun. Lord Krishna has many names from Gopal to Nandlal, Kanhiya to Sham. Different words having the same meaning are called Synonyms. These are synonymous words.

It is poor in the sense that one word may denote more than one meaning : cricket is a popular game and also an insect. Bridge is a construction over river, and also the name of game. Beas is a river and also a town in Punjab. A word having more than one meaning is a called a homonym. In English there is hardly a word having only one meaning. It is said that the word "order" has 250 meanings in the English language. Ranganathan finds five meanings of the word "classification". Homonyms and synonyms are vitally useful for the literary writers. They make the writings delicious, imaginative and rich with aesthetic pleasure.

## 3.6.2   Homonyms and Synonyms

But synonyms and homonyms are a great barrier in communication; even harmful for legal and business transactions, science and research communication. In science communication we should be precise to the extent that one word should have one and only one meaning and vice versa. It means an ideal situation of one to one correspondence between concepts and terms. That is language of any science and academic field of study and research should be strictly free of homonyms and synonyms. It has already been achieved to a great extent in natural sciences. Social sciences, including library and information science, are struggling for the standardisation of terminologies in their subjects. Maturity of a discipline of knowledge can easily be measured by its standardised terminology. S.R. Ranganathan always urged librarians to learn and use technical terminology of library science for research and communication in our field. He also advised librarians to learn the technical terminology of other subjects for better information retrieval and to provide satisfactory reference service to scholars of various subjects. Ranganathan himself has developed good number of terms across the length and breadth of library science. It was his method and style to define the terms adequately in the beginning of his research articles. He always used well defined technical terms in all his writings and has left a treasure trove of technical terms as a legacy for us.

Language, including technical language, being a living and dynamic entity, keeps changing

in many ways. New terms are coined to convey new concepts and theories, some old terms are deleted as they become obsolete with time and some of the terms even change their meaning. In our discipline old terms such as open access, browsing, networks, etc have acquired different meanings in the electronic environment.

### 3.6.3  Canons for Terminology

Ranganathan not only himself coined many a new terms, he also formulated many principles for coining and display of new terms. As said earlier, the first and foremost quality of any terminology is to be free of homonyms and synonyms. Following are the canons he formulated for the purpose:

- Canon of Context

- Canon of Enumeration

- Canon of Currency

- Canon of Reticence

Canon of Context lays down that the terms in the classification schedules be written and read in the context of the upper class for example, instead of writing

Simple salts

Double salts

Complex salts

We should write:

Salts

    Single

    Double

    Complex

Similarly in Psychology under the persons facet:

- Child

- Male

- Female

mean Child psychology, Male psychology, Female psychology respectively. For the brevity and simplicity of the schedules it is not necessary to repeat the upper link. This canon is meant both for the classificationist and the classifier. It also applies in our daily routines.

**Canon of Enumeration**: Scope of terms or disciplines is not universally settled. For example, subject "Dynamics" is considered a part of mathematics by some, and of physics by others. As another example "Documentation" is part of library science in Colon Classification whole in the Universal Decimal classification (UDC) it is an independent class. Further constitutional history is not part of political science or law but of history in the CC. In such cases no one is wrong – as it is debatable.  In such circumstances it is safe to delineate the scope by listing i.e. enumerating its subdivisions. It is a operational and pragmatic way to define the scope of a subjects. This is the advise of this canon.

**Canon of Currency:** As already said terminology in any discipline is not static or frozen. It is always dynamic and moving. Even the old concepts get new meanings and an old concept may get a new term. Old terms may denote new concepts. A classification system must always update its terminology using current terms. New editions of classification systems not only include new knowledge but also use current terminology. For example, in the DDC library science has become "Library and information science"; Home science has become "Home management". It will not only help in efficient information retrieval but will also make our classification systems respectable in the eyes of scholars and subject specialists. This canon lays down: "Terms used to denote a class in a scheme for classification should be one current among those specializing in the subject field covered by the scheme". Lastly the Canon of Reticence means that the terms that we use in the schedules of classification should neither be judgemental nor critical. The DDC 14th edition used the term "humbugs" for parapsychologists. For example, one should not use the terms major or minor authors while dividing literary writers. It is not proper for librarians to categories authors so or be contemptuous of a subject believed by others. Literary historians can describe authors so. Even then they could be on slippery grounds. The literary reputation of an author is never constant. It is changing even after his/her death. Hence a classification system should use current and neutral terms.

### Self Check Exercise

**Note:**  i)  Write your answer in the space given below.

ii)  Check your answer with the answer given at the end of this Unit.

1)  Briefly explain the work in the Verbal Plane.

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## 3.7   NOTATIONAL PLANE

Though the last plane of work in designing a library classification system, yet it is the most visible face of the final product. Being visible, some people mistake it for classification itself. In fact notation is a series of symbols or codes to represent the subjects which were concepts and names in the idea and verbal planes, respectively. It is a plane which faithfully implements the findings or decisions of the idea plane. Ranganathan called it as servant of the idea plane. It is better to call it as the Executive Plane. Its position can be better understood by using an analogy of motion picture. In a movie, story and plot make the idea plane, screenplay and dialogue make the verbal plane, while actors are the notational plane. The function of notation in library classification is clear, but its status is ambiguous, at best. It is rightly said that a bad notation may mar a good work in the idea plane, but a good notation cannot improve the bad work of the idea plane. (Idea plane may be treated conceptual as classification).

### 3.7.1   Definition

Notation is a system of short hand symbols to denote subjects and their subdivisions by ordinal digits. A digit is an element of notational systems. These digits have only ordinal value i.e. they show only order. These digits are not cardinal or quantitative. To explain, in a notational system comprising of 1,2,3,…9 etc., it means value of 2 is not greater

than1, but will only come after it. Similarly, if it comprises of symbol A,B….Z, it means C is not greater than A or B, but will fall between B and D. That is notation conveys only the order not value or weight.

## 3.7.2 Need and Purpose

In the Idea and Verbal planes every concept is given a due place in a classification system, but these terms howsoever, cannot be assigned as index terms to the documents in a library. This is mostly for the following:

- Names/terms for subjects in the verbal plane are too long to be written as labels. Hence we require short symbols to denote subjects.

- Names of subjects are different in different languages whereas in a library we have books in many languages. Mathematics is called "Ganit" in Hindi-then where should be place a book of mathematics in Hindi? : under "G" or "M".?

- Names keep changing. For example Economics was once called Political Economy. Education Ministry is now called Ministry of Human Resources Development. Sri Lanka was once called Ceylon.

- If names are used for arrangement of documents then there would be many problems. The subjects will get scattered, e.g. Mathematics will come under "M", whereas Algebra will go to Geometry to "G" and Trigonometry to "T". A family will thus get dispersed.

- Even if these names are labeled on the documents how these will preserve the systematic order of subjects (in arrays and chains) arrived in the idea plane.? Words in themselves can only be arranged alphabetically. Therefore, to preserve the decided sequence of subjects and their subdivisions a series of ordinal symbols are assigned to the concepts and terms. For example, in botany the arrangement of various parts of plants decided in the idea plane is

| | |
|---|---|
| Plant | I |
| Root | I,3 |
| Stem | I,4 |
| Leaf | I,5 |
| Flower | I,6 |
| Fruit | I,7 |
| Seed | I,8 |

(The above arrangement is according to the principle of spatial contiguity – we proceed part by part from bottom to top. This sequence also conforms to the principle of "Later in Time"). We have assigned a number to each subdivision to preserve their arrangement and use it mechanically at some later time. This symbols-complex, called class numbers, are not only short but will also help to shelve or arrange document at proper places. These class numbered documents can be taken out, read and placed again at their proper places without any difficulty. Notation offers a self-evident order. Obviously, it is much easier to use these shorthand symbols for arranging documents than to use the names of subjects.

### 3.7.3 Other Uses

● It is an indispensable component of library classification – which is usually not required in knowledge classifications.

● Apart from arranging documents on the shelves it arranges entries in classified catalogues and shelf lists.

● Shows relations of subjects in the over all scheme of the mapping of knowledge.

● In a faceted classification it makes the structure of the subject transparent.

● It is essential for Chain Indexing. (You will learn about Chain Indexing in the unit on cataloguing).

● It may be essential for arrangement of (books) circulation record in a library.

Notation is so essential to classification that Palmer and Wells have defined library classification as "representation of an infinite series of subjects by a finite series of symbols". It is aptly said by W.H. Philips that if classification is foundation study of librarianship, then notation is the basis of practical book classification."

**Self Check Exercise**

**Note:** i) Write your answer in the space given below.

ii) Check your answer with the answer given at the end of this Unit.

1) Describe the need and purpose of notation.

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# 3.8 CANONS OF NOTATION

Now we pass on to the *how* of notation. To design a qualitative and effective notation Ranganathan has formulated and prescribed some canons for the choice and design of a notational system. These are:

1) Canon of Homonym and Synonym

2) Canon of Relativity and Uniformity

3) Canon of Hierarchy

4) Canon of Mixed Notation

5) Canon of Faceted Notation

6) Canon of Co-extensiveness

Ranganathan though described notation as servant of the idea plane, yet it is more than a mere series of symbols. He expected much from notation. He always treated it as a device to translate the subject of a document into an artificial language of ordinal numbers. And he wanted to endow it with qualities of a language. In the same vein his Canon of Homonyms and Synonyms prescribes that a class number should denote one and only one subject, and conversely a subject should be denoted by one and only one class

number. In fact, it is too much to expect from notation which is no more than an ordering device. Ranganathan has visualised only an ideal and perfect notation which is far from reality and much advanced of its present needs. Even half of its envisioned efficacy will be achieved at an unaffordable price in terms of complexity. It is possible to denote a subject by one and only one class number, but in reality a class number denotes a group of subjects. For example, in the DDC 610 always means Medical Science and 611 always means Human Anatomy. On the other hand Bengali language has only one number 491.44, but 491.49 Other Indian languages stands for Awadhi, Bagheli, Chhatisgarhi, Eastern Hindi, Kafiri and Pahari. So many languages share one class number. A classification like Rider's International Classification (1961) which always uses three alphabets to denote a subject is likely to be full of homonyms –a class number denoting many subjects at a time.

Any classification at best makes broader groups than to faithfully and precisely translate the subject of the document into notation. In fact, more homonymous a class numbers more hospital a classification system. Also many classification system such as Bibliographic Classification (2nd ed, BC-2), even the DDC offer many alternatives (optional class number). For example, in BC-2 Religion can either be placed at P or Z. therefore, this canon is difficult to be observed in reality – even Ranganathan CC violates this canon at many places. Canon of Relativity and Uniformity means that length of a class number (i.e. total number of digits in it) is usually the indication of the breadth and depth of the subject, it denotes. Breath and depth are technically known as extension and intension of the subject respectively. For example:

| 02 | Library Science |
| 025 | Library Operations |
| 025.3 | Bibliographic analysis and control |
| 025.32 | Descriptive cataloging |
| 025.322 | Choice of entry |
| 025.3222 | Authority files |

In the above example as the subject becomes more and more specialised the number (quantity) of digits goes on increasing. It also means that the hierarchy of a subject is depicted through the increasing length of notation. Theoretically, it is quite possible to go down the hierarchy to a great depth. In practical library classification this lengthening of chain cannot go on for ever. A practical library classification has to stop somewhere to keep the length of the class number in check. Therefore, for brevity and simplicity some classifications do not show the hierarchy of notation beyond some point, though order of subjects is maintained. In the National Library of Medicine Classification (USA) we have,

| FAI | Great Britain |
| FE5 | England |
| FG9 | Guernsey |

Here three subjects of decreasing extension (and increasing intension) are denoted by equal number of digits, though their order on shelf will be from general to specific or broader to narrower. Canon of Hierarchy is implied in the Canon of Relativity. It means that every characteristic used in the division of a universe of entities must be represented by a digit. In others words the class number must and faithfully depict the deepening

hierarchy of subjects, e.g.

| | |
|---|---|
| 5 | Sciences |
| 51 | Mathematics |
| 516 | Geometry |
| 516.3 | Analytic geometry |
| 516.35 | Algebraic geometry |
| 516.352 | Theory of curves |

Many a scheme violates this canon to secure brief numbers. We do not think the depiction of hierarchy through notation is useful beyond a point.

**Canon of Mixed Notation**: Usually there are two types of notations: Pure and Mixed. A pure notation is the one comprising of single species of digits, say only A/Z as in RIC, or 0/9 Arabic numerals as in the DDC. There was a time when purity was considered a virtue due to ease of use. Mixed notation comprises of a mix of two or more species as in Library of Congress Classification which uses mix of alphabets and numerals to denote subjects. UDC which mainly uses 0/9 notation with host of punctuation marks and mathematical signs has also a mixed notation. In the present times a classification has a very difficult task of mapping and structuring the expansive, complex and turbulently growing multidimensional universe of knowledge. A pure notation cannot work effectively. Hence classifications, of necessity, have resorted to mixed notation. It is rightly said that many of the problems of the DDC are due to its pure notation. A mixed notation has a wider base that is has more number of digits in it. A wider base is able to give shorter class numbers. For example, a notation of Indo-Arabic numerals 0/9 is able to produce one thousand 001 to 999 three digited class numbers, while a system using A/Z notation will have ($26^3$) 17576 subjects using three digits. Though a mixed notation is bit difficult to handle, yet it is a necessary evil. Then the question is how much mixed? Moderately mixed, as in BC-2 or Library of Congress is ideal. But highly mixed notation with many unfamiliar symbols may be disastrous for library classification. If some problems of the DDC are due to its purity of notation, on the other hand highly mixed notation comprising of 74 digits in Ranganathan's has played a role in its destruction and unpopularity.

**Decimal Fractions and Arithmetical Numerals:** Further, Indo-Arabic numerals may be used arithmetically or as decimal fractions. Library of Congress uses them arithmetically while all other systems, including the CC, use Arabic numerals as decimal fractions. The DDC pioneered the use of decimal notation and is now considered naturally convenient to denote subjects and their subdivisions. Decimal notation has many obvious advantages over the arithmetical numbers.

**Faceted Notations:** Notation must be structurally transparent to show various facets or elements of a class number. For example, in UDC, 82 Shak-2 denotes plays of Shakespeare. Here 8 is literature while 2 is English literature, Shak stands for Shakespeare, and -2 is drama. Even in the DDC 822.33 means the same thing. It is structured internally, as 8 is literature, 22 English drama, 822.3 is Elizabethan plays, 822.33 is Shakespeare. But in this case though the notation is faceted or structured but it is not transparent. Every hierarchical classification is structured but may not be transparent, whereas the faceted notation of CC is both structured and crystal transparent, e.g. O111, 2J64, H means Literature-English-Drama-Shakespeare-Hamlet.

**Canon of Co-extensiveness**

It means that every aspect of the subject should be indicated by a digit. That is a class number should be totally comprehensive of the characteristics used in dividing a subject. It again brings us to the question of hierarchy and relativity :

| Indian History | 954 |
|---|---|
| Mughal History | 954.02 |
| Akbar | 954.02 |
| Court of Akbar | 954.02 |

This classification violates the Canon of Co-extensiveness. So is the case with the following numbers from the Rider's IC:

| Diseases of Stomach | UJK |
|---|---|
| Gastritis | UJK |
| Gastric Disorders | UJK |
| Gastric Ulcer | UJK |

In the above two examples the increasing depth (intension) of the subject has not been represented by correspondingly lengthening the class number. It means 954.02 and UJK are homonymous class numbers. Ultimately, it results in broader classification. Some classification thinkers arguably believe that it is superfluous to aspire or try for co-extensive class numbers. Moderately depth classification is quite sufficient for shelf arrangement. H.E Bliss (1870-1955) is said to have said "Be minute, be minute, be not too minute". To this Ranganathan replied "Be minute, be minute, be too minute". Debate is endless. It again brings us to the question: Is our library classification sophisticated enough to carry the entire burden thrust on it? We must not expect from library classification, especially its notation, what it inherently is not capable of.

### 3.8.1  Qualities of Notation

Apart from all the above mandatory qualities (as Ranganathan terms them as canons) other qualities of notation can be of three types:

1)   Optional or desirable

2)   Essential and vital

3)   Scientific

Above all the notation should be user friendly. Among the desirable qualities, a notation should be brief and not highly mixed, so that digits convey a self-evident order. For example, order of mathematical symbols or punctuation marks is not self evident. Digits should be easy to write, in fact should be available on the computer key board. Class number should be easy to pronounce and remember for a short while. Brevity of class numbers in the print environment was a necessity as a class number had to be written on the book spine, which has a very limited breadth. Lengthy class numbers also pose difficulties in arrangement on the shelves. But in the OPACs the length of a class number does not matter. Hierarchical and faceted notation with highly recall and relevant ratio is best for information retrieval. Mixedness and length of notation do not matter in an automated library whereas in a print or manual library these are weighty and influential considerations.

**How of Brevity:** Proportionate or equitable allocation of digits to subjects will result in brief numbers. It means that static subjects like philosophy or religion should be allocated a small slice of the notational cake whereas dynamic subjects like science and technology, computers should be given a larger slice. As said earlier, wider base of mixed notation will also turn out brief numbers. Above all broader classification results in brief numbers.

### Mnemonics

Another desirable quality of notation is it being mnemonic. A mnemical notation denotes same or similar recurring concept by the same digits. The DDC and the CC are highly mnemonic systems.

| Language | Literature | Linguistics | History |
|---|---|---|---|
| English | 820 | 420 | 942 |
| German | 830 | 430 | 943 |
| French | 840 | 440 | 944 |
| Hindi | 891.43 | 491.43 | - |

English language, Literature and History are always denoted by "2" and German by "3", so on. Similarly, take the case of CC:

| Main class | Anatomy | Physiology | Diseases |
|---|---|---|---|
| G Biology | G :2 | G :3 | G : 4 |
| I Botany | I : 2 | I : 3 | I : 4 |
| K Zoology | K : 2 | K : 3 | K : 4 |
| L Medicine | L : 2 | L : 3 | L : 4 |

Anatomy wherever it occurs has been denoted by "2" and disease by "4". Ranganathan identifies three kinds of mnemonics, namely, alphabetical, schedule and seminal. Schedule mnemonics have been explained above. In alphabetical mnemonics an entity is denote by its name using its initial alphabet, e.g., J381B means Basmati Rice, while D5125H means Hero Bicycle, D5133M means Maruti Car. Library of Congress, (LCC) and UDC use alphabetical mnemonics to a large extent. In the LCC we have:

A    General works

AC   General Collections

AE   General Encyclopedias

AS   General Societies

Seminal mnemonics means to denote a concept by its inherent number: 1 denotes unity, God, Parents, World; 2 denotes two dimensions, anatomy, constitution. Further, Social pathology, Torts and Diseases will be denoted by 4.

As another form of seminal mnemonics, seminally equivalent entities, e.g., feed, food, fuel, should be denoted by same digit wherever they occur. Repair of machines, treatment of diseases, and alleviation of social ills also get the same number in respective main classes. Mnemonics though they bring sort of symmetry in the classification yet at many places they may conflict with the helpful sequence. Nevertheless, mnemonics are optional.

# 3.9    HOSPITALITY IN ARRAY

Hospitality is the most essential, rather vital, quality of any notational system. It is the capacity of notation to accommodate new subjects at their proper places without disturbing the existing sequence. Non-technically, it is also known as flexibility or resilience of classification. It is essential as knowledge is simultaneously growing exponentially in multiple directions. Therefore, any living and practical classification must have the capacity to give place to the new subjects at their *proper places* – latter point is essential. That is why library classifications are revised from time to time to include new subjects at their natural places. For example, the DDC (1876) of 44 pages has grown gradually to more than 3000 pages in the DDC-22(2003). Hospitality can be at two levels.

1)    Hospitality by classifiers

2)    Hospitality by classificationists in new editions.

## 3.9.1    Hospitality by Classifiers

Almost all standard library classification systems recommend that the classifiers should not tinker with the schedules. They should not make local numbers in case a number for a new subject is not available in the classification. Usually in such situations it is advised that a classifier should wait for the new edition and temporarily may place the new subject with its broader class. But Ranganathan has made provision for the classifiers to synthesise a class number for a topic not explicitly listed in the schedules. These are devises for hospitality and number building by the classifiers. These are namely:

Subject Device

Chronological Device

Geographical Device

Super-imposition Device

Alphabetical Device

This armory of devices at the disposal of a classifier keeps the work of classification going. Using these devices judiciously a classifier can make class numbers for new subjects. Perhaps on the dint of these devices Ranganathan claimed his system to be "self-perpetuating" – that is which is able to classify new knowledge without immediate intervention of the classificationist. Nevertheless, it is doubtful if a classification, howsoever hospitable, can be self-perpetuating. (A full discussion on the use of these devices is beyond the scope of this unit).

## 3.9.2    Hospitality by Classificationists in New Editions

Every system designer is aware of making provisions to properly accommodate new subjects at later stages. Therefore, in every system some conceptual, structural and mechanical provisions are made to accommodate new subjects at proper places (sometimes at not so proper places). Sophistication of a notational system can be measured by its instant hospitality to new subjects. Let us make a case study of Ranganathan's Colon Classification for hospitality where notation consisting of six species is highly mixed:

| 1 | A/Z | Roman Caps | 26 |
|---|---|---|---|
| 2 | $\triangle$ | Greek Delta | 01 |
| 3 | 0/9 | Indo-Arabic Decimal number | 10 |
| 4 | a/z | (Excluding I,L,o) i.e.o | 23 |
| 5 | * " ← | Indicator digits with anteriorising value | 03 |
| 6 | & ' . : ; , - = + ( ) → | Ordinary indicator digits | 11=74 |

Ranganthan has resolved hospitality at two levels namely, in arrays and chains.

### 3.9.3  Gaps in Arrays

An array is a sequence of co-ordinate classes, Gap device a method to accommodate future subjects, is used at every level of arrays in almost all classifications. Gap device leaves some vacant numbers here and there to be filled in with future and unborn subjects. In the CC, e.g.,

U1   Mathematical Geography

U2   Physical Geography

U3   [Vacant]

U4   Anthropogeography

U5   Political Geography

U6   Economic Geography

U7   [Vacant]

U8   Travels

In the above array U2 and U7 are vacant positions which can be filled with new topics of Geography. The DDC uses this method to a great extent. In 500 in the Third Summary we have many vacant position in DDC -22 : 504, 517, 524, 544, 545, 574, 589. At lower levels there are numerous such vacancies. These can be used in the future to accommodate new subjects.

**Limitations**

Though used by almost every classification, gap device is not the real solution. This method does not ensure a rightful place for the new subjects. There may not be any vacant place available at a needed place; on the other hand many vacant places remain unfilled for long as no new subjects are emerging there. In the DDC many new subjects are misplaced as due to lack of space at the right place they are allotted a vacant place nearby. It distorts the structure or mapping of knowledge. There are no gaps left in classes like Technologies where new subjects are popping everyday. Therefore, gaps are not the solution but alibis to postpone the crisis.

### 3.9.4  Sectorising Digits

These are devices to accommodate a subject at a proper place in an array even if no vacant place is there. For this Ranganathan invented an ingenious method of empty

digits, now also called Sectorising Digits. He sets aside 0,9,z and Z as empty digits. These digits are never used alone but used as repeater digits to extend an array. For example 1,2,3,…8, 91, 92… 99, 991, 992…993……999 are all co-ordinate classes. Similarly, we can have an array extended like A, B,C….Y  ZA, ZB,ZC….ZY, ZZA…….ZZX and so on. Hero Z has no semantic value, only ordinal value. It means semantically it is empty. Though the DDC has no such provisions nor terms like this, it often uses "9 others" to dump en masse other remaining subjects which could not be accommodated in the array 1/8. A good example is the main class 900 History, Geography, Biography. The three subjects have been clubbed together as there is no other place in the decimal notation beyond 900.

### 3.9.5  Emptying Digits

Digits T, V and X are set aside as emptying digits as these empty a preceding digit of its meaning but allow it to retain its ordinal value. For example, in the CC

K    Zoology

L    Medicine

No space is left between the two to insert a new subject Animal husbandry. Using

X as an emptying digit KX is given to Animal husbandry. Here K no more denotes Zoology, and KX may be treated a single digit which means Animal husbandry and is arranged between K and L. Hence it is a very clever device to accommodate new subjects at proper place in an array. Similarly, we have

44   India

44T Nepal

Emptying digits are just like the King Bali in the Ramayana who was blessed with sacking the power of his enemies who faced him in any battle. That is why Lord Rama had to kill him while hiding himself in a bush – though then it was not the norm to kill an enemy from a hidden position.

### 3.9.6  Empty-Emptying Digits

To make further rather almost unlimited interpolation in the Colon Classification U, W and Y have been postulated as Empty-Empty digits. It means not only these digits are empty of any meaning these also make other digits empty to which these are attached, e.g., in the CC-7.

| Y | Sociology | YYT | Sociometry |
|---|---|---|---|
| YT | Demography | YYU | Socio-Cybernetics |
| YUA | Cyber Culture | Z | Law |
| YUG | Bio-Sociology | | |
| YX | Social Work | | |

In this way, any number of new co-ordinate subjects can be interpolated at their proper places in an array of classes.

## 3.10  HOSPITALITY IN CHAIN

Chain is a sequence of classes of successively decreasing extension. The DDC provides infinite hospitality in chain by the use of decimal fraction. New subjects can be added at the end of a chain by a decimal fraction. This method is now used almost by all the

classifications. Use of decimal numerals is almost a norm while designing classification systems:

| | |
|---|---|
| 328 | Legislative Process |
| 328.3 | Parliaments |
| 328.33 | Members of Parliament |
| 328.334 | Basis of Membership |
| 328.3345 | Election Constituencies |
| 328.33455 | Gerrymandering |
| 328.334552 | Reserve constituency* |

* The last number has been added by us to show how the new subjects can be added by lengthening the chain. We can also give many such examples from the CC. Hierarchy showing relations of sub-ordination and co-ordination, and relativity are scientific and logical qualities of any notational system.

**Self Check Exercise**

**Note:**  i)  Write your answer in the space given below.

ii)  Check your answer with the answer given at the end of this Unit.

2)  Describe the Qualities of Notation.

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## 3.11 PROBLEMS OF NOTATION

There cannot be any library classification without notation. For many library users notation is the library classification. In fact it is one of the three forms to designate and denote concepts, the other two being terms and definitions. But notation is only skin deep, and should not be over burdened with tasks. Apart from subject designation, it preserves and mechanises the chosen order of subjects and documents. Though indispensable it has many problems. In many systems notation has become too complex. Lengthy class numbers are inevitable in depth classification which pose many problems. They are not user friendly. The order of digits in a mixed notation may not be comprehensible to the ordinary library users. Not only this, in the UDC, punctuation marks are posing a problem in automatic arrangement as their value is not compatible with the ASCII. Late French classification thinker Eric de Grolier (1911-1998) regrets that we have not applied to library classification the progress the notation has made in other field such as mathematics, logic and chemistry. One hindrance is our library users who are laypersons and may not understand very advanced or sophisticated notation. Coming of digital libraries may provide a virgin field to realise the full potential of notation in library classification.

# 3.12  SUMMARY

Since the late nineteenth century we have reached a stage where we have developed a well rounded theory of classification. In the Pre-World War II era the theory of classification was only descriptive, that is what could be inferred from the already published classification systems such as the DDC, LCC. But the theorists like C.A. Cutter, W.C.B, Sayers, E.C. Richardson, H.E. Bliss, S.R. Ranganathan and groups like CRG, London, FID/CR, or DRTC Bangalore have contributed considerably towards a pre-mediated theory of classification systems design and evaluation. Ranganathan rather delved much deeper than others and formed a detailed and minute theory on every aspect of classification. He divided the whole work into three Planes which he called Idea, Verbal and Notational planes. In this lesson we have studied the importance of the Idea and Verbal planes and the various objective canons and principles that Ranganathan formulated for work in these phases. In the Idea plane basic subject constituents are sorted into discrete concepts by selection and successive application of characteristics. Sorted out discrete elements called isolates by Ranganathan are arranged in arrays and chains by use of exclusive canons for them. Principles of Helpful Sequence guide us in placing equally ranked entities in an array in some systematic and helpful order. Verbal plane gives concrete names to the airy concepts in the mind by clothing them in standardised terminology. A standardised, free of homonyms and synonyms terminology is vital for any science communication. In a schedule of classification terms should be current, and written and read in the context of the upper link. Their definition and scope can be best determined by enumeratiion i.e. by listing the subtopics. The terms used should be current but not judgemental or critical.

Notation is more than a series of short hand ordinal symbols to denote subjects. It is a system; an artificial language to translate the subject of the document into ordinal numbers for arrangement. Its other functions are to preserve and mechanise the order of subject decided in the idea plane. It helps in number synthesis, shows hierarchy of subjects, is an essential component of classified catalogues and a location tool in OPACs and shelf lists. Notation is essential for Chain Indexing that is a process of deriving subject headings from the class number. Combined with verbal terms notation can be very effective for high precision and high recall in any retrieval system. Notations are usually of two types, pure and mixed. Pure notation comprises of a single species of digits such as 0/9 as in DDC, or A/Z as in RIC, mixed notation uses mix of many species such as 0/9, A/Z, a/z, even mathematical marks such as = + and punctuation marks such as : ; - ( ) and many more. A mixed notation is a necessity in face of complexity of knowledge and its organisation, yet it should be kept as simple as possible. For example, BC-2 or LCC use 0/9 and A/Z only. The CC notation comprising of six species of 74 digits in all is too complex by all accounts, and it is one of the reason for low use of the CC. Among the qualities of notation are its brevity, simplicity, easy pronunciation, and familiarity. In brief it should be user friendly. Digits should be equitably distributed among the subjects. Symbols used should be familiar and their ordinal value should be obvious or very clear. Now the digits should be available on the computer key board. Notation should show hierarchical relations and be free of homonyms and synonyms. It should be mnemonical which is easy to remember. It means same or analogous concepts occurring at different places should be denoted by the same digits. For example, food, animal feed and fuel occurring in indifferent main classes should get the same number. Not only this; diseases, mechanical disorders and social ills should be denoted by same digits in medicine, mechanical engineering and sociology respectively. Physiology is always denoted by 3 wherever it occurs in the CC e.g.,

G: 3 General Physiology

I: 3 Plant Physiology

K: 3 Animal Physiology

L: 3 Human Physiology

But the most vital quality of notation is its hospitality. It is defined as capacity to accommodate new subjects at their proper places without disturbing the existing ones. DDC does it mostly by leaving gaps here and there, and by decimal fraction at the end of chain. Gap device though popular is not a scientific solution of problem. Ranganathan invented the use of sector notation, Empty, emptying digits to interpolate and extrapolate new subjects in an array. Devices for making new isolate numbers or specifying the existing vague ones are availed of by the classifiers. These devices are geographical device, chronological device, subject device, superimposition and alphabetical device. More the number of devices for hospitality or specificity of subjects more complex a notation. Need is being felt to use in library science advances made by notation in subjects like mathematics or chemistry.

# 3.13 ANSWERS TO THE SELF CHECK EXERCISES

1)  An array is a line of entities of equal rank. These entities should be arranged in some systematic and predictable sequence. Some guiding principles for the arrangement of members in an array in helpful order are : Historical sequence, Evolutionary Sequence, Geographical or Spatial contiguity sequence, increasing quantity or complexity order, canonical sequence, and lastly alphabetical order.

2)  In the verbal plane we assign standard terms to the concepts of idea plane. Standardisation of terminology is very important in any science any serious communications. The terms in any science should be free of homonyms and synonyms. These should be current and uncritical. Terms should be read in context of upper link in a classification schedule.

3)  Notation is an essential adjunct of library classification, though in knowledge classification it may be dispensed with. It is more than a code or series of shorthand symbols to denote subjects. It implements the decisions of the Idea plane. Notation preserves the order of subjects decided in the idea plane, and also machanises their arrangement when replacing documents on the shelves after use. It may be easily described as engine of library classification. It is essential by a location device and useful as access point in OPACs and ordering device in shelflisting. Classified catalogues cannot be constructed without notation. It also helps in number synthesis and chain indexing.

4)  Notation is a system to represent subjects, and its qualities have been categorised as optional and vital. Accordingly its two major qualities are its user-friendliness and hospitality, respectively. Former refers to its ease of use. A brief, familiar and moderately mixed notation is useful and liked by librarians and users alike. It makes a classification popular. Hospitality is the capacity to give place to new subjects at proper places without disturbing the existing ones. A classification without adequate provisions for hospitality will become dated, senile and die. Hierarchy is its scientific quality.

# 3.14 KEYWORDS

| | | |
|---|---|---|
| **Array** | : | Group of entities of equal rank arranged in some definite and helpful order. |
| **Base of Notation** | : | Total number of digits in a notational system. Base of notation in DDC is only 10, while in CC it is 74. In the LCC it is 36. |
| **Canons** | : | Normative principles applicable to a branch of a subject, e.g. Canons of cataloging, Canons of classification. |
| **Chain** | : | A group of unequal but independent entities arranged in general to specific or broader to narrower order. A family lineage forms a chain. |
| **Characteristics** | : | An attribute or property which forms the basis of division into subgroups. "Sex" is a characteristic in dividing a class of boys and girls on the basis of gender. |
| **Digit** | : | A single character in a notation say 9, A, or +: etc. |
| **Empty – Emptying Digit** | : | A digit which is both empty and emptying U, W and Y are Empty-Emptying digits in the CC. |
| **Empty Digit** | : | A digit having only ordinal value and without any semantic value. In CC 0, 9, z and Z are empty digits in lower order arrays. |
| **Empty Digit** | : | A digit which takes away the semantic power of the preceding digit but allows it to retain its ordinal value. T, V and X are Emptying Digits. For example in KX, K has nothing to do with Zoology, but KX will file between K and L. |
| **Planes of Work** | : | Three successive phases of work to divide the work of classification in three distinct Sectors called Idea, Verbal and Notational planes, respectively. |
| **Postulation Approach** | : | Work of designing classification systems based on a pre-mediated theory in the form of normative principles, Canons, Principles, and Postulates. |
| **Terminology** | : | A system of standardised names given to concepts and entities for unambiguous communication. |

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# UNIT 4 COMPARATIVE STUDY OF SCHEMES OF CLASSIFICATION

**Structure**

## 4.0   OBJECTIVES

After reading this Unit, you will be able to:

- compare and contrast the salient features of the major living library classifications, namely, the DDC, UDC, LCC and CC;

- discuss the strengths and weaknesses of these systems of classifications; and

- make a right choice of classification suitable to your library.

## 4.1   COMPARATIVE LIBRARIANSHIP

Comparative librarianship is a branch of international librarianship to study and compare the library systems of different countries and organisations. This methodology can equally be applied to various systems and services offered by different libraries. Quite often comparative study of classification systems and their elements is made by comparison

of the features of various systems. A model library classification can be designed by borrowing the best features of each. S.R. Ranganathan's *Prolegomena* (1937, 1957, 1967) uses this comparative method to evolve a theory of library classification. It may be noted that comparison is done between two similar things. It will be no use comparing a horse with a cow or even car with a cart, but will be gainful to compare two different brands of cars.

## 4.2   INTRODUCTION TO MAJOR SCHEMES OF CLASSIFICATION

Modern history of library classification began in 1876 with the publication of Dewey's system. Its use spread very quickly as it neatly and instantly solved many of the problems being faced by the librarians in shelf arrangement and display of books. In its wake many new general classification systems emerged mostly to improve upon it or explore some alternative approaches. Noticeable among these systems are:

Dewey Decimal Classification (DDC) (1876+)

C.A. Cutter's Expansive Classification (1893)

Universal Decimal Classification (UDC) (1895+)

Library of Congress Classification (LCC) (1903+)

J.D. Brown's Subject Classification (SC) (1906)

Ranganathan's Colon Classification (CC) (1933+)

Bliss' Bibliographic Classification (BC) (1940-1953)

Rider's International Classification (IC) (1961)

Broad System of Ordering (BSO) (1978)

Bibliographic Classification, 2nd ed.  (BC)(1977+)

Systems by Cutter, Brown, Bliss (1st ed.) and Rider are no more in use. Bibliographic Classification, 2nd ed., being revised by J. Mills is still not complete, though considered as one of the best classification of the present times. DDC, UDC and LCC are considered the three major living classification systems, and are highly popular, and at time in competition with one another. Colon Classification of S.R. Ranganathan is the most scientifically designed system. It rather brought a paradigm shift due to its revolutionary method of facet analysis and postulational approach. Though CC itself is in danger, or may not even survive for long, but its methods have already pervaded the science, terminology and technology of classification design. It is a class apart, though not used highly. It is a sort of mother to later day classification systems. All other systems like DDC, UDC, BC-2 and BSO have borrowed its methods to the extent possible for their revision and modernisation. Here is a comparative study of these systems.

## 4.3   DISCIPLINE AND MAIN CLASS

All the library classifications are first divided by discipline. A discipline is a fundamental field of teaching and learning. A discipline is a major chunk of knowledge characterised by the similarity of objects of study or use of a common research methodology. Disciplines are academic in nature and are ways of looking at the world by academicians. Three classic and traditional disciplines in order are Sciences, Humanities and Social sciences. Now many more disciplines have emerged such as Physical Sciences,

Biosciences, Behavioral Sciences, though some call them sub-disciplines. Number of such disciplines keeps growing as the knowledge grows. Obverse of a discipline is isolated object or phenomena e.g., copper, child, tree, school which could be studied in context of any discipline.

### 4.3.1 Main Class

A discipline or sub discipline is further divided on the same basis into smaller chunks called main classes. All current classifications are based on main classes which makes the primary or basic facet. The main classes in any system form the first and mutually exclusive array of the division of the universe of knowledge. A main class may be defined as a homogenous, coherent and interrelated area of knowledge within the comprehension of an ordinary intellectual being. The scope and number of main classes vary from system to system and from time to time. For example, Astronomy is a part of Mathematics in CC (1963), while in DDC it is an independent class. Many smaller topics in the CC sixth edition (1963) got the status of a main class in the seventh edition (1987). Nevertheless, the number, scope and order of main classes form the core of any library classification system.

**DDC**

As constrained by its decimal notation in the DDC the discipline based main classes are numbered 1/9 and the Generalia class denoted by 0 precedes them. The main classes of the DDC as denoted by a minimum of three digits are :

| | |
|---|---|
| 000 | Generalia |
| 100 | Philosophy, Psychology |
| 200 | Religion |
| 300 | Social Sciences |
| 400 | Linguistics |
| 500 | Natural Sciences |
| 600 | Technology (Applied Sciences) |
| 700 | Arts (Fine) |
| 800 | Literature |
| 900 | Geography, Biography and History |

It may be noted that in the last main class Geography and History have been clubbed together as there is no more space available after 9 in a decimal notation. The (MCs) 100/600 are sciences based upon reason; 700/800 are imaginative works, while 900 pertains to memory. This is based upon the three faculties of mind as proposed by an English Philosopher Francis Bacon (1561-1626). Dewey in his arrangement of main classes inverted the three Baconian mental faculties of memory, imagination and reason. Each of the main class is further divided into ten divisions and each of the division is further divided into ten sections :

| | |
|---|---|
| 500 | Sciences |
| 510 | Mathematics |
| 520 | Astronomy |

:     :     :

590       Zoology

Each of the 100 Division ending with one zero is divided into ten sections

510       Mathematic

511       General Principles

512       Algebra

516       Geometry

519       Probability

This division can be carried to any extent by putting a dot after the third digit:

511.1     Finite mathematics

511.2     Mathematical logic

511.3     Approximation

511.4     Mathematical models

This division can be further carried:

511.3     Mathematical logic

511.32    Sets

511.322  Set theory

511.3223 Fuzzy sets

It may be noted that apart from being rooted in 17th century philosophy of Francis Bacon there are many flaws in the structure. The theory of three faculties of mind namely, reason, imagination and memory is no more scientifically valid. The matrix of dividing by 10 at every stage is artificial. One can easily see the unjustified separation of 400 Linguistics from 800 Literature. There is no justification for keeping Philosophy 100 and Psychology 150 together. History 900 has been separated from Social Sciences 300. There are many more such flaws at lower levels. Yet the DDC is credited to be first discipline based classification and is the most popular system today. Disarming its critics it makes no pretense of being a true map of knowledge. It is a practical shelf arrangement system and tries to give every significant topic a place in an overall scheme of subjects.

**UDC**

DDC is the base of UDC. Therefore, all the above criticism equally applies here. Yet some rectifications have been done by merging 4 Linguistics with 8 Literature. The main class 4 has been kept vacant and is likely to be filled with the newly developed faceted class Medicine. It will vacate 61 of its current class Medicine to expand 620 Engineering. Its auxiliaries and special tables are a sort of cosmetic surgery over the DDC to improve its structure and efficiency in classifying micro literature.

**LCC**

LCC, developed during 1898-1910, consists of 21 main classes denoted by A/Z, and are based somewhat on the Expansive Classification (1893) of C.A. Cutter (1837-1903):

A       General Works

| B | Philosophy, Psychology, Religion |
|---|---|
| C/I | History |
| G | Geography and Anthropology |
| H, J/L | Social Schemes, Law and Education |
| M/N | Music and Fine Arts |
| P | Languages and Literature |
| Q/T | Science, Medicine, Agriculture and Technology |
| U/V | Military/Navy |
| Z | Bibliography and Library Science |

I,O,W,X,Y have been kept vacant. In the above evolutionary arrangement theory precedes practice. Though each class is independent, the whole schedules have been expanded to 51 volumes in depth of details. It has been described as a general classification comprising of a series of depth schedules. It is a best example of an enumerative system. The main classes are further divided by a second seemed alphabet:

| Q | Science |
|---|---|
| QA | Mathematics |
| QB | Astronomy |
| QC | Physics |
| QD | Chemistry |

Double digit subdivisions are further sub divided by numerals. It is the only classification which is now using arithmetic numerals in face of the trend of decimal notation:

| QD | Chemistry |
|---|---|
| 1-65 | General topics |
| 71-142 | Analytical chemistry |
| 146-197 | Inorganic chemistry |
| 241-441 | Organic chemistry |
| 901-991 | Crystallography |

As a shelf classification it is quite successful.

**CC**

S.R. Ranganathan (1892-1972) was a great thinker and theoretician. Despite this he had not developed any theory of classification when he conceived, designed and published CC between 1924-1933. Though he believed in Vedic classification, yet outlook of his main disciplines and main classes is traditionally Western; the first division of knowledge in CC is in traditional disciplines in the order of their evolution, i.e. Sciences, Humanities and Social sciences. Within each discipline the CC has a well thought out order of main classes based on clearly stated principles.

| A/B | Science/Mathematics |
|---|---|

| C/D | Physics/ Engineering |
|-----|---------------------|
| E/F | Chemistry/Technology |
| G/H | Biology/Geology |
| I/J/K | Botany/Agriculture /Zoology |
| L | Medicine |
| M/N | Useful/Fine Arts |
| O/P | Literature/Languages |
| Q/R | Religion/Philosophy |
| S/T | Psychology/Education |
| U/V | Geography/History |
| W/X | Political Science/Economics |
| Y/Z | Sociology/Law. |

Between M and N a unique main class $\wedge$ Mysticism has been interposed. Generalia or form classes such on Bibliography, Encyclopedias, etc. have been denoted by a/z, while the newly emerging main classes such as Library Science, Mass communication have been denoted by 1/9. A/M Sciences and Technology have been arranged in order of their increasing concreteness, as M useful Arts, an assortment of applied arts and crafts, is the most concrete in the group. Within A/Z, as shown in the above pairings, theory is followed by applications, e.g., I Botany precedes J Agriculture. This arrangement known as the Principle of dependency was first proposed by August Comte (1798-1857), the father of Sociology. In N/S Humanities the arrangement is in order of increasing richness of subject contents. The T/Z Social Sciences are in the order of the increasing artificiality of their laws. Z Civil Laws are considered purely artificial and frequently changing. Mysticism is at the confluence of sciences and humanities and is considered highest knowledge in Hindu tradition. Coupled with the form of documents the arrangement of books on shelves is in a form, what Ranganathan calls APUPA pattern. This order is pedagogical. No other classification comes near to such a fine and systematic order of subjects as that of the CC.

**Self Check Exercise**

**Note:** i) Write your answer in the space given below.

ii) Check your answer with the answer given at the end of this Unit.

1) Define a main class (MC). Make a critical study of the MCs of the DDC.

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## 4.4   NOTATION

Notation, an adjunct of classification, is the most visible feature of a library classification system. Its efficiency and user-friendliness mostly determine the quality and popularity of any system. A notation should consist of familiar digits which convey their order

obviously, should show synthesis and hierarchy of subjects. Further it should be brief, mnemonic and must be hospitable to new subjects.

## 4.4.1 DDC

DDC invented the use of Indo-Arabic decimal notation to denote subjects and their further subdivisions. A dot is put after the third digit only as a partitioning devise, which has no mathematical or semantic value:

001/999   Universe of knowledge

700       Fine arts

780       Music

787       String music

787.8     Plectra lute

787.87    Guitar

Its notation is pure, hierarchical and mnemonical. It hospitality is poor as it has only gaps and decimal fraction devise for this purpose. Its allocation of notation among the subjects is faulty due to historical reasons. For example, the highly dynamic and rich class 600 Technology gets the same space as given to a static subject like 200 Religions. But its strength lies in its simplicity and internationally used Indo-Arabic numerals.

## 4.4.2 UDC

UDC based on DDC denotes its main classes decimally 0/9 which can be further divided hierarchically as in the DDC. But more powerful is its kit of synthesis and auxiliaries for number building.

In addition there are special auxiliaries applicable only to a given small area. Thus the notation of UDC is mixed, quite hospitable to new subjects by way of hierarchy, gaps and by use of alphabets and auxiliaries.

| Symbol | Function | Examples |
|--------|----------|----------|
| + | Coordination | 02+07 Library Science and Journalism |
| / | Consecutive extension | 5/6 Science & Technology |
| : | Simple relation | 02:07 Relation between Library Science & Journalism |
| […] | Subgroup | [1+2]03 Dictionary of Philosophy & Religion |
| :: | Order-fixing | 02::07 Library Science & Journalism (order fixed) |
| = | Languages | 02=161.1 Library Science in Russian |
| (0…) | Form | 7(091) History of Art |
| (1/9) | Place | 7(540) Indian Art |
| (=…) | Ethnic grouping and nationality | 7(=72) Australian Tribal Art |
| '…' | Time | 02 '20' Library Science in 21st Century. |
| .00 | Point of View | 7.00028 The Christian views on art |
| -03 | Materials | 645.13-037.87 Linoleum floor coverings |
| -05 | Persons | 7-053.2 Children's art |

**Problems of UDC Notation**

The ordinal value of the symbols is fixed and clear in manual arrangement, but there is problem in computer aided arrangement as the ordinal value of the punctuation marks comes in conflict with the ASCII. Though the notation seems complex, yet this complexity seems inevitable and acceptable in view of its aim of being a bibliographic classification to be used in bibliographies and information centres.

### 4.4.3 LCC

As said earlier, the LCC uses two Roman capitals for its main classes. Then each of the two digit alphabet is further divided by arithmetical notation. The notation being moderately mixed, and the large base from A/Z, and further divisions like AA to VZ and Z give it enormous capacity for future expansions. Moreover, letters I,O,W,X and Y are still vacant. In the arithmetical notation many gaps have been left which can be filled. Where there are no gaps, of late, it has started using decimal extension for inserting new subjects. Use of alphabetical subdivisions provides endless hospitality at a point.

| QD 149 | | Inorganic chemistry |
|--------|-----|---------------------|
| QD 149.5 | | General works |
| QD 149.7 | | By region or country |
| QD 149.7 | A-Z | By country |
| QD 149.7 | In | From India |
| QD 149.7 | Jap | From Japan |

The notation is not mnemonic except for the alphabetical subdivisions

A full class number may also include cutter number for the author and the year of publication:

Economic way of thinking by P.T. Heyne, 2003

HB 717.5 H 46 2003

Here H46 is cutter number for Heyne, and 2003 is the year of publication.

### 4.4.4 CC

Notation of CC is a high water mark of library notation. It is a comprehensive system in itself, and is bred on systematic canons and devices. Only problem is its complexity and frightening class numbers. But Ranganathan was not daunted by its or his own criticism on this account. Notation of CC comprises of 74 digits belonging to six species of digits:

1. A/Z  Main classes                                    26
2. $\triangle$ Greek letter                             01
3. 0/9  Decimal Notation for isolate numbers            10
4. a/z  (except i,l,o) Common isolates                  23
5. Special Indicator digits * ←                         03
6. Ordinary indicator digits.
   & ' . : ; , - = → + ( )                             11

The notational base of the CC is the widest ever in any library classification. Therefore, it has the largest room to accommodate new subjects at their proper places. Ranganathan devised many methods for hospitality of notation though faceting itself is a great hospitability mode. Apart from conventional hospitality devices of decimal fraction and gaps, he devised sector notation, empty and emptying digits for interpolation and extrapolation of new subjects in arrays. Also the notation is extremely mnemonic:

| Class | Anatomy | Physiology | Diseases |
|-------|---------|------------|----------|
| G Biology | G : 2 | G : 3 | G : 4 |
| I Botany | I : 2 | I : 3 | I : 4 |
| K Zoology | K : 2 | K : 3 | K : 4 |
| L Medicine | L : 2 | L : 3 | L : 4 |

To explain, General anatomy, Plant anatomy, Animal anatomy and Human anatomy have everywhere been denoted by ":2" .

## 4.5 EXTENT OF USE AND POPULARITY

Library classifications are designed for practical use; some were even designed for use in a specific library. But soon their use extended outside their specific institutions. Extent of their use determines their survival and consequent their teaching, research and published literature on them. Popularity of a system depends on many factors like, time of its origin, inherent technical qualities, ease of use, use in centralised cataloging such as MARC, constant revision, support services, institutional backing, and its marketing.

### 4.5.1 DDC

It is the pioneer system and also the most popular one. Used in about 2 lacs libraries in 140 countries across the globe, it is said the sun never sets on it. Apart from this, it has been translated in about 34 languages of the world including Hindi, Arabic and Vietnamese. Some sixty national bibliographies use this system to arrange their contents. Its Internet accessible version, known as WebDewey, is available through "OCLC connection." It is also used in organising and searching some search engines. Some such examples are: Webrary www.webrary.org/reb/weblinksmenu. html, and the UK Web Library<www.scit.wlre.ac.uk/wwlib/. Webrary is a service provided by the Morton Grove Public Library in USA. It links to the useful references are organised by the DDC class numbers. The U.K. Web Library (WW Lib) is provided by the University of Wolverhampton School of Computing and Information Technology.

### 4.5.2 UDC

By birth UDC was not designed for shelf arrangement of books. It aimed at documentation and information centers. Now in terms of its applications it is the most diversely used tool from organising libraries, websites. bibliographies to artifacts and realia. It is used in 125 countries. In 34 countries it is the main classification system used across national information centres. In 45 countries it is used in certain kinds of libraries. Its translations exist in 39 languages. Nationals Information Services and Systems (NISS), UK, now called Intuit, provides information for Education. It uses UDC to organise its directory of Networked Resources. For example, selecting a specific class number say 34 will list all the resources on Law, while 343 will only list resources on Criminal law.

### 4.5.3 LCC

Though the LCC was designed only for the Library itself yet it is being used in about 60% of the US large public, academic and research libraries. LCC numbers appear on MARC records which are used by many libraries for copy cataloging throughout the world. Even some national bibliographies of Asia and Europe are using this system. Due to depth of details, constant revision and institutional backing it has a very bright future. Its online version known as Classification Plus also includes LCSHs, and is much more versatile. In the web environment the potential of using LCC as a tool for organising Internet resources has proved quite successful. It is used in Cyberstacks (sm) on the Iowa State University website. The Cyberstacks is a collection of important www and other Internet resource in the selected fields of science and technology categorized by the LCC, e.g,

G    Geography, Anthropology

H    Social sciences

J    Political science

These are further divided by the LC class numbers, e.g, TL 787-4050 will provide a resource on the NASA astronauts biographies. For each resource a brief annotation is also provided.

### 4.5.4 CC

CC is an influential system though not a highly used one. It is claimed that in 1960s about 20 university libraries used this system along with many public and college libraries in India. The CC numbers are given as an element in the INB entries though its main arrangement is by the DDC. No new library is opting for this system due its dated schedules and lack of any support or backup service. But it is still being taught in library schools of India.

## 4.6    HISTORICAL CONTRIBUTION

Many library classifications both dead and living, have contributed individually to the classification theory and practice. History of library classification is exciting.

### 4.6.1 DDC

Contributions of DDC are many and everlasting. Use of decimal notation was an ingenious stroke of discovery. Though simple and efficient to represent subjects and place new subjects, it has many inherent limitations to portray a true structure of knowledge. Later classifications have used decimal notation in one way or the other. Even the LCC is now resorting to this method for hospitality of new subjects. Its other contributions are division by discipline, depiction of hierarchy, and invention of the relative index. It is 135 years old and going strong and getting popular day by day. The lesson is: well governed schemes remain rejuvenated and are trusted by librarians.

### 4.6.2 UDC

UDC, credited to be the first bibliographic classification, introduced for the first time in any classification powerful synthetic equipment in the form of auxiliaries. It performs the jobs of shelf arrangement and information retrieval with equal ease. Some also credit it as the first faceted scheme which heralded the Ranganathan methods. It was also the first classification to be tested for usefulness of classification in computerised databases.

Also known as European Dewey it was the first classification sponsored by a professional organisation which ultimately became International Federation for Information and Documentation (FID). Further, it was the first classification available in three official languages namely, French, German and English. Its translations are available in 24 languages. It again is the first classification to be owned and managed by a consortia of publishers (UDCC) spread across the globe. Its contributions to classification are both technical and organisational.

### 4.6.3 LCC

It has the distinction of being the producer and the consumer at the same time — a prosumer, Alvin Toffler would say. It is a general classification with a series of depth schedules and can be used alike both in general and research libraries. Its great support base from the Library of Congress and use in centralised and cooperative cataloguing services cover many of its technical drawbacks. Support of world's largest and greatest library and its use in its excellent bibliographic services impose greatness on this system despite its so many technical faults and weaknesses.

### 4.6.4 CC

It is a pioneer faceted scheme which brought a revolution in classification thinking and practice. Its methods of facet and phase analysis have become the general theory of classification. It has devised an objective mechanism for designing and evaluating library classification systems by dividing the entire work in Idea, Verbal and Notational planes. By finely formulating canons, principles and postulates for the process of classification he raised classification work to the status of science. Now many schemes, both general and special, have sprung up using facet analyses. BSO is one such example. Many old systems like DDC and BC-2 have used its methods for their revision. It started a new paradigm which is the basis of all indexing languages useful for print and electronic environments.

**Self Check Exercise**

**Note:**   i)   Write your answer in the space given below.

       ii)   Check your answer with the answer given at the end of this Unit.

1)   Explain the contribution of the CC to classification.

.......................................................................................................................

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## 4.7   SUMMARY

We have discussed the salient features of four great library classifications namely, the DDC, UDC, the LCC and CC. We discussed their main classes, their arrangement, notation, and their methods for hospitality of new subjects and their popularity or extent of use. DDC is a pioneering modern classification. It invented decimal fraction notation which is hierarchical and provides endless hospitality in chain. Its constant revision and use in OCLC WebCat and in about 2 lac libraries around the world makes it the most popular system. New libraries are going for it as a natural choice. Its other contribution of division by discipline, invention of the relative index and well formed and

oiled sound machinery for governance, maintenance and marketing make it one of the outstanding classification among the public and the professionals. UDC is the first faceted bibliographic classification sponsored by an organization which later became FID (closed in 2000). Over the DDC base it superimposed a powerful synthetic equipment. That has made it an efficient scheme for information retrieval in computerised databases. It is used in more than one lakh libraries and information centres. Its official availability in French, German and English also makes it to serve as an inter-indexing switching language. The Library of Congress system with 21 main classes comprising of 29 parts and 51 volumes runs to about 11000 pages. It serves both as a general and depth classification. It is the only living and thriving enumerative classification today. Though its organisation is faulty yet it is among the big three library classifications due to strong organisational back up and use in MARC records. Being is producer and consumer keeps it ever updated to accommodate new subjects. The CC though not a highly used classification is the one that has brought a revolution in classification theory and practice. Designed as the first truly faceted classification Ranganathan further refined it into a analytico synthetic classification. He formulated a wealth of canons and principles for the science of classification which now form the general theory of classification and are helpful in designing other such systems. Though its own future in bleak, yet the methods it has developed will live long.

# 4.8    ANSWERS TO SELF CHECK EXERCISES

1)    In modern library classification disciplines of knowledge are first divided into main classes. A main class is a homogenous area of knowledge whose length and breadth is within the comprehension of a normal scholar. Number and scope of main classes varies from classification to classification system and from time to time. In the DDC there are 100/900 main classes preceded by a Generalia class 000. The number of MCs is ten only because there are ten places in a decimal system. It is an artificial division, indeed. Further DDC main classes are based on the inverted Baconian System.

| Faculty | Subject | Main Classes |
|---------|---------|--------------|
| Reason | Sciences & Technology | 100-600 |
| Imagination | Art & Literature | 700-800 |
| Memory | History | 900 |

This theory is now outdated. Also it separates sciences from Technology and History from Social Sciences. In all, divisions by ten are unnatural.

2)    The CC designed by S R Ranganathan (1892-1972) between 1928-1933 was first published in 1933 by the Madras Library Association. Now it is in its 7th edition published in 1987. It was the first faceted classification and later it refined and upgraded itself into an analytico–synthetic classification based totally on postulational approach. Ranganathan solved many problems of the enumerative systems such as of DDC and LCC. His system provides individualising class numbers to the documents and provides infinite hospitality for new subjects. On the theory and methods of the CC many new faceted schemes have been developed. Faceted systems are now quite useful for information retrieval and searching the Web.

# 4.9 KEYWORDS

**Apupa Pattern** : The CC is able to arrange documents in a pedagogical order on the shelves through the use of two types of common isolates.

**Comparative Classification** : Use of comparative methods to classification systems to identify the best practices and elements to design an ideal classification. It is a part of international librarianship.

**Discipline** : A large area of knowledge having similar objects of study or a common research methodology. The traditional disciplines are Natural science, Humanities and Social Sciences.

**Main Class** : A traditional area of coherent knowledge whose length and breadth falls with in the comprehension in of a normal scholar. Also it is the first array division of a discipline. For example, sciences are divided into main classes mathematics, physics, chemistry, zoology, etc.

**MARC Record** : Machine readable catalogue produced by the Library of Congress for online use and for distribution of cataloguing records. The main feature of such records is internationality recognized numerical tags assigned to each field known as MARC 21 to identify each field in a catalogue entry.

**Mixed Notation** : A notation comprising of two or more species of digits, e.g., combined use of alphabets and numerals as in the LCC, or numerals and punctuation marks as in the UDC. Notation of the CC is the most mixed.

**Notation** : Series of short hand symbols to represent subjects and to mechanically fix their order decided in the idea plane. That is why Ranganathan called it as servant of the idea plane. It is also helpful in synthesis of numbers and to mechanise the arrangement of documents on the shelves or entries in a classified catalogue.

**Pure Notation** : A notation comprising of single species of digit, e.g. the DDC has only 0/9 used decimally, or Rider's International Classification comprising of alphabets uses only A/Z.

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