Use of Normative Principles for Comparison of Schemes of Classification.*

(Classification problems. 12). (Comparison series. 2).

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Ascertains, by an *a priori* approach, that the essential difference between two schemes of classification lies in their capacity to give co-extensive (CN) and in their having self-perpetuating quality. Discusses and demonstrates the use of Normative Principles for the systematic comparison of two schemes of classification. Confirms that the essential difference between the schemes of classification lies in their capacity to give co-extensive (CN) for the subjects already embodied in documents and also for those that may arise in the future as the universe of knowledge develops. Suggests the examination of an alternative set of postulates with reference to the two essential criteria for the comparison.

ABBREVIATIONS USED:

(BC)	= Basic Class(es)	(IP)	= Idea Plane
(BF)	= Basic Facet	(NP)	= Notational Plane
CC	= Colon Classification	[P]	= Personality Facet
(CN)	= Class Number(s)	RIC	= Rider's International
[E]	= Energy Facet		Classification
(FC)	= Fundamental	(VP)	= Verbal Plane
	Category(ies)		

1 Library Classification

Nearly a century ago Melvil Dewey designed the Decimal Classification with certain very practical ends in view. The usefulness of library classification in document retrieval was soon realised. Other schemes of classification were drawn up. The improvements in the schemes necessitated by the develop-

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ments in the universe of knowledge were initiated on day-to-day experiences in classifying documents. This was largely a trial and error method. In due course, however, based on the experience gained in the actual classification of documents and on the basis of an intuitive approach on the part of classificationists in respect of the modes of developments in the universe of knowledge, certain postulates and principles were brought to a conscious level as a help in the building of schemes of classification. In the early attempts (1925–35) in this direction, the work of W C B Sayers [21, 22] and of H E Bliss [1] are landmarks. Almost concurrently S R Ranganathan took up a new line of approach—the analytico-synthetic approach—to the design of schemes of classification. The result was the CC. On the basis of the experience gained in the application of the CC in the library of the University of Madras between the years 1924–37, certain new Normative Principles were abstracted. Thus the discipline of library classification was brought into the realm of a science. Between 1937–1957 the normative principles were further tested, modified, and refined.

11 NEED FOR COMPARISON BETWEEN SCHEMES OF CLASSIFICATION

Some of the schemes of classification drawn up since the DC encompass the entire universe of knowledge, while others cover a much restricted area of the universe of knowledge. In recent years when the document retrieval problem, particularly in respect of micro-documents, has become not only a pressing but also a complicated problem, attention has been consciously directed to the comparison of schemes of classification either for the purpose of choosing one that is most useful or to take advantage of such of the principles as are helpful in the design of schemes of classification.

12 CRITERIA FOR COMPARISON

"To appreciate the strength and weakness of a scheme of classification, to compare the relative merits of two or more schemes of classification, and to do the day-to-day work of classification it is necessary and helpful to enunciate a set of

tests and to lay down some systematic procedure" [16].   This has been stressed in some of the recent writings on this subject [2, 23]. 'Efficiency of Retrieval' has been taken as one of the criteria used in such comparisons [3].   The Normative Principles used in the building up of a scheme of classification are generally designed to ensure 'Efficiency in Retrieval'.   Therefore, another possible approach would be to compare the Normative Principles underlying the schemes.   Schemes of classification have been evaluated on this basis [10].

13 SCOPE OF THE PAPER

This paper demonstrates the systematic application of certain Normative Principles in the comparison of two schemes of classification—the CC, an analytico-synthetic scheme,. and the RIC the latest enumerative scheme (1961).   It is also the purpose of this paper to show that certain basic Normative Principles are applicable even to apparently widely different kinds of schemes of classification.

I would emphasise that this is just an attempt to evolve a methodology for comparison.   It does not make any pronouncements on the schemes compared on the basis of the results of the comparison.

2 Essential Difference between Two Schemes of Classification

Two schemes of classification can differ from one another in regard to any one or more of the following factors:

1 Sequence of (MC) or (BC);
2 Sequence of Array Isolates,
3 Host Class;
4 Terms used in naming the isolates;
5 Notation—Pure or Mixed;
6 Species of digits used; and
7 Length of the base.

None of these differences, will amount to an essential difference [14]. The essential difference would be in respect of:

1 Self perpetuating quality—that is, the capacity to give co-extensive (CN); and

2   The provision of guide lines to develop any one particular spot in or the whole of, the scheme.

21   CAPACITY TO GIVE CO-EXTENSIVE (CN)

211   CO-EXTENSIVENESS

Co-extensiveness is the expression in a class number of the measure of incidence of each of the relevant characteristics of the subject embodied in the document [9]. This can be studied in three planes.

1   Co-extensiveness in (IP).—Ascertaining and analysing the relevant characteristics incident in a specific subject.

2   Co-extensiveness in (VP).—Providing proper terms to represent the relevant characteristics incident in the specific subject.

3   Co-extensiveness in (NP).—Providing symbols to represent the relevant characteristics incident in a subject.

212   CO-EXTENSIVENESS IN (CN) AND DOCUMENT RETRIEVAL

The capacity to give co-extensive (CN) is taken as an essential characteristic because the efficiency to retrieve expeditiously the largest number of documents most relevant to the reader's need is very much dependent upon each document being given a co-extensive (CN) at the input stage. The length of the (CN) to reach the co-extensiveness is only a matter of convenience. Co-extensiveness is the primary consideration.

22   PROVIDING GUIDING PRINCIPLES

The universe of knowledge is ever changing. Its horizons are ever expanding. A scheme of classification if it is to be of practical use has to keep pace with the universe of knowledge. But it is very difficult for the classificationist to keep pace with or to pre-vision to any considerable extent the likely happenings in the universe of knowledge that is a multi-dimensional, dynamic, continuum [11]. Therefore, it will be practically impossible for him to enumerate all the possible isolates in a schedule.

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One possible solution will be to build into the scheme, at the time of its design, the capacity to accommodate in its appropriate place any new isolate as and when it arises. If the scheme is to be a *self-perpetuating* one, it is essential that the designer or classificationist explicitly states the guiding postulates and principles underlying its design and development. Therefore, the explicit statement or non-statement of the guide lines for the design and development can be regarded as an essential difference between two schemes of classification.

23 CRITERIA FOR COMPARISON

Two schemes can, therefore, be compared.

1 On their relative capacity to provide co-extensive (CN); and

2 On the basis of their methodology to provide for the building up of co-extensive (CN).

This means comparing the devices employed by the two schemes to give co-extensive (CN).

This comparison can be made at two levels, *viz*, Seminal and Phenomenal.

231 SEMINAL LEVEL

The ideal comparison of schemes of classification can be done if each one of them has a set of postulates explicitly stated. This will enable us to find out which set of Normative Principles is more helpful. This will be comparing the schemes at the seminal level. But as there are very few schemes of classification which have explicitly stated postulates and principles such a comparison of schemes of classification is not practicable at present.

232 PHENOMENAL LEVEL

As the next best method we can compare two schemes of classification at the phenomenal level. We can apply certain set of Normative Principles—that is, canons, principles, and postulates—and observe to what extent each scheme of classi-

fication conforms to these Normative principles. The set of postulates and principles used in this paper are those enumerated by Dr Ranganathan [12, 15]. They have been evolved on the basis of experience gained in classifying documents in many libraries during the past thirty years. More recently, they are also being used and tested in the work of designing depth schedules for various specific subjects. The comparison is based on the application of some of the canons, principles, and postulates to the (IP), (VP), and (NP).

3 Idea Plane

Work in the (IP) should be common to most of the universal schemes of classification, because it deals with the intrinsic quality of the universe of knowledge. The postulates for the (IP) are also based on the intrinsic quality of the universe of knowledge. Therefore, the postulates for the (IP) are applicable to these universal schemes of classification.

31 POSTULATES

There are five sets of postulates:

1 Postulate of Fundamental Categories;
11 Postulate of Basic Facet;
12 Postulate of Isolate Facet;
13 Consolidated Postulate about Subject;
2 Postulates of Concreteness;
21 Postulate of Sequence;
3 Postulate for Space and Time Facets;
4 Postulate of Rounds for Energy;
41 Postulate of Rounds for Personality and Matter;
42 Postulate of Sequence within a Round;
5 Postulate of Levels;
51 Postulate of Level Cluster.

311 POSTULATE OF FUNDAMENTAL CATEGORIES

There are five and only five (FC), *viz*, Personality, Matter, Energy, Space, and Time.

This is a basic postulate. It classifies the various kernel ideas into the five pockets: Personality, Matter, Energy, Space, and Time. Although this postulate is primarily based on CC, it can be applied to any scheme of classification. The PMEST idea has been applied to the Decimal Classification and the Universal Decimal Classification. It has worked well [13]. The following is an illustration of the application of the postulate to RIC:

3111 Example

NHR Teaching foreign language in elementary schools.

The above (CN) occurs in RIC under the (MC) N Education. Applying the Postulate of (FC), we get

> Teaching [E]
> Foreign language [P]
> Elementary school (child) [P]
> Education (BC).

3112 Annotation

CC clearly demarcates the (FC) in the (CN) by means of connecting symbols. The RIC does not give any such indication. But the PMEST idea easily works in the (IP) even with it.

312 POSTULATE OF CONCRETENESS

The five (FC) fall into the following sequence, when arranged according to their decreasing concreteness P, M, E, S, T.

313 POSTULATE OF SEQUENCE

The basic facet of the subject should be put first; and the other facets should be arranged thereafter in the sequence of the decreasing concreteness of the (FC) of which they are respectively taken to be manifestations, provided there is not more than one basic facet and not more than one manifestation of any (FC).

3131   Example

SN	Example	Sequence of (FC)	
		CC	RIC
1	Propagation of sound waves in physics	Physics (BF) Sound Waves [P] Propagation [E]	Physics (BF) Sound Waves [P] Propagation [E]
2	Physiology of respiratory system in medicine	Medicine (BF) Respiratory System [P] Physiology [E]	Medicine (BF) Physiology [E] Respiratory System [P]
3	Curricula for secondary school education	Education (BF) Secondary school [P] Curricula [E]	Education (BF) Secondary school [P] Curricula [E]

3132   Annotation

RIC conforms to the Postulate of Sequence in examples 1 and 3. In example 2, it gives a different sequence.

It may be an interesting study to apply the Postulate of Sequence to each one of the 17,576 (CN) in RIC and find out in how many cases RIC follows the postulate.

32   CANONS FOR CHARACTERISTIC

321   CHARACTERISTIC

Characteristic is an attribute or complex of attributes with reference to which the likeness or unlikeness of entities can be determined and at least two of the entities of the universe are unlike.

There are seven canons for characteristic:

1   Canon of Differentiation;
2   Canon of Concomitance;
3   Canon of Relevance;
4   Canon of Ascertainability;
5   Canon of Permanence;
6   Canon of Relevant Sequence; and
7   Canon of Consistency.

The canons 1, 2, 4 and 5 are all generally followed in both the schemes.

322 CANON OF RELEVANCE

Each characteristic should be relevant to the purpose of the classification.

3221 Example

1 In classifying Drugs, the 'Source of drug' is taken as the relevant first characteristic in the universe of Pharmacology whereas the 'Organ affected' is taken as the relevant first characteristic in the universe of Therapeutics, in both the schemes of classification.

2 In classifying 'Books', the 'Typography of the book', and 'Mode of composition' are taken as the relevant characteristics in the universe of printing, whereas 'Material used', and 'Type of binding' are taken as the relevant characteristics in the Universe of Binding, in both the schemes of classification.

3222 Annotation

The choice of a relevant characteristic depends upon the specialists approach to the subject of the document. In the case of Drugs, the approach of the Pharmacologist is different from that of a doctor interested in Therapeutics [17].

323 CANON OF RELEVANT SEQUENCE

The characteristics of the scheme are to be used in a sequence relevant to the purpose of classification.

3231 Example

SN	Subject	Sequence of Characteristics	
		in CC	in RIC
1	Literature	Language Form Author	Language Form Author
2	Medicine..	Organ Problem	Problem Organ

3232 Annotation

RIC follows a different sequence in Medicine.

33 CANONS FOR ARRAY

331 ARRAY

An array is a set of classes arranged in the proper sequence and derived from a universe on the basis of a single characteristic at any step in the progress towards a complete assortment of the entities of the universe [5].

RIC consists of 26 (MC). These form array of Order 1 Under each (MC) there are 26 sub-classes. These form array of Order 2. RIC provides for 676 sub-classes in the array of Order 2. Each of the 676 sub-classes is further subdivided into 26 sub-sub-classes. These form array of Order 3. Thus there· are 17,576 sub-sub-classes in array of Order 3.

There are four Canons for Array.

1 Canon of Exhaustiveness;
2 Canon of Exclusiveness;
3 Canon of Helpful Sequence; and
4 Canon of Consistent Sequence.

332 CANON OF EXHAUSTIVENESS

The classes in the array of classes should be totally exhaustive of their immediate common universe.

3321 Example

Devices Used	
in CC	in RIC
Sector Device	Gap Device
Empty and Emptying Digit Device	Provision of residual class under " other " or " Rest of".
	Example: CY Other Religion F History, Rest of World OYY Other Rubber Products

333 CANON OF EXCLUSIVENESS

The classes in an array of classes should be mutually exclusive.

3331 Example

CC	RIC
Uses one and the same characteristic to derive an array of classes or isolates	Uses one and the same characteristic to derive an array of classes.
	Provides instructions such as "Class the pests and diseases of a specific crop under that crop," to avoid cross-classification where more than one characteristic is used.

334 CANON OF HELPFUL SEQUENCE

The sequence of the classes in any array of classes should be helpful. It should be according to some convenient principle, and not arbitrary, wherever insistence on one principle does not violate other more important requirements.

Fourteen principles are available for deriving the sequence of isolates in an array. They are given below in the sequence in which they should be applied.

1 Increasing Quantity;
2 Later-in-Time;
3 Later-in-Evolution;
4 Spatial Contiguity;
5 Bottom-Upwards; ·
6 Left-to-Right;
7 Away-from-Position;
8 Clock-wise;
9 Increasing Complexity;
10 Canonical Sequence;
11 Literary Warrant
12 Alphabetical Sequence;
13 Increasing Concreteness; and
14 Increasing Artificiality.

3341 Principle of Later-in-Time

If the classes in an array have originated in different times, they may be arranged in a parallel progressive time-sequence.

33411   Example

SN	Subject	CC	RIC
1	Stratigraphy	Archeozoic Paleozoic Mesozoic Cainzoic Quarternary	Archeozoic Paleozoic Mesozoic Cainzoic Quarternary
2	Religion	Hinduism Buddhism Judaism Christianity Islam	Christianity Judaism Islam Hinduism Buddhism

33412   Annotation

RIC follows the Principle of Later-in-Time in Stratigraphy But in Religion it gives a different sequence.

33342   Principle of Later-in-Evolution

If the isolates in an array belong to different stages of evolution, they should be arranged parallel to the course of evolution.

33421   Example

SN	Subject	CC	RIC*
1	Medicine, Physiology	Embryo Child Adolescent Old age	Embryo Child Adult Old age
2	Political Science, Government	Anarchy Primitive Feudal Monarchy Oligarchy	Primitive (Patriarchal) Feudal (Tribal) Oligarchy (Aristocratic) Monarchy (Dictatorship) Democracy Republics

* The terms given within brackets are the equivalent terms given in RIC

33422 Annotation

In RIC, Oligarchy, which is later-in-evolution than Monarchy, precedes Monarchy.

3343 Principle of Spatial Contiguity

If the classes of an array occur contiguously in space, they may be arranged in a parallel spatial sequence.

33431 Example

SN	Subject	CC	RIC
1	Space schedule ..	Asia Europe Africa America Australia	America Europe Africa Asia Australia

33432 Annotation

Both RIC and CC follow the Principle of Spatial Contiguity. Only the starting points are different.

3344 Principle of Bottom Upwards

If the isolates in an array can be taken to be those occurring regularly along with a vertical line, then they should be arranged from bottom-upwards.

33441 Example

Subject: Medicine

CC	RIC
Lower extremity	Head
Toe	Neck
Foot	Thorax
Ankle	Abdomen
Leg	Upper extremity
Knee	Lower extremity
Thigh	Thigh
Abdomen	Knee
Thorax	Leg
Upper extremity	Foot
Neck	Toe
Head	

33442   Annotation

RIC follows the reverse of the Principle of Bottom-Upwards, that is Top-Downwards.

3345   Principle of Away-from-Position

If the isolates in an array can be taken to start from a certain point and diverge away from it, roughly along a line, they should be arranged from the starting point along the diverging line.

33451   Example

Subject: Astronomy

CC	RIC
Moon	Sun
Sun	Moon
Mercury	Mercury
Venus	Venus
Mars	Mars
Jupiter	Jupiter
Saturn	Saturn
Uranus	Uranus
Neptune	Neptune
Pluto	Pluto

33452   Annotation

RIC takes 'Sun' as the starting point. CC takes 'Earth' as the starting point.

335   CANON OF CONSISTENT SEQUENCE

Whenever similar classes occur in different arrays, their sequences should be parallel in all such arrays unless there is a positive difference in purpose and helpfulness.

3351 Example

SN	Subject	CC	RIC — Sequence of isolates in		
1	Space Schedule ..	Gives a common schedule which is applicable to all (MC)	(MC) History America Europe Africa Asia Australia	(MC) Law America Europe Africa Asia Australia	(MC) Agriculture America Europe Africa Asia Australia
2	Language ..	Gives a common schedule which is applicable to several (MC)	(MC) Language European Hebrew Persian Arabic Turkish Hindustani Chinese Japanese Africa		(MC) Literature European Arabic Persian Hebrew Turkish Hindustani Chinese Japanese
3	Approach materials .. (Reference)	Gives a common schedule applicable to all (MC)	(MC) Physics, Solids Cyclopaedia Periodicals Bibliography Research		(MC) Agriculture Cyclopaedia Periodicals Bibliography Research

3352 Annotation

1 In example 2, RIC deviates from the Canon of Consistent sequence.

2 In most cases, RIC conforms to the Canon. However, it has not taken advantage of providing schedules for Common Isolates which would help in shortening the length of the schedule. By avoiding such repetitions alone, RIC could have slimmed down its 930 page-schedule by about 270 pages [4].

3 RIC does not also make use of Mnemonics. Thereby the autonomy to the classifier is considerably reduced.

34 CANONS FOR CHAIN

341 CHAIN

Chain is a sequence of the classes of a universe consisting of a class and its universes of successive removes carried backwards to any point desired [6].

3411 Example of 'chain

CC	RIC
Agriculture	Agriculture
Food crops	Grain crops
Cereals	Rice
Rice	..

There are two Canons for chain:

1 Canon of Decreasing Extension; and

2 Canon of Modulation.

342 CANON OF DECREASING EXTENSION

While moving down a chain of classes from its first link to its last, the intension of the classes should decrease at each step.

3421   Example

SN	Subject		CC	RIC
1	Chemistry	..	Inorganic substance	Inorganic substance
			Group 0	Non-metallic compounds
			Helium	Rare gases, Helium
2	Medicine	..	Human body	Human body
			Digestive system	Digestive system
			Intestine	Intestine
			Large intestine	Rectum
			Rectum	

343   CANON OF MODULATION

A chain of classes should be derived from the universe with the use of correct resolving power at each stage of division.

Resolving power is the power of recognising the sub-classes appropriate to the array of the first order of an immediate universe.

3431   Example

The examples given under Sec 3421 may be taken as examples for this Canon also.

3432   Annotation

1   In example 1, CC shows only 3 links whereas RIC shows four links. This is because RIC divides the universe of Inorganic substances into metallic and non-metallic.

2   In example 2, CC shows 5 links whereas RIC shows only four links. This is because RIC does not divide the universe into 'Small intestine' and 'Large intestine' whereas CC does so.

35   CANONS FOR FILIATORY SEQUENCE

351   FILIATORY SEQUENCE

Filiatory sequence is a sequence of entities which have close linear kinship or relation [7].

There are two canons:

1 Canon for sub-ordinate classes; and

2 Canon for co-ordinate classes.

352 CANON FOR CO-ORDINATE CLASSES

Among the classes in an array, no class with less affinity should come between two classes with greater affinity.

3521 Example of Array of (MC)

Sequence in	
CC	RIC
Physical sciences	Humanities
Biological sciences	Social sciences
Humanities	Physical sciences
Social sciences	Biological sciences
	Fine arts
	Languages
	Literature

3522 Annotation

Fine arts, Languages, and Literature obviously have more affinity to Humanities and Social Sciences than to Physical or Biological Sciences. RIC does not follow the Canon of Co-ordinate Classes in the array of (MC).

4 Verbal Plane

41 TERMINOLOGY

Terminology is the set of terms used in a schedule to denote the ideas represented by the ordinal numbers. The set of terms used in a scheme of classification are to be chosen carefully. For this purpose, they are to be precise and pin-pointed. This, in turn, requires the strict adherence to certain Normative Principles both by the classificationist and by the classifier. We can compare two schemes of classification on the basis of the Canons for Terminology.

42 CANONS FOR TERMINOLOGY

There are four canons:

1 Canon of Currency;
2 Canon of Reticence;
3 Canon of Enumeration; and
4 Canon of Context.

43 CANON OF RETICENCE

The terms used to denote the classes in a scheme of classification should not be critical.

431 ANNOTATION

1 Both CC and RIC have tried to avoid critical terms. But to satisfy the Canon of Exhaustiveness, RIC has used such colourless terms as "CY Other religions", "ZQ Other Asian literatures and languages," etc. This has been used in almost all the 676 sub-classes of array of Order 2.

2 To make the Space Isolates schedule exhaustive, RIC has used the terms such as "Rest of the world," "Rest of Asia" etc.

3 In RIC such terms as "WI Minor Arts allied to Sculpture" violates this Canon. Under this heading are enumerated Numismatics, Lapidiary Work, Jewellery, Goldsmithy, etc.

4 CC also uses, in a few cases, the colourless term 'Others', eg, "Other texts" in [P2] of the (BC) R6 Indian Philosophy.

5 Although such deviations from the Canon of Reticence are made to make the schedule exhaustive, it should be done only as a last resort.

44 CANON OF ENUMERATION

The denotation of each term in a scheme of classification should be decided in the light of the classes enumerated in the various chains (lower links) having the class denoted by the term as their common first link.

441 ANNOTATION

CC strictly follows the Canon of Enumeration. But RIC does not seem to have used this Canon to full advantage. The

following are some examples:

1 UWB Drug affecting the digestive system.
   Laxatives. Purgatives. Emetics. Demulcents.
2 UWD Heat and blood drugs.
   Heart stimulants and depressants. Blood coagulants and anti-coagulants. Blood and plasma transfusions.

These (CN) occur under the (MC) UW Therapeutics. According to the Canon of Enumeration, the term 'Drug affecting the digestive system' against UWB and "Heart and blood drugs" against UWD would have served the purpose. The other terms are not necessary. The schedule should not be made to function as a dictionary. Moreover, RIC does not intend to give fully co-extensive-(CN) for micro-subjects [19]. To satisfy the approach by the name of these comprehensive terms, it could have included these terms in the alphabetical index and refer red to the corresponding intended (CN).

45 CANON OF CONTEXT

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

451 EXAMPLE

SUBJECT: Sound

Sample schedule in	
CC	RIC
C PHYSICS C3 SOUND *Foci in* [P] 1 Audible sound 2 Infra sound 5 Ultra sound *Foci in* [E] 1 Generation 2 Propagation 3 Frequency 5 Interference 7 Acoustics 8 Nature	QL SOUND. LIGHT. HEAT. QLA Sound. General works. Theories of sound. QLB Creation of sound waves. In solids, liquids, and gases. QLC Sound wave vibrations. In strings and wires. In rods, bars, and tuning forks. In disks, plates, membranes and disphragms. In contained cones or columns of air, etc. QLD Transmission, reproduction and reflection of sound waves. Echoes. QLE Superposition of wave vibrations. QLF Characteristics of sound waves. Velocity. Refraction. Amplification of, etc. QLG Subsonic and ultrasonic vibrations. Bat heard sounds. Explosive sounds.

452 ANNOTATION

1 RIC has not taken advantage of the Canon of Context. It has enumerated the term 'Sound' against each one of the (CN). And against the (CN), QLA and QLG it uses the same term more than once.

2 CC has more or less used the Canon of Context to great advantage. It has, however, not made full use of this Canon, for, it repeats the term 'sound' in all the isolates in [P]. It would have been sufficient to enumerate:

    1 Audible;
    2 Infra; and
    5 Ultra.

3 The advantage of this Canon is in that it
    1 Shortens the length of the schedule; and
    2 Avoids homonyms.

5 Notational Plane

51 NOTATION

The system of ordinal numbers representing the classes in a scheme of classification [8].

A scheme of classification is characterised by its Notational System. Therefore, while designing a scheme of classification, the choice of a Notational System also is an important consideration.

52 CANONS FOR NOTATION

There are six canons:

1 Canon of Relativity;
2 Canon of Uniformity;
3 Canon of Expressiveness;
4 Canon of Non-hierarchical Notation;
5 Canon of Mixed Notation; and
6 Canon of Pure Notation.

The Canons 1 and 2; 3 and 4; and 5 and 6 may be considered in pairs in that sequence.

53 RELATIVITY AND UNIFORMITY

531 CANON OF RELATIVITY

The number of digits in a class number should be proportional to the order of the class it represents.

532 CANON OF UNIFORMITY

The number of digits in a class number should be constant whatever be the order of the class it represents.

The Canon of Uniformity is the negation of the Canon of Relativity. It is possible to design the notational system on the basis of either of these two canons.

533 EXAMPLE

Order of Intention	Subject		CC	RIC
1	Physics	..	C	QJA
2	Light	..	C5	QLH
3	Dispersion	..	C5:3	QLL
4	Spectrum technique	..	C5:31	QLP
5	Ultraviolet spectrum	..	C52:31	QLQ
6	Raman effect	..	C52:38N28	QLQ

534 ANNOTATION

It may be seen that the number of digits in the (CN) in CC increases as the order of intension increases. RIC conforms to the Canon of Uniformity. None of its (CN) is longer than or less than three digits.

54 EXPRESSIVENESS

541 CANON OF EXPRESSIVENESS

There should be in a class number a digit to represent each of the characteristics used in constructing the class number.

542 CANON OF NON-HIERARCHICAL NOTATION

In a class number there need not be a digit to represent each of the characteristics used in constructing the class number.

The Canon of Non-hierarchical Notation is the negation of Canon of Expressiveness. It is possible to design the notational system on the basis of either of these two canons.

543 EXAMPLE

Subject	CN in	
	CC	RIC
Raman effect ..	C5 : 38N28	QLQ

544 DIGIT BY DIGIT ANALYSIS OF THE (CN)

CC		RIC	
CN	Subject	CN	Subject
C	Physics	Q	Physical sciences
C5	Light	QL	Sound. Light. Heat.
C5 : 3	Dispersion (Spectroscopy)	QLQ	Raman effect
C5 : 38N28	Raman effect		

545 ANNOTATION

CC, by means of its analytico-synthetic structure, is able to give fully co-extensive (CN) to micro-subjects. Therefore, its (CN) are expressive. In RIC the Canon of Uniformity is given preference to the Canon of Relativity. Therefore, it cannot give fully co-extensive (CN) to many of the microsubjects. A statistical study shows that RIC is capable of giving co-extensive (CN) in 52 cases out of 100 in the case of subjects going with the (MC) Medicine [4].

55 MIXED NOTATION

551 CANON OF MIXED NOTATION

The notation of a scheme of Classification should be a mixed one.

552 CANON OF PURE NOTATION

The notation of a scheme of classification should be a pure one.

553 ANNOTATION

CC uses more than one species of digits, namely .

1 Roman capital letters;
2 Roman small letters;
3 Indo-Arabic numerals;
4 Packeted symbols; and
5 Punctuation marks

RIC uses only one species of digits, namely Roman capital letters.

6 Canons for Knowledge Classification

There is no explicit statement for the Canons for Knowledge Classification in RIC. Therefore, in RIC the Canons can be applied only to the (CN) or the Isolate Numbers enumerated, which should normally reflect the findings in the (IP).

There are seven canons:
1 Canon of Hospitality in Array;
2 Canon of Hospitality in Chain;
3 General Canon of Mnemonics;
4 Canon of Verbal Mnemonics;
5 Canon of Scheduled Mnemonics;
6 Canon of Systematic Mnemonics; and
7 Canon of Seminal Mnemonics.

61 CANON OF HOSPITALITY IN ARRAY

The construction of a class number should admit of an infinite number of new co-ordinate classes or isolates being added to the array to which it belongs at appropriate filiatory places without disturbing the existing class numbers in any way.

611 DEVICES FOR HOSPITALITY IN ARRAY

The following table shows the various methods used in CC and in RIC to implement the Canon of Hospitality in an Array.

SN	CC	SN	RIC
1	Emptying digit device	1	Providing such class headings as ' Other '
2	Sector device		
3	Group notation device	2	Gap device
4	Chronological device		
5	Geographical device		
6	Alphabetical device		
7	Common isolate device		
8	Subject device (Packet device)		

Note.—The devices 1, 2, 3 in column 1 are purely notational devices. The others are devices implementing certain findings in the (IP).

612 ANNOTATION

In the Array of (MC), in RIC there is no provision for interpolating or extrapolating new (MC).

62 CANON OF HOSPITALITY IN CHAIN

The construction of a class number or an isolate number should admit of an infinite number of new class numbers or isolate numbers being added at the end of the chain to which it belongs, without disturbing the existing class numbers or isolate numbers in any way.

621 DEVICES FOR HOSPITALITY IN CHAIN

The following table shows the various devices used in CC and in RIC to implement the Canon of Hospitality in Chain.

SN	CC	SN	RIC
1	Decimal fraction notation device	1	Gap device
		2	Increasing the number of digits in the (CN) (We can get 26 headings under each one of the 17,576 (CN) already listed, *ie*, 456,976 additional (CN).
2	Gap device		
3	Facet device		
4	Phase device		
5	Superimposition device		
6	Subject device		

6211 Annotation

In RIC many of the chain isolates are given co-ordinate status with the links of Lower Order. Thus, several links in a chain get one and the same (CN).

For example,

UAN   Lower extremities
        Thigh. Knee. Leg. Foot.

63 MNEMONICS

According to Dr Rider, the RIC is not using the idea of Mnemonics [20]. Therefore, the Canons for Mnemonics cannot be applied to RIC.

7 Conclusion

71 GENERAL APPLICABILITY OF NORMATIVE PRINCIPLES

It is noted that the Normative Principles used in the comparison are generally applicable to and are followed by CC as well as RIC, although the principles themselves were developed for the CC approach to classification. This emphasises the fundamental nature of these principles. In fact they appear to reflect the basic thinking process in any designer of a scheme of classification.

72 EFFICIENCY IN RETRIEVAL AND NORMATIVE PRINCIPLES

These principles, we may remind ourselves, have been developed with the specific purpose of ensuring efficiency in retrieval. Therefore, it is unlikely that we shall find considerable differences in performance on the retrieval side between schemes of classification which basically conform to these principles, though they may differ apparently in many other respects (see Sec 2). This is confirmed to some extent, for example, by the Aslib-Cranfield experiment [3]: The recall efficiency got with the four retrieval systems tested was nearly the same. Therefore, a test of efficiency merely on the basis of the number of documents recalled by the systems will not suffice in a comparative study.

It would be interesting to examine to what extent the Normative Principles discussed in this paper are applicable and are conformed to, by the document retrieval systems studied. It is noteworthy that in another test [18] even a mere faceted scheme gave a better performance in respect of the relevancy of the documents retrieved.

73 RELEVANCY AND CO-EXTENSIVE (CN)

The degree of relevance of the documents retrieved in response to a query depends on the capacity of a scheme of classification to give co-extensive (CN) (see Sec 211). It would be interesting to examine whether the poor performance of a retrieval system was due to its not having the built-in-capacity to give co-extensive (CN) on the basis of relevant Normative Principles.

74 CRITERIA FOR CHOICE BETWEEN TWO SCHEMES

If two schemes of classification are capable of comparable performance in respect of recall and relevance, then our choice between them would depend upon their capacity to provide co-extensive (CN) for new developments in the universe of knowledge in the future. This means the explicit statement of the guiding postulates and principles for the design and development of the scheme. Thus, we may infer that we have to look for the essential difference between two schemes of classification on the basis of their capacity of give co-extensive (CN) and on their self-perpetuating quality.

75 TESTING WITH ALTERNATIVE POSTULATES

In the present study I have made use of only one set of postulates although, as mentioned in Sec 72, the postulates are apparently applicable to any scheme of classification. It is essential that alternative postulates be examined with reference to the two essential criteria for comparison mentioned above.

8 Acknowledgement

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