UNIT 3 POSTULATIONAL APPROACH

Structure

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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. Ranganathan 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
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:
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, 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 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 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:**
1) 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
than 1, 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  | 1 |
| Root   | 1,3 |
| Stem   | 1,4 |
| Leaf   | 1,5 |
| Flower | 1,6 |
| Fruit  | 1,7 |
| Seed   | 1,8 |

(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 overall 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, Chhattisgarhi, 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:

<table>
<thead>
<tr>
<th>02</th>
<th>Library Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>025</td>
<td>Library Operations</td>
</tr>
<tr>
<td>025.3</td>
<td>Bibliographic analysis and control</td>
</tr>
<tr>
<td>025.32</td>
<td>Descriptive cataloging</td>
</tr>
<tr>
<td>025.322</td>
<td>Choice of entry</td>
</tr>
<tr>
<td>025.3222</td>
<td>Authority files</td>
</tr>
</tbody>
</table>

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,

<table>
<thead>
<tr>
<th>FAI</th>
<th>Great Britain</th>
</tr>
</thead>
<tbody>
<tr>
<td>FE5</td>
<td>England</td>
</tr>
<tr>
<td>FG9</td>
<td>Guernsey</td>
</tr>
</tbody>
</table>

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 facetted or structured but it is not transparent. Every hierarchical classification is structured but may not be transparent, whereas the facetted 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:

<table>
<thead>
<tr>
<th>Subject</th>
<th>Class Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian History</td>
<td>954</td>
</tr>
<tr>
<td>Mughal History</td>
<td>954.02</td>
</tr>
<tr>
<td>Akbar</td>
<td>954.02</td>
</tr>
<tr>
<td>Court of Akbar</td>
<td>954.02</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Subject</th>
<th>Class Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diseases of Stomach</td>
<td>UJK</td>
</tr>
<tr>
<td>Gastritis</td>
<td>UJK</td>
</tr>
<tr>
<td>Gastric Disorders</td>
<td>UJK</td>
</tr>
<tr>
<td>Gastric Ulcer</td>
<td>UJK</td>
</tr>
</tbody>
</table>

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 keyboard. 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.

<table>
<thead>
<tr>
<th>Language</th>
<th>Literature</th>
<th>Linguistics</th>
<th>History</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>820</td>
<td>420</td>
<td>942</td>
</tr>
<tr>
<td>German</td>
<td>830</td>
<td>430</td>
<td>943</td>
</tr>
<tr>
<td>French</td>
<td>840</td>
<td>440</td>
<td>944</td>
</tr>
<tr>
<td>Hindi</td>
<td>891.43</td>
<td>491.43</td>
<td>-</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Main class</th>
<th>Anatomy</th>
<th>Physiology</th>
<th>Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>G Biology</td>
<td>G:2</td>
<td>G:3</td>
<td>G:4</td>
</tr>
<tr>
<td>I Botany</td>
<td>I:2</td>
<td>I:3</td>
<td>I:4</td>
</tr>
<tr>
<td>K Zoology</td>
<td>K:2</td>
<td>K:3</td>
<td>K:4</td>
</tr>
<tr>
<td>L Medicine</td>
<td>L:2</td>
<td>L:3</td>
<td>L:4</td>
</tr>
</tbody>
</table>

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.
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 devices 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:
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.

<table>
<thead>
<tr>
<th>Y</th>
<th>Sociology</th>
<th>YYT</th>
<th>Sociometry</th>
</tr>
</thead>
<tbody>
<tr>
<td>YT</td>
<td>Demography</td>
<td>YYU</td>
<td>Socio-Cybernetics</td>
</tr>
<tr>
<td>YUA</td>
<td>Cyber Culture</td>
<td>Z</td>
<td>Law</td>
</tr>
<tr>
<td>YUG</td>
<td>Bio-Sociology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>YX</td>
<td>Social Work</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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:

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>328</td>
<td>Legislative Process</td>
</tr>
<tr>
<td>328.3</td>
<td>Parliaments</td>
</tr>
<tr>
<td>328.33</td>
<td>Members of Parliament</td>
</tr>
<tr>
<td>328.334</td>
<td>Basis of Membership</td>
</tr>
<tr>
<td>328.3345</td>
<td>Election Constituencies</td>
</tr>
<tr>
<td>328.33455</td>
<td>Gerrymandering</td>
</tr>
<tr>
<td>328.334552</td>
<td>Reserve constituency</td>
</tr>
</tbody>
</table>

* 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:  
1) Write your answer in the space given below.
2) Check your answer with the answer given at the end of this Unit.
3) Describe the Qualities of Notation.

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

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 enumeration 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.,
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 mechanises 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.

3.15 REFERENCES AND FURTHER READING


