Prithvi N. Kaula
Banaras Hindu University, Varanasi, India

Canons in Analytico-Synthetic Classification*

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Presentation of the rules (canons) which S. R. Ranganathan laid down for the three planes of work, the Idea Plane, the Verbal Plane and the Notational Plane. Explanation of each of the 34 canons which are indispensable tools for the establishment of any classification system. An overall survey of the canons is given in Fig. 1. I.C.

1. Species of classification

The main core of classification is the capacity of a scheme to classify the specific subjects embodied in documents. The concept in classification conforms to an idea, unit of thought, a subject or a quasi subject. The nature of classification for our discussion is the classification of isolate ideas which leads to the classification of subjects.

Five species of classification of subjects have been recognised which are as under:

1. Enumerative Classification
2. Almost Enumerative Classification
3. Almost Faceted Classification
4. Rigidly Faceted Classification
5. Analytico-Synthetic Classification

An Enumerative Classification enumerates all possible specific subjects with their respective class numbers, all ready-made. An Almost Enumerative Classification also enumerates all possible specific subjects with their respective class numbers – monolithic schedules – but providing for one or more auxiliary schedules. An Almost Faceted Classification consists of a large single schedule enumerating most of the specific subjects and in addition a few Schedules of Common Isolates and also some schedules of Special Isolates. A Rigidly Faceted Classification consists of schedules of Basic Classes, Common Isolates and Special Isolates only. The facets in such a scheme are pre-determined. An Analytico-Synthetic Classification has no rigid, pre-determined facets. It only prescribes the sequence of isolates and facets according to Postulates, Principles and Canons. A Faceted Classification is not analytico-synthetic unless it is freely faceted and is guided by Postulates, Principles and Canons.

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2. Canons of Classification

Canons are generalised principles forming the basis of the General Theory of Classification. They help in the following:

a) Designing the schedules of classification schemes
b) Examination of the isolates in the existing schedules
c) Further expansion of the schedules and providing new classes and their numbers without disturbing the existing arrangement
d) Scientific study of classification
e) Serving as a touchstone to assess the efficiency of a scheme of classification.

2.1 Genesis of the Canons

W. C. Berwick Sayers used the term "Canon" in his study of classification. Earlier to the use of this term, E. C. Richardson had formulated this concept by using the term "Criteria" in his *Classification* (Edn. 2, 1912). L. Stanley Jast had formulated "fundamental logical rules" in his *Library Classification and Shelf Arrangement*. Sayers studied them and named them Canons. He marshalled and explained the canons to show which of the schemes of classification had relative merits. He examined and tested the schemes through canons and published them under the title *Canons of Classification* (1915). Earlier he had published a *Grammer of Classification* (1912). Bliss enunciated "Principles" instead of Canons. Ranganathan elaborated the Canons of Sayers and also enunciated his own Canons. He distinguished them from Postulates and Principles.

2.2 Sayers' Canons

Sayers in his pioneering attempt enunciated 14 Canons. He categorised them as under:

(a) General: 8 Canons
(b) Terminology: 2 Canons
(c) Generalia: 1 Canon
(d) Notation: 3 Canons

The Canons were not given specific names. They are generalised statements and were to be used as guidelines to examine the value of one system of Classification as compared to another as regards its general character, its order, logical process of its subdivisions, sections practicability in its notation and indexing.

2.3 Ranganathan's Canons

Ranganathan gave specific names to Canons and explained their significance, application and value to the study of the General Theory of Classification. The first edition of *Prolegomena* (1937) contained 28 Canons. The second edition (1957) contained 33 Canons. These were grouped as under

(a) General Theory of Classification: 22 Canons
(b) Special Theory of Classification: 6 Canons
(c) Special Theory of Book Classification: 5 Canons

Edition 3 of *Prolegomena* contained 39 Canons. These are grouped under three Planes of Work:

(a) Canons for Idea Plane: 15 Canons
(b) Canons for Verbal Plane: 4 Canons
(c) Canons for Notational Plane: 20 Canons

All of these Canons are shown diagrammatically in Fig. 1.

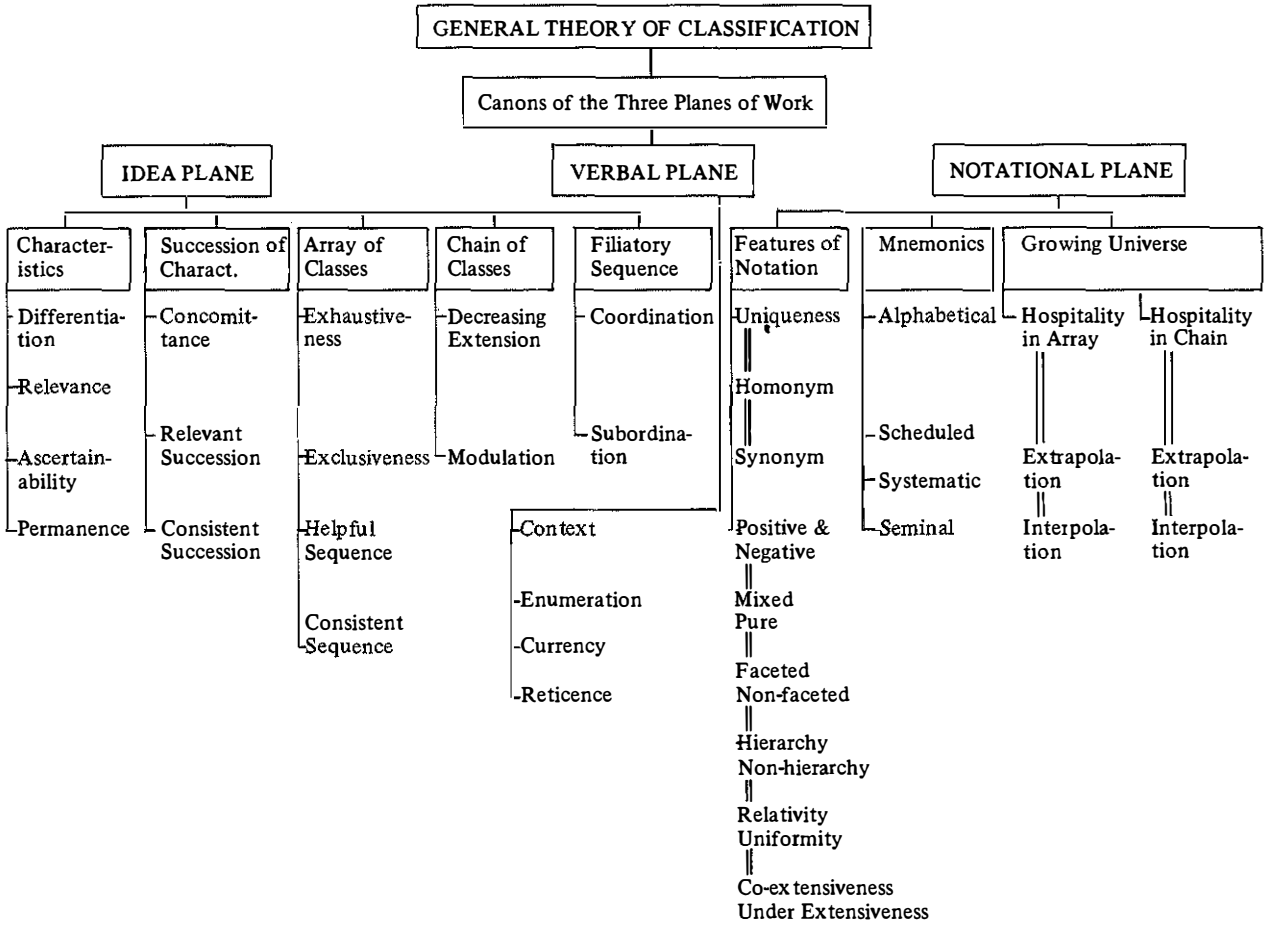


Fig. 1: Hierarchical Display of the Canons of the Three Planes of Work

3. Canons in the Idea Plane

3.1 Canons for Characteristics

Each Characteristic of an associated scheme of characteristics should satisfy the following four Canons:
(a) Canon of Differentiation
(b) Canon of Relevance
(c) Canon of Ascertainability
(d) Canon of Permanence.

3.1.1 Canon of Differentiation

A Characteristic used as a basis for the classification of a universe should differentiate some of its entities so as to give at least two classes or ranked isolates. This canon corresponds to Sayers' Canon 9. Each division of a Main Class should be formed on the basis of differentiating qualities. In the universe of men, the characteristics of height differentiates but the characteristic 'possession of a natural organ' like head, face, neck, hands, etc. does not. In an Analytico-Synthetic Classification each Main Class (MC) begins with the statement of the successive trains of characteristics used for its subdivision. It also determines the sequence of each train of characteristics called facet. Take the subject Education for its division into two trains of Characteristics: [Educand] and [Problem]. The subject gets two facets which are differentiated through its Facet Formula.

3.1.2 Canon of Relevance

Each characteristic chosen for a universe of ideas should be relevant to the purpose of classification. Sayers calls this canon "the Canon of Essential Characteristics" (Canon 8). The characteristic which is most helpful for the purpose of the scheme should be selected. In the universe of delegates attending a conference, the purpose of classification is to divide them into convenient groups of the subject of their interest for discussion purposes. That would be a relevant characteristic. But to divide them on the basis of colour, height, clothes, age, etc. or even mother tongue would not. Any of these basis of division would be considered an irrelevant characteristic.

In the universe of books if the purpose of classification is to serve the needs of users in the library, subject matter, language, year of publication and author would be relevant characteristics and *not* division according to size, binding, accessioning, etc.

3.1.3 Canon of Ascertainability

Each characteristic used as a basis for the classification of a universe should be definitely ascertainable. In the universe of authors in Literature, the date of death is a characteristic of a person but cannot be definitely and reliably ascertainable in the case of living authors. On the other hand the date of birth is ascertainable in the case of all authors and may be chosen as the basis of its classification. Some schemes for Classification have divided writers under the category "major writers" and "minor writers" which is bound to change. On the other hand the Colon Classification individualises the authors by the Author Characteristic based on the date of birth of each author. That is also the case with regard to biographies.

3.1.4 Canon of Permanence

Each characteristic chosen should continue to be unchanged so long there is no change in the purpose of classification. Take the universe of periodicals. Some schemes for classification divide them into two groups:
a) Those published by learned societies
b) Those that are not published.
These characteristics of periodicals are bound to change. Many periodicals published by societies have changed their sponsoring bodies and some without them have been adopted by some other bodies. So in classification of periodicals, the date of birth of a periodical would be a permanent characteristic.

3.2 Canons for Succession of Characteristics

The three canons in the succession of Characteristics are the following:
(a) Canon of Concomitance;
(b) Canon of Relevant Succession;
(c) Canon of Consistent Succession.
These are commonsense canons and no scheme for classification worth considering would violate them. In the universe of entities, the Canons are applicable to the universe of Basic Subject, universe of Isolate Ideas, and universe of Compound and Complex Subjects.

3.2.1 Canon of Concomitance

Concomitance means concurrence or agreement or being put together. The Canon enunciates that not two characteristics should be concomitant. That means, they should not divide universe of subject into the same subdivision and thus give rise to the same array of classes or of isolate ideas. In the universe of delegates to a conference, age and the year of birth should not be used as characteristics in succession as the basis for classification; for they will both give rise to the same array and yield the same result. In the other hand age and height, if used as two successive characteristics will yield different sets of arrays.

3.2.2 Canon of Relevant Succession

The succession of the characteristics used should be in a relevant sequence for the purpose of classification. The universe of Literature, for the purpose of classification, will give rise to four characteristics – [Author], [Work], [Language], and [Form]. There are 24 different successions in which the four characteristics can be arranged. However, the most relevant one has to be chosen out of the 24 sequences. The sequence should be [Language], [Form], [Author] and [Work]. Some schemes for Classification have chosen the first three characteristics in the sequence [L] [F] [A] and the Colon Classification has chosen the four characteristics in succession [L] [F] [A] [W]. Similarly in other subjects the sequence of Facets has been relevant for the purpose of classification.

3.2.3 Canon of Consistent Succession

The sequence of applying the chosen characteristics should be consistently adhered to in relation the purpose of the classification. It is obvious that any lack of consistency will lead to chaos and defeat the purpose of the classification. For the universe of subjects going with the Main Class History, the Decimal Classification and the Universal Decimal Classification have chosen the succession of characteristics as [Area] and [Period]. This should be adhered to consistently. Similarly in the Colon Classification the four characteristics [Communi-

ty] [organ] (of the state) [Attribute of Organ] and [Period] should be used consistently wherever History class is to be applied.

3.3 Canons for Array

An Array of Classes constitutes the sequence of co-ordinate classes based on a single characteristic and arranged among themselves according to their ranks. The (MC) of each scheme for classification form an array of the first order. The divisions of each of the classes form different arrays of the second order. The sections of each of the divisions form different arrays of the third order and so on. For example: In UDC Class Number 327 is constituted of three digits wherein 3 belongs to the first order of array which is the (MC) Social Sciences; 2 belongs to the second order of array which is the subject Political Science; 7 belongs to the third order of array which is the division Foreign Relations.

There are four Canons for Arrays of Classes and each array is expected to satisfy them:

a) Exhaustiveness
b) Exclusiveness
c) Helpful Sequence
d) Consistent Sequence.

3.3.1 Canon of Exhaustiveness

The Classes in any array of classes should be totally exhaustive of their common immediate universe. According to this canon, every entity comprised in the immediate universe should find a place in one of the classes in the array derived from the immediate universe. The canon deserves our attention to the need for examining the correctness of the enumeration of classes in an array. In the Edition 1 to 14 of DDC the array of classes in literature would end up with "Minor poets", "Minor dramatists" or "Minor writers" after enumeration of certain individual authors. This provision has been replaced by "other" concept. This makes the array limited and not exhaustive. CC allows any number of classes to be enumerated in any array until the immediate universe is exhausted.

3.3.2 Canon of Exclusiveness

The classes in an array of classes and the ranked isolates in any array of ranked isolates should be mutually exclusive. The Canon means that no entity comprised in the immediate universe can belong to more than one class of the array. In other words no two classes of the array can overlap or have an entity in common. The first order of array under the class Economics in DDC and UDC are not derived from the same characteristics. The Classes in the array belong to different characteristics. This leads to cross classification. The Classes in the array under each (MC) are arranged on a single train of characteristics.

3.3.3 Canon of Helpful Sequence

The sequence of the classes in an array of classes, and of the ranked isolates in an array of ranked isolates, should be helpful to the purpose served. This should be according to some accepted principle and not arbitrary. This canon is considered as the basic canon of classification.

3.3.3.1 Principles of Helpful Sequence

The following are the main guiding principles that should be used to implement the canon:

1. Principle of Later in Time
2. Principle of Later in Evolution
3. Principle of Spatial Contiguity
3.1 Principle of Entities along a Vertical Line
3.1.1 Principle of Bottom Upwards
3.1.2 Principle of Top Downwards
3.2 Principle of Entities along a Horizontal Line
3.2.1 Principle of Left to Right
3.2.2 Principle of Right to Left
3.3 Principle of Entities along a Circular Line
3.3.1 Principle of Clockwise Direction
3.3.2 Principle of Counter Clockwise Direction
3.4 Principle of Entities along a Radial Line
3.4.1 Principle of Periphery to Centre
3.4.2 Principle of Centre to Periphery
3.5 Principle of Away-from-position
4. Principle of Quantitative Measure
4.1 Principle of Increasing Quantity
4.2 Principle of Decreasing Quantity
5. Principle of Increasing Complexity
6. Principle of Canonical Sequence
7. Principle of Literary Warrant
8. Principle of Alphabetical Sequence.

3.3.3.2 Examples of Application of Principles

Later-in-Time: In CC the arrangement of isolates in the universe of religions is on the basis of time-sequence of their origin. DDC and UDC do not respect the principle.

Later-in-Evolution: In CC the arrangement of isolates in the universe of psychology and the universe of education is parallel to the course of evolution. DDC and UDC does not respect this principle. On the other hand in the universe of zoology, all the three schemes provide the sequence of isolates in the array on the basis of this principle.

Spatial Contiguity: Spatial Contiguity means the state of being adjacent to each other along a unidirectional line or a radial line or a circle.

In CC the regional organs in the universe of botany follow the Principle of Bottom Upwards.

In CC the regional organs in the universe of medicine follow the Principle of Top Downwards. DDC and UDC follow this principle in botany as well as in medicine. CC follows this principle consistently in other subjects as well.

CC arranges divisions on the surface of the earth or what may be called geographical areas on the basis of geographical contiguity which is a combination of two or more principles.

Quantitative Measure: In CC the arrangement of isolates in the universe of geometry (Number of dimensions) and the organs of a state in Political Science are on the basis of the Principle of Increasing Quantity. The arrangement of isolates in the universe of libraries in CC is based on the Principle of Decreasing Quantity.

Increasing Complexity: In classifying the universe of linguistics by CC the isolates in element characteristics are arranged in conformity with the Principle of Increasing Complexity. So also in arranging the isolates on the basis of the Subject of Study in the universe of geography, the same principle has been applied.

Canonical Sequence: The Principle of Canonical Sequence which means the accepted traditional sequence has been used in dividing (MC) in CC in the subjects of mathematics, physics, geology, fine arts, philosophy. The isolates in the form characteristics of the subject literature in DDC, CC and UDC conform to this principle.

Literary Warrant: This principle is also called the Principle of Favoured Category. The isolates in crop characteristics in (MC) agriculture particularly food plants are arranged on the basis of the decreasing quantity of documents published on them.

Alphabetical Sequence: This principle is to be applied when no other sequence of isolates in an array is found more helpful.

3.3.4 Canon of Consistent Sequence

Whenever similar classes occur in different arrays, their sequence should be parallel in all such arrays. Conforming to this canon will be conducive to economy of time and mental attention. The load on the memory of the classifier and of the user will be minimised. DDC, UDC and CC make use of this canon in arranging the same group of isolates in the same sequence wherever the array may be in which they occur.

A number of examples can be cited. In CC or in any faceted classification conformity to this canon is developed to a large extent which results in great economy in the length of schedules. The different devices used by CC to satisfy this canon are the following:

1 Chronological Device
2 Geographical Device
3 Subject Device
4 Facet Device
5 Phase Device
6 Superimposition Device
7 Enumeration Device
8 Common Isolate Device

The schedules of Common Isolates such as Anteriorising Common Isolates, Posteriorising Matter Common Isolates, Posteriorising Personality Common Isolates, Posteriorising Energy Common Isolates, Space Isolates, Language Isolates, Time Isolates also brings automatic conformity to this canon. The auxiliary schedules of DDC and UDC and the special analytical divisions provide similar conformity to this canon.

3.4 Canons for Chain of Classes

A Chain is a sequence of classes made up of any given class which forms the last link of the chain, its immediate universe, its immediate universe of the second remove, of the third remove, etc. Two canons are specified to provide guidelines for each chain of classes.

a) Canon of Decreasing Extension
b) Canon of Modulation

The canons are applicable to any universe of entities.

3.4.1 Canon of Decreasing Extension

Extension is a qualitative measure of a class or of a ranked isolate. A class of greater extension is of smaller intension. Likewise a class of smaller extension is of a greater intension. The canon enunciates that while moving down a chain from its first link to its last link, the intension of classes should increase and the extension of classes should decrease. It conforms to the general principle of General versus Specific. Broader intension to narrower extension.

The division of each class in the universe of subjects unless it conforms to an array, has to satisfy this canon.

3.4.2 Canon of Modulation

A chain of classes should comprise one class of each and every order that lies between the orders of the first link and the last link of the chain. In other words between the last link and the first link in the chain of classes there should be no missing link. All intermediate links should be represented. The structure of DDC according to A. J. Wells, Editor of the *British National Bibliography* "frequently omitted the steps in the hierarchy. The missing links had to be discovered and inserted" (2). He cites a number of examples. In the (MC) religion there is no class to represent christianity.

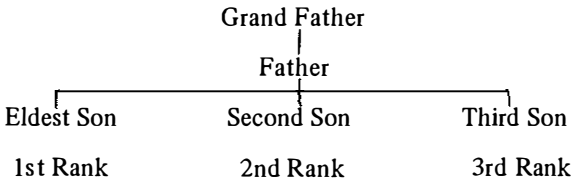
3.5 Canons for Filiatory Sequence

Filiatory sequence means a sequence which represents the degree of mutual relation between subjects. Two types of relations of classes are recognised as coordinate classes and as subordinate classes. These two concepts lead to two canons:

a) Canon of coordinate classes
b) Canon of subordinate classes

3.5.1 Canon of Coordinate Classes

Among the classes in an array, no class with less affinity should come between the classes with greater affinity. In the genealogical tree it can be illustrated as under:



The sons who are brothers by themselves are of coordinate relation with regard to their immediate universe. The (MC) of a scheme for classification which are in one and the same array are of coordinate status.

3.5.2 Canon of Subordinate Classes

All the subcoordinate classes of a class in whatever chain they may occur should immediately follow it without being seperated from it or among themselves by any other class. In other words subordinate class of a class should be arranged immediately after it according to their degree of relation.

In the genealogical tree of a family as depicted in section 3.5.1 above, the relationship of grandfather to his son (who also has his own son) who is a grandson to the grandfather is that of succession. It is an example of subordinate classes. In the universe of subjects the divisions, sections, subsection successively formed as the chain of classes conform to this canon.

4. Canons in the Verbal Plane

In classificatory language precise terms with their uniqueness in meaning should be used. Such terminology should have no vagueness in the meaning and should be free from the incidence of homonym and synonym. New terms when used to represent new concepts should also

conform to these standards. Glossaries of standard technical terms should therefore be provided for each specific field. A Glossary of Classification Terms has been published by the Indian Standards Institution (3). It requires revision and wide adoption.

Four canons relate to the work in the Verbal Plane. These are:

a) Canon of Context
b) Canon of Enumeration
c) Canon of Currency
d) Canon of Reticence

4.1 Canon of Context

The denotation of each term in a scheme of classification should be decided or to be determined in the light of different classes or ranked isolates of lower order (upper links) belonging to the same primary chain as the class or the ranked isolate denoted by the term.

4.2 Canon of Enumeration

The denotation of each term in a scheme of classification schould be decided in the light of the classes enumerated in the various chains of lower links which are denoted by the term as their common first link. In DDC and UDC geography has been ranked under history. So also is biography. By applying the Canon of Enumeration, the history class should enumerate only such classes that are related to history.

4.3 Canon of Currency

The term used to denote classes in a scheme for classification should be the one current among those specialising in the specific subject field. That means that a scheme for classification should provide for periodical revision of terms used in the scheme. This canon implies two things:

1. The term chosen at the time of the design of a scheme should accord with current usage;
2. Obsolete terms should be changed periodically into the current ones.

4.4 Canon of Reticence

The term used to represent a class or a ranked isolate in a scheme for classification should not be critical or show bias or partial opinion of the designer of the scheme. In the earlier edition of DDC, the term "Minor Authors" in the literature schedule violate the Canon of Reticence.

5. Canons in the Notational Plane

The work in the Notational Plane is dependent on the work in the Idea Plane. The Idea Plane is paramount and the Notational Plane is subsequent to it. But it should have the capacity and versatility to carry out all that the Idea Plane decides. It should have the features to provide infinite Hospitality in Array as well as Hospitality in Chain. Ranganathan has shown the capacity of a notation by providing the following devices: Sector Device, Empty Emptying Device, Zone Analysis, Group System, Indicator Digits, Facet Indicators, Phase Indicators and Systematic and Seminal Mnemonics. This has been necessitated by the ever growing, ever turbulent, multidimensional and multidirectional universe of subjects. The notational system used for classification should therefore satisfy a set of canons.

The Canons in the Notational Plane are arranged in three groups:

- Canons for Uniqueness of Notation and its Positive and its Negative Canons
- Canons of Mnemonics
- Canons for the Growing Universe

5.1 Canons for Uniqueness of Notation

The Class number of a subject in a system of class numbers and the isolate number of an isolate idea in a system of isolate numbers should be unique. Two canons are therefore enunciated:

I. Canon of Homonym
2. Canon of Synonym

5.1.1 Canon of Homonym

The Canon implies that each class number should represent one and only one subject. No class number should represent two or more subjects. Similarly each isolate number should represent one and only one isolate idea. In DDC under several subjects we find the same number representing two or more subjects or isolate ideas. This is mainly due to non-faceted class number. In DDC earlier editions the History of Great Britain, History of England, History of Commonwealth, History of British Empire would be represented by one and the same class number.

5.1.2 Canon of Synonym

The Canon implies that each subject should be represented by one and only one class number. No subject should be represented by two or more class numbers. Similarly each isolate idea should be represented by one and only one isolate number. DDC very often violates this canon as it provides alternate numbers due to its pattern. UDC provides deliberately synonymous class numbers. By its connecting symbol ":" (Colon) which is the relation symbol, it provides for alternate numbers made up of two or more block numbers. This option to have class numbers made up of two or more block numbers connecting with ":" (Colon) in any sequence without any consideration for the uniqueness of the number does not make the work in the Notational Plane exactly as it should be in the Idea Plane. The canon should therefore be regarded as one of the few compulsary canons in classification. CC satisfies this canon and the Canon of Homonym by providing single individualising class numbers. Long back, in one of his earliest article P. N. Kaula pointed out the fallacy of homonymous and synonymous numbers (4). An elaborate list of such numbers should be worked out so that the scheme may be further improved.

5.2 Positive and Its Negative Canons

Ten other canons depicting specific features of the notational system of any scheme of classification are to be satisfied. They are stated in pairs and each pair consists of one canon and of its negation. The following are the pairs of canons:

1. Canon of Mixed Notation and Canon of Pure Notation
2. Canon of Hierarchy and Canon of Non-Hierarchy

3. Canon of Faceted Notation and Canon of Non-Faceted Notation
4. Canon of Relativity and Canon of Uniformity
5. Canon of Coestensiveness and Canon of Under-Extensiveness.

5.2.1 Canon of Mixed Vs Pure Notation

One of the canons of Sayers has been the Canon of Purity which was based on the assumption that DDC was more popular and widely used due to its purity of notation. But there are other schemes for classification which have a mixed base. Ranganathan wrote the "peril of pure notation and the might of mixed notation". He and other specialists are of the view that mixed base as consisting of Arabic numbers, Roman Capitals and Roman smalls give distinctive class numbers to 3×10^{10} i.e. 30,000 million subjects.

5.2.2 Canon of Hierarchy Vs Non-Hierarchy

Hierarchical notation provides a digit to represent each of the characteristics used in structuring the class number or the isolate number. Non-hierarchical notation does not provide a digit to represent each of the characteristics used in structuring the class numbers of the isolate number. Telescoped Array is provided by bringing the coordinate and subordinate isolates as viewed from the Idea Plane, but whose class numbers appear to be coordinate as viewed from the Notational Plane. Geographical divisions in DDC, UDC and CC provide telescoped Array of classes in each of the schemes.

5.2.3 Canon of Faceted Vs Non-Faceted Notation

A faceted notational system provides for small unit schedules with meaningful connecting digits. The advantages of faceted notational structure over the non-faceted or enumerative pattern are obvious. In non-faceted notation, block notational system is used which provides the combination of class numbers instead of isolate numbers. The notation therefore becomes long and yet less hospitable. Faceted notation provides Hospitality in Chain at many points.

5.2.4 Canon of Relativity Vs Uniformity

The number of digits in a class number or in an isolate number should be proportional to the order or the intension of the class it represents. The purpose of this canon is to determine the relative length of a class number or an isolate number. The canon of Uniformity asks the classifier to have the number of digits in a class number or in an isolate number constant whatever be the intension of the subject or isolate idea represented by it. The Canon of Relativity is also denoted by the Canon of Elasticity.

5.2.5 Canon of Co-extensiveness Vs Under-Extensiveness

The two canons relate to the concept of minute classification with a coextensive class number which represents each of relevant characteristics of the subject embodied in the document classified. Under-extensiveness relates to the concept of broad classification in which the class number of a subject is used also as the class number of its subdivisions or its coordinate division.

6. Canons for Mnemonics

The Mnemonic notation is used to represent the same idea by an isolate number to whatever host class it is attached. The form divisions, area divisions, language divisions provided in DDC give the scheme a mnemonic system. UDC has other auxiliary divisions too. Thus it provides more mnemonic features of the scheme. CC uses mnemonics in a profuse manner. An Analytico-Synthetic Classification provides far greater mnemonic features not to be found in other schemes. Berwick Sayers had enunciated the Canon of Mnemonics which has been elaborated by Ranganathan to four canons. These are the following:

a) Canon of Alphabetical Mnemonics
b) Canon of Scheduled Mnemonics
c) Canon of Systematic Mnemonics
d) Canon of Seminal Mnemonics

The canons denote a mode of securing consistent sequence among the isolate ideas figuring in classifying work.

6.1 Canon of Alphabetical Mnemonics

This is also called Canon of Verbal Mnemonics. It consists in representing an idea by the first letter or the first few letters in its name. The universe of trees in forestry may be individualised by using the first letter or the first two letters representing the name of each tree. Authors in the (MC) Literature in UDC are arranged alphabetically.

6.2 Canon of Scheduled Mnemonics

This Canon implies that a scheme for classification should use one and the same digit or digit group to represent an isolate idea or an array isolate idea already scheduled in the scheme. The Devices used in CC secure Scheduled Mnemonics. DDC secures Scheduled Mnemonics by the instruction "Add" Device, Geographical Device and Form Device. It violates the canon as it cannot use Facet Device and Chronological Device. The UDC besides using the Devices has also a Relation Device to bring together facets and phased class numbers. The Library of Congress Classification and Rider's International Classification have no provision for Scheduled Mnemonics.

6.3 Canon of Systematic Mnemonics

Systematic Mnemonics is another type of mnemonics or aid to memory in which the arrangement of isolates in an array is got by the enumeration of the special isolates in it in a systematic way. The following are the Principles used in CC for such a systematic arrangement:

1 Later in Time
2 Later in Evolution
3 Spatial Contiguity
4 Increasing Quantity
5 Increasing Complexity

Application of the Canon secures the following sequence on the basis of the Principles of Helpful Sequence mentioned above:

1 Time Sequence
2 Evolutionary Sequence
3 Spatial Sequence
4 Quantity Sequence
5 Complexity Sequence

The Canon implies that in a scheme of classification, the digits used to represent the isolate ideas in an array should run parallel to the sequence in which the principles of Helpful Sequence would arrange the isolate ideas.

6.4 Canon of Seminal Mnemonics

A scheme for classification should use one and the same digit to denote seminally equally concepts in whatever array and in whatever class context it occurs, irrespective of divergent terms used to denote it in different arrays and in different class contexts. In other words Seminal Mnemonics provides the same digit representing cognate concepts in all its places of occurrence. CC is the only scheme for Classification that has provided for Seminal Mnemonics. In Ed. 1 of the *Prolegomena* this type of mnemonics was named "Unscheduled Mnemonics". Class numbers formed with Seminal Mnemonics digits in a scheme of classification will satisfy the Canon of Consistent Sequence, Canon of Filiatory Sequence and the Canon of Helpful Sequence in an ideal way.

The use of Seminal Mnemonics in CC is depicted as under:

1. Represents Unity, World, God, Natural History
2. Represents Morphology, Constitution
3 Represents Function and its analogues, Physiology, Activities
4 Represents Disease, Pathology, Torts
5 Represents Power, Liquid, Women, Foreign
6 Represents Abnormal, Money
7 Represents Personality, Ontogeny, Source
8 Represents Administration, Management.

The Seminal Mnemonics are a great assets to CC. They give considerable autonomy to the classification in the expansion of the schedules as required by the growing universe of subjects and also for the classifier who can automatically provide numbers embodying new subjects without depending totally on the revision of the scheme.

7. Canons for a growing universe of subjects

A scheme for classification has to meet the requirements of the ever growing and ever turbulent universe of subjects or any sub-universe of it. It should be able to accomodate in a filiatory position the newcomers, unknown and unpredictable. This uncertainty produces a great pressure on the notational system of a scheme for classification. Sayers called it Hospitality and advocated the adherence to the Canon of Hospitality. Ranganathan made it into two groups of Canons:

1) Canons for Hospitality in Array
2) Canons for Hospitality in Chain

Each of the two sets of Canons has two canons each relating to Extrapolation and Interpolation.

7.1 Canons for Hospitality in Array

A scheme for classification should satisfy the following two canons providing Hospitality in Array:

1) Canon of Extrapolation in Array
2) Canon of Interpolation in Array

7.1.1 Canon of Extrapolation in Array

This canon can be satisfied by adopting Sector Notation and Gap Device. CC is the only scheme for classification providing for Sector Notation. With the mixed base of 56 digits it is able to accommodate 1166 class numbers in an array. The Gap Device is being used in DDC and UDC but it provides limited hospitality.

7.1.2 Canon of Interpolation in Array

An array of class numbers or of isolate numbers should admit of the interpolation of any number of new coordinate numbers at any point in an array. The Gap Device has been followed to interpolate a new number between any two existing class numbers or isolate numbers. In CC each of the digits T, U, V, W, X, Y and Z is postulated to have the power of emptying, in certain contexts, the semantic of its ordinal value. Thus in the array of (MC) AZ, BZ, CZ, . . ., HX, KX and YX are of the same order as the digits A, B, C, etc. Further the digits V, W, Y, and Z are prescribed to be both Empty and Emptying digits. Kaula had suggested the use of stroke and the use of Roman small z to interpolate partial comprehension classes and other classes respectively.

7.2 Canons for Hospitality in Chain

Two canons similar to those provided for Hospitality in Array should be satisfied by a scheme for classification. These are the following:

1) Canon of Extrapolation in Chain
2) Canon of Interpolation in Chain

7.2.1 Canon of Extrapolation in Chain

Extrapolation in chain ending with any number is secured by the use of Decimal Fraction Device and Gap Device.

Decimal Fraction Device consists of using decimal fraction notation to provide unlimited hospitality at the end of chain. Except for the Library of Congress Classification and Riders International Classification, all schemes for classification use decimal fraction notation. CC because of its analytico-synthetic character provides hospitality at many points in the chain. The Gap Device is also used by the classification scheme to provide for Extrapolation in Chain.

7.2.2 Canon of Interpolation in Chain

A chain of class numbers or isolate numbers should admit of the interpolation of any number of links between any two consecutive links in the chain. No scheme for classification has introduced a specific device to satisfy this Canon. A. J. Wells as Editor of the *British National Bibliography* introduced "Stroke notation" for interpolation in a chain in decimal numbers. It also introduced Extension Notation in several cases (2). P. N. Kaula introduced Double Stroke Device to provide for interpolation of a new digit or digits between the two consecutive links in the chain.

8. Conclusion

A study of Canons of Ranganathan's Theory of Classification has been made for the first time in any national, regional or international conference. It is for the first time that such an elaborate analysis of Canons for work in the three Planes in Classification has been presented.

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