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**PART J**

**CANONS FOR WORK IN THE NOTATIONAL PLANE**

## CHAPTER JA

### INTRODUCTION

#### 1 Scope of Part J

As stated in Chap HA, all the illustrations will hereafter be drawn from the Universe of Subjects. This universe is an ever-growing one. Whether a universe is a static one or an ever-growing one, the notational system used for its classification should satisfy a certain set of canons. This set we shall call 'Basic Canons for Notation'. This part deals with them. Part K deals with the Canons for Mnemonics. The additional Canons needed for the notational system of an ever-growing universe are described in Part L.

#### 2 List of Canons 1

The notational system of a scheme for the classification of any universe should satisfy the following two canons:

- 1 Canon of Synonym; and
- 2 Canon of Homonym.

#### 3 List of Canons 2

There are ten other canons to be satisfied by the notational system of any scheme for classification. These fall into five pairs such that each pair consists of one canon and of its negation. The following are the five such pairs of canons:

- 1 Canon of Relativity and Canon of Uniformity;
- 2 Canon of Hierarchy and Canon of Non-Hierarchy;
- 3 Canon of Mixed Notation and Canon of Pure Notation;
- 4 Canon of Faceted Notation and Canon of Non-Faceted Notation; and
- 5 Canon of Co-extensiveness and Canon of Under-extensiveness.

The succeeding chapters of this Part throw their weight in favour of the first canon in each of the above pairs.

## CHAPTER JB

### SYNONYM IN THE NOTATIONAL SYSTEM

#### 1 Canon of Synonym

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.

The above 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.

In the succeeding sections of this chapter, any statement about the class number of a subject is also true of the isolate number of an isolate idea.

#### 2 Why of the Canon

In Sec HA3 the alphabetical representation of subjects by their names was ruled out, because of a natural language having synonyms and the great chance of the synonyms leading to the location of one and the same subject under its different names. Classificationists and librarians have no power to blot out the synonyms in a natural language or to prevent the formation of new synonyms. This is one of the reasons why a classificatory language of ordinal numbers is designed by the library profession. The profession should not inject, into this classificatory language of theirs, the very same fault of synonyms for which alphabetisation was ruled out.

#### 3 Possibility of the Canon

Unlike the natural language, classificatory language is one controlled by a small group of specialists—viz, classificationists. It is open to any member of the public to add a synonym to a word in a natural language. But in a classificatory language, the public have no such opportunity. Therefore, it is possible for the classificationist to keep his classificatory language synonym-free. He must do so. That is the direction of the Canon of Synonym.

#### 4 Violation of the Canon

But, unfortunately, some schemes for classification overlook this Canon. They overlook the fact that if two or more different class numbers are used to represent one and the same subject, the materials on that subject are liable to be scattered under the different class numbers. To put it in a jocular way, a classifier may give one class number to a subject in 1966, another classifier succeeding

him in 1967 may give any one of the other synonymous class numbers. Even the same classifier may do so.

#### 41 DECIMAL CLASSIFICATION

In DC Ed 14 (1942), scores of synonymous class numbers had crept in, perhaps unawares. Fortunately, DC Ed 17 (1965) has largely removed this fault by retaining only one of the synonymous class numbers in each case. This shows that DC has now become sensitive to the Canon of Synonym.

##### Example

SN	Subject	DC Ed 17 (1965)	DC Ed 14 (1942)
1	Reading list of books for children	028.52	028.5 and 371.643
2	Forest ecology	581.5	581.52642 and 634.946
3	Veterinary hygiene	636.089 4	614.9 and 636.0893

#### 42 UNIVERSAL DECIMAL CLASSIFICATION

In UDC, synonymous class numbers have been deliberately provided. Its Connecting Digit ':' has proved a fruitful source of synonyms. It is called the "Relation Sign". "The : (Colon) sign, the most important of the connecting symbols, is used generally to link two or more UDC numbers denoting related concepts of (approximately) equal value, the numbers being reversed to ensure separate entries for the co-ordinate ideas.

##### "Example

- 17:7 Ethics and morals in art (reversed as 7:17)  
 31:63 Statistics applied to agriculture, agricultural statistics (reversed as 63:31)  
 341.63(44:45) Arbitration between France (44) and Italy (45) [reversed as 341.63(45:44)]" [25].

UDC seems to be so particular about the creation of synonyms in this way that it goes to the length of prescribing simplification in routine work in the following words. "Typing duplicate cards for files, purely for the sake of the reversed numbers, may be avoided by using carbon replicas and underlining the appropriate component." The UDC goes on further to say that "The significance of the colon digit, indeed, is not limited to a strictly co-ordinate relationship, and it may be used to separate several UDC numbers which for clarity and to avoid long combinations, may be written one below the other.

## "Example

- 669.1:543 Iron and steel: analysis  
 :546.22 Sulphur (in iron and steel)  
 :546.815 Lead (in iron and steel)" [25].

## 421 Exposure by Mills

Jack Mills exposes the creation of synonyms in the use of the digit colon in the following words:

"It is used to specify a subordinate concept in a compound when no other way of showing the compound is feasible . . . It is also used even when provision already exists for specifying the compound in a briefer and more direct fashion by special auxiliary, for example, 633.1:631.35 Grain crops—harvesting machinery, instead of 633.1-135; or 420.415.6 English syntax, instead of 420-56; or 728(42):72.035 Architecture houses—England—revival styles, instead of 728(42):035; or even 616.2:616-053.2 Diseases—respiratory—children, instead of 616.2-053. This use of the colon serves one clear and important purpose. It allows the multiplication of entries, so that one entry can be filed separately under each part separated by colon(s). By permuting the citation order of these parts, a separate and complete file on each part can be maintained.

## "Example

- 633.1:631.319 Grain crops—drill ploughs  
 633.1:631.331 Grain crops—sowing machinery  
 633.1:631.35 Grain crops—harvesting machinery  
 633.1:631.43 Grain crops—soil, physical properties  
 633.1:632 Grain crops—diseases, pests (and their control)  
 633.1:632.954 Grain crops—weed killers

as well as

- 631.319:633.1 Drill ploughs—grain crops  
 631.331:633.1 Sowing machinery—grain crops  
 631.35 :633.1 Harvesting machinery—grain crops  
 631.43 :633.1 Soil, physical properties—grain crops  
 632 :633.1 Diseases, pests (and their control)—grain crops  
 632.954:633.1 Weed killers—grain crops.

It should be noted that it is only when the method of permuting coloned numbers by multiple entry is used that the colon can be said to reflect 'Co-ordinate' relations. If the method followed is the traditional one of making one entry only in the classified file (bringing out 'distributed relatives' in the A/Z index—as described in 2.1 and 2.2), then any concept which is cited *after* another, whatever notational device is used, is strictly *subordinate* to the previous one. That is, entries on the second concept are distributed, whereas those on the first concept are kept together, for example, in 622.33:622.232 the equipment concept is subordinated to the mineral

concept." [23].

However, a few pages later in the same book Mills puts his finger at the danger of using synonymous class numbers.

"Note the filing position of the colon compared with special auxiliaries, bearing in mind its use as a facet indicator (as when, in Agriculture 63, it is used to introduce the Operations and Processes facets 631/632 in preference to the use of the special auxiliaries —1/—2). For example,

*"Using colon :*

633.1	Agriculture, grain crops
633.1:631.55	Agriculture, grain crops: <i>harvesting</i>
633.1 (02)	Agriculture, grain crops (treatise on)
633.1 "18"	Agriculture, grain crops "19th century"
633.1 (410)	Agriculture, grain crops (Great Britain)
633.1.001.5	Agriculture, grain crops—research
633.11	Agriculture, grain crops, wheat

*"Using special auxiliary:*

633.1	Agriculture, grain crops
633.1(02)	Agriculture, grain crops (treatise on)
633.1 "18"	Agriculture, grain crops "19th century"
633.1 (410)	Agriculture, grain crops (Great Britain)
633.1.001.5	Agriculture, grain crops—research
633.1-155	Agriculture, grain crops— <i>harvesting</i>
633.11	Agriculture, grain crops, wheat

It can be seen that this use of the colon misplaces the entries in that it locates a precise facet of the topic (here, the Operations Facet of agriculture represented by Harvesting) right at the beginning, preceding the general and descriptive accounts of the topic indicated by Common auxiliaries ( ), " ", etc." [24].

#### 422 ROOTS OF THE TROUBLE

The roots of the trouble due to synonyms in UDC come from different directions.

1 The digit 'Colon' is multi-functional. It is used to separate facets of different characters (See Chap CS) and also to represent phase relations (See Chap SQ) of different kinds;

2 Failure to separate out the work in the Idea Plane from that in the Notational Plane (See Part M);

3 Failing to use the Principle of Holism according to which classification and cataloguing should clearly demarcate their respective jurisdictions. Each should leave to the other what is better done by the other than by itself. Chain procedure [98] is an effective tool in making the joint service of classification and cataloguing quite effective in conformity to the Principle of Holism [119];

4 Failing to use the concept of Collection Numbers to meet the special needs of a minority group among readers (See Chap WB); and

5 Failure to recognise the help that can be taken from a special set of alphabetical entries in the catalogue in a library with too many different minorities to be served with the aid of Collection Numbers alone (See Chap WB).

#### 43 BIBLIOGRAPHIC CLASSIFICATION

BC also goes in for synonymous class numbers under the caption, "Alternative locations" and "Alternative methods". Here is the description.

"*Adaptation of logical order to practical uses and to convenience through collocation, together with adaptation to different views and various purposes, are principles that pervade this system. Alternative locations are accordingly provided throughout the schedules and also alternative methods of classifying the complex subject-matters relative to the several languages and literatures, for which special auxiliary schedules are available. Besides these indicated and available alternatives, there are many see also references, which would serve not only for subject-cataloguing but for use of "shelf-list" catalogs and for research at the shelves. The alternative locations are not only for important major subjects, such as Theology, and for sub-sciences such as Bacteriology, Mineralogy, Paleontology, and Bio-chemistry, but for special subjects everywhere throughout the schedules; for instance, Ecological Variation, Spectroscopy, and Education in Hygiene, or "Health Education", often, as in the last instance, involving synonymous terms. A list of the most important major alternatives is serviceable in Table V. For special subject-bibliography, Biography, Periodicals, Pamphlets, Documents, etc, there are alternatives either to sub-classify them specially throughout the system by applying Schedule 1, or else to keep them unitary under major classes or divisions. These alternatives are termed 'systematic alternatives', as distinct from the indicated alternatives and alternative methods defined above. This principle of Adaptation by Alternatives is most distinctive of this system. It renders the schedules somewhat more complicated but that is compensated by the enhanced adaptability"* [12].

Here are a few extracts from the "Table 5, Important Alternatives":

"*Aviation and aeronautics may be classified either under Physics in BT or under the Arts in UK.*

"*Bacteriology, including Microbiology, is assigned to FV, or EY, but the botanical study of Bacteria may be placed under*



Cryptogamia, in FLD.

"*Bibliology, Bibliography, and Documents* may be classified either in Class Z, after Literature, or in Class 2, preceding Special Collections.

"*Biochemistry, EH*, has the alternative CS, under Organic Chemistry.

"*Constitutional Law*, collocated with the study of Constitution, in RC, requires an alternative under Law in SC" [14]. As I have understood Bliss, different alternative class numbers cannot be used by one and the same library. Each library will have to exercise the option once and for all. For international use also, it is possible to exercise one of the alternatives once and for all. Thus, the Canon of Synonyms can be respected.

## 5 Colon Classification

### 51 SYNONYMOUS CLASS NUMBER

In CC, there is an apparent violation of the Canon of Synonym in the schedule of Geographical Isolates. Taking the country "India", for definiteness but without loss of generality as the mother-country of the library, it looks as if India could be represented either by the number 2 or by the number 44 at its pleasure. But the rule prevents the use of both. It has to exercise the option once and for all.

### 52 USE OF COLLECTION NUMBER

To meet the need of alternative approach of readers, instead of providing an alternative class number for each of the subjects which come within the purview of the alternative approach, CC persists in giving the only unique class number prescribed by it for each special subject; but to facilitate the alternative approach of a group of readers it uses "Collection Number" (*See Part U*).

## 6 Compulsory Canon

The Canon of Synonym is one of the few compulsory canons in classification. The purpose of this is to avoid the scattering of documents on one and the same specific subject instead of concentrating them at one point. Many of the other canons are either only desirable or merely state what happens normally.

## 7 Recommendation to FID

Whatever might have been the reason for the originators of UDC to have contemplated the use of synonymous class numbers, it is recommended to the International Federation for Documentation (FID) that this practice should be given up.

## CHAPTER JC

### HOMONYM IN THE NOTATIONAL SYSTEM

#### 1 Canon of Homonym

The subject represented by a class number in a system of class numbers and the isolate idea represented by an isolate number in a system of isolate numbers, should be unique.

The above 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 the succeeding sections of this chapter, any statement about the class number of a subject is also true of the isolate number of an isolate idea.

#### 2 Why of the Canon

If the subjects are arranged by their names in a natural language, different subjects having the same name will get promiscuously mixed up in the shelves and their main cards will be equally mixed up in the catalogue. This will be the very negation of classification—leading to “Chaos-in-Little”.

#### 3 Possibility of the Canon

In a natural language, Homonym gets created inevitably (See Sec GA4). As stated in Sec JB5, Classificatory language is an artificial language created and controlled by a small group of specialists—viz, Classificationists. It is possible for any member of the public to bring into vogue the use of one and the same word to denote two or more ideas. But it is not possible for him to do so in classificatory language. It is quite within the competence of the classificationist to keep his classificatory language homonym-free. He must do so. This is the direction of the Canon of Homonym.

#### 4 Source 1 for Homonym: Policy about Length of Class Number

The policy of the classificationist, restricting the number of digits allowed in a Class Number, is Source 1 for Homonym in Class Number.

#### 41 RIDER'S INTERNATIONAL CLASSIFICATION

In RIC, the following statement of policy occurs:

*“Enlarging International Classification Number—It has been emphasised that the International Classification has no heading (obviously, meaning Class Number) —and will never have any heading—more than three letters long”* [159].

As an aside it can be seen that the widely understood term

'Classification Number' mentioned in the heading has been replaced in the very first line under the heading by the term 'Heading'. The result of this policy can be seen in most of the items in the schedule owing a class number as representing several classes—related though they might be. This occurs in all the subject-fields—literally from A to Z.

- AHQ Book acquisition. Selection. Exchanges. Handling of gifts. Acquisition processes. Discarding. Inventory.  
 NFB Recitations. Oral teaching. Oral drill. Home work. Work assignments.  
 ZKF Hindi and Hindustani poetry. General works. Histories. Collections.

The result of such homonyms in class numbers is the creation of innumerable pockets of "Chaos-in-Little" on the shelves in the Stack-Room. Evidently, stressed by the realisation of this fault, RIC concedes as follows, in the very next sentence containing the policy statement about three digits. "But this does not stop any library using it from developing (for its own private use) expansions of any of its headings" [159].

#### 42 BIBLIOGRAPHIC CLASSIFICATION

BC often speaks of "Economic Limit of Notation" [13]. How the Economic Limit is arrived at has not been shown. By sheer repetition, it has been made a dogmatic creed. This creed reminds one of making the head fit the cap. Surely, it is not the length that should decide the class number, but the subject.

A slant of—perhaps pardonable—pride in the shortness of its notation is betrayed by BC in the following words: "To exemplify the economy of our composite notation, three very special subjects follow here; and for comparison we add to two of these the supposed equivalent number-built notation of the expanded *Decimal Classification*. And how would the *Colon Classification* deal with these subjects and how long would its notations be?" [15]. Then follow the three subjects each with its BC number and its UDC number. I reproduce below these numbers as given in that book and add also the CC numbers.

##### Subject 1. Development of Radar in the French Navy

Scheme	Class Number	Number of digits
BC	BOW-RN13	8
CC	D9N8, 44 (MV5.53)	15
UDC	621.396.9:359 (44)	17

*Note.*—The CC number is provisional.

Subject 2. Effect of heat treatment on the electrical  
properties of Germanium

Scheme	Class Number	Number of digits
BC	CNGG,D,CH	9
CC	F143;c60gC4	11
UDC	537.311.33:546.289:669-15	25

Subject 3. Precise calibration of tuning forks  
in radio Engineering

Scheme	Class Number	Number of digits
BC	BOS-BPF-BBTC	12
CC	D65,4;(C3e1:1)	14
UDC	621.317.755:534.321.7.08	24

BC does score in all the cases. UDC's handicap is its DC core clipping its versatility, when it might otherwise have shorter numbers. The average length in CC is one and a quarter times that of BC; and that in UDC is slightly more than double.

But at what cost does BC make this score in length? Its connecting digits are all homonymous. Therefore, its numbers cannot be translated backwards uniquely—that is, into the name of one and only one subject. For example, the first BC number may mean any of the six subjects shown in the following table. Column 4 in the table gives the different CC numbers that the six different subjects get. The translation backwards of any of the CC numbers will lead only to one and the same unique subject.

SN	Name of Subject	BC	CC
11	Exposition, in France, of radar for students of naval science	BOW-RNf3	D9N8,440bMV5.53
12	Exposition of radar for the staff of the French Navy	BOW-RNf3	D9N8,440bMV5.53,b
13	Influence of the French Navy on radar	BOW-RNf3	D9N8,440gMV5.53
14	Influence of naval science on radar, in France	BOW-RNf3	D9N8,440.530gMV5

SN	Name of Subject	BC	CC
15	Development, in France, of the naval use of radar	BOW-RNf3	D9N8,44(MV5).53
16	Development of the use of radar within the French Navy	BOW-RNf3	D9N8,44(MV5.53)

This means that the BC vitiates itself with the fault of homonyms—a fatal fault in a classificatory language of ordinal numbers, designed to mechanise the arrangement of documents in a preferred sequence. It is the incidence of this fatal fault that led CC to the final adoption of packet notation for subject device in 1954. It is again the incidence of the same fatal fault that led CC in 1952 to the replacement of a bare zero by a zero followed by a lower-case letter, in order to distinguish the different kinds of possible phase relations such as bias, comparison, and influence. We do not know how BC would add to its digits to differentiate the numbers for the six subjects mentioned above. But, if we drop these essential connecting digits from CC, then the relative lengths of BC and CC numbers will be as follows:

SN of Subject in Sec JC42	BC	CC
1	8	16
2	9	11
3	12	16

There is no appreciable difference in the length of the class numbers.

#### 43 DECIMAL CLASSIFICATION

DC appears to be in two minds with regard to the policy about the length of class number as a source for homonym. It has no declared policy, as in the case of RIC. But a comparison of Ed 17 (1965) and Ed 14 (1942) shows this divided mind.

#### 431 RESOLUTION OF HOMONYM

In some cases, Ed 17 has resolved the homonyms found in Ed 14.

## Example

SN	DC Ed 14 (1942)		DC Ed 17 (1965)	
	Class Number	Subject	Class Number	Subject
1	294.4	Jainism. Sects of Jains	294.4	Jainism
			294.49	Sects and reform movement
			294.492	Svetambara
			294.493	Digambara
2	535.3	Reflection. Refraction. Absorption.	535.3	Transmission. Emission. Absorption
			535.323	Reflection
			535.324	Refraction
			535.326	Absorption

## 432 CREATION OF HOMONYMS

In some cases, Ed 17 has clubbed together different items of Ed 14 and thus created homonyms.

SN	DC Ed 14 (1942)		DC Ed 17 (1965)	
	Class Number	Subject	Class Number	Subject
1	371.96	Social classes	371.96	Students exceptional because of class distinction, Socially deprived, nobility, royalty
	371.961	Princes		
	371.962	Nobles		
	371.963	Aristocracy		
	371.964	Middle class		
	371.965	Working Class		
	371.966	Dependents		
2	583.27	Celastrales	583.27	Celastrales Empetraceae, Cneoraceae Pandaceae, Icaciniaceae Salvadoraceae,
	583.271	Celastrineae		
	583.272	Celastraceae		
	583.273	Cyrtillaceae		
	583.274	Stackhousiaceae		

SN	DC Ed 14 (1942)		DC Ed 17 (1965)	
	Class Number	Subject	Class Number	Subject
	583.275	Corynocarpaceae		Stackhousia- ceae,
	583.276	Hippocrateaceae		Celestraceae,
	583.277	Straphyleaceae		Corynocarpa- ceae
	583.278	Pentrophyllaceae		Cyrillaceae Aquifoliaceae, Hippocratea- ceae
3	611.13	Arteries	611.13	Arteries
	611.131	Pulmonary artery		
	611.132	Aorta		
	611.133	Caroid arteries		
	611.134	Subclavian arteries		
	611.135	Thoracic aorta		
	611.136	Abdominal aorta		
	611.137	Iliac arteries		
	611.138	External Iliac artery		

### 5 Remedy for Homonyms Created by Policy

The remedy for the creation of homonyms by policy regarding the length of class numbers is, loyalty to the Laws of Library Science. These Laws have led to the Canon of Co-extensiveness. Therefore, to respect the Canon of Homonym, the Canon of Co-extensiveness should be respected (See Chap JH).

### 6 Source 2 for Homonym : Policy of Non-Faceted Class Number

The policy of the classificationist, restricting class numbers to be only non-faceted is Source 2 for Homonym.

#### Example

In DC Ed 14, we have the following in the complete Tables:

491.2 Old Indic Sanskrit

491.27 Sanskrit Dialects, Primary Prakrits.

In supplementary Table 4 "Philological Divisions", we have the following: "The languages in Table 3 can be divided like 420, English, by adding the figures below." Among the figures we have "7 Archaisms". Thus we get the following,

491.27 Archaisms of Sanskrit

Thus, the class number 491.27 turns out to be a homonym.

In Ed 17, also, this homonym persists. The number can mean either. The use of the term "Nonstandard Sanskrit" to denote 491.27 confirms this.

#### **7 Remedy for Homonym Created by Policy 2**

The remedy for the creation of homonym by the policy of non-faceted class number is to follow the Canon of Faceted Notation (See Chap JG).



## CHAPTER JD

### RELATIVITY Vs UNIFORMITY

#### 1 Canon of Relativity

The number of digits (including digit-groups treated as a single digit) in a class number or in an isolate number should be the same as the order of the subject or the isolate idea, as the case may be, represented by it.

#### 2 Canon of Uniformity

The number of digits in a class number or in an isolate number should be constant whatever be the order of the subject or the isolate, as the case may be, represented by it.

In the succeeding sections of this chapter any statement about the class number is equally valid on the isolate number also.

#### 3 Elasticity

The term 'Uniformity' expresses the opposite of the term 'Relativity' as applied to lengths of class numbers. Some denote the Canon of Relativity by the term 'Canon of Elasticity'. We speak of elastic ribbon. But some have popularised the use of this word in the sense of hospitability, and, therefore, I refrain from using it with a new significance. Hence the term 'Canon of Relativity'.

#### 4 Example 1

SN	Treatise on	DC	UDC	CC
1	Physics	530	53	C
2	Light	535	535	C5
3	Diffraction	535.4	535.42	C5:3
4	Spectrum Technique	535.84	535.33	C5:31
5	Ultra-violet Spectrum	535.844	535.33-3	C52:31
6	Raman Effect	535.846	535.375	C52:38N28

SN	Treatise on	BC	LC	SC	RIC
1	Physics	B	QC	B001	QJA
2	Light	BI	QC353	C100	QLH
3	Diffraction	BIJ	QC431	C110	QLL
4	Spectrum Technique	BFN	QC451	C110	QLP
5	Ultra-violet Spectrum	BFY	QC459	?	QLQ
6	Raman Effect	BJD	QC454	?	QLQ



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## 41 NUMBER OF DIGITS

Order	DC	UDC	CC	BC	LC	SC	RIC
1	3	2	1	1	2	4	3
2	3	3	2	2	5	4	3
3	5	6	4	3	5	4	3
4	6	6	5	3	5	4	3
5	7	8	6	3	5	?	3
6	7	7	9	3	5	?	3

Here are some observations on this table. The Canon of Relativity is fully observed by CC, DC and UDC also observe it in a large measure. LC, SC, and RIC completely flout it. On the other hand, they follow the Canon of Uniformity. BC fails to follow the Canon of Relativity from Order 3 onwards.

## 5 Example 2

Consider the following table where Geography is taken as the Universe.

SN	Treatise on	DC Ed 14	DC Ed 17	UDC
1	Physical Geo- graphy	551.4	910.02	551.4
2	Oceanography	551.46	551.46-551.47	551.46
3	Dynamics in Ocean	?	551.47	551.465
4	Current	551.47	551.4701	551.465
5	Current in Atlantic	551.471	?	551.465(261/264)
6	Current in Mediterranean	551.472	551.472	551.465(262)

SN	Treatise on	CC	LC	SC	BC	RIC
1	Physical Geography	U2	GBS3	D000	DR	QRO
2	Oceanography	U25	GC11	D101	DRS	QRU
3	Dynamics in Ocean	U256	GC201	?	DRS	QRU
4	Current	U2562	GC231	D120	DRT	QRX

SN	Treatise on	CC	LC	SC	BC	RIC
5	Current in Atlantic	U2562.95	GC271	D120.431	DRT	QRY
6	Current in Mediterranean	U2562.951	GC277	D041.431	DRT	QRY

## 51 NUMBER OF DIGITS

Order	DC Ed 14	DC Ed 17	UDC	CC	LC	SC	BC	RIC
1	5	6	5	2	4	4	2	3
2	6	13	6	3	4	4	3	3
3	?	6	7	4	5	?	3	3
4	6	8	7	5	5	4	3	3
5	7	?	16	8	5	8	3	3
6	7	7	12	9	5	8	3	3

The remarks on the above table are similar to those on the table in Sec JD41.

### 6 Advantage of Relativity

There is an advantage in a notational system following the Canon of Relativity. Generally speaking, from 5 to 8 per cent of the readers in libraries, taken as a whole, call only for books on classes of Order 1. This means that they will be exposed only to class numbers of one digit. From 8 to 12 per cent of the readers call only for books of classes of Order 2. This means that they will be exposed only to class numbers with two digits. From 15 to 20 per cent call only for books of classes of Order 3. This means that they will be exposed only to class numbers of three digits. Further, 50 per cent of the readers call only for class numbers of Order 4 or less. This means that they will be exposed only to class numbers in which the number of digits is 4 or less. Books with class numbers of 12 digits are sought only by 1.5 per cent of readers. Books with class numbers of 8 digits are sought only by about 10 per cent of the readers. These are all specialist readers. They will not be affected by exposure to such long class numbers. But, the generalist reader will be. As said earlier in this section, these generalist readers will not be exposed to more than 4 digits. This is the psychological advantage of the notational system following the Canon of Relativity (*See also Sec HB6*).

### 7 Advantage of Uniformity

In Machine Retrieval, the class number of the classificatory

language should be translated into the Code Number of the machine language. This translation itself has to be done with machinery. If it is cheaper to feed into the machinery class numbers with the same number of digits, following the Canon of Uniformity will be an advantage.

### 8 Reconciliation

But is it possible to reconcile the contradicting demands of the psychology of the readers on the one side, and the cheapness of machine retrieval on the other? In particular, it must be examined whether all the Class Numbers of a notational system following the Canon of Relativity cannot be brought to Uniformity by the introduction of dummy digits. If it can be, it has to be remembered that the dummy digits should all be added at the end of the Class Number if it is a Decimal Fraction Notation (See Sec HC32 and HC320).

### 91 VIOLATION OF THE CANON

Whenever one array in the notational plane is telescoped into the preceding array, the Canon of Relativity will be violated (See Sec JE3 to JE8).

## CHAPTER JE

### HIERARCHY *Vs* NON-HIERARCHY

#### 1 Canon of Hierarchy

In a class number or in an isolate number, there should be a digit to represent each of the characteristics used in constructing the class number or the isolate number, as the case may be.

#### 2 Canon of Non-Hierarchy

In a class number or in an isolate number, there need not be a digit to represent each of the characteristics used in constructing the class number or isolate number, as the case may be.

In the succeeding sections of this chapter, any statement on class number is equally valid for isolate number also.

#### 3 Relativity and Hierarchy

Sec CE1 defines the order of a class as the number of successive characteristics used to derive it from the original universe. Let us read the Canon of Relativity with this definition. Every characteristic used in deriving the class from the original universe will be represented by a digit in the class number. Thus, all the characteristics of the class that are considered relevant to the purpose of the classification will be represented by the successive digits in the class number. Thus, the Canon of Hierarchy looks like a corollary of the Canon of Relativity.

#### 4 Telescoped Array

There may, however, be occasional exceptions to this. One such exception is, when the number of classes in an array is definitely known to be considerably smaller than the number of places normally available in the array.

*Note.*—In the succeeding tables the following abbreviations are used.

A1 = Array of Order 1

A2 = Array of Order 2

(AIN) = Array Isolate Number

Tel = Telescoping of

Tel 1 = Telescoping 1 of

## Example 1. Telescoped Array of Geographical Divisions

CC		UDC and DC	
(AIN)	Isolate Term	(AIN)	Isolate Term
1	World <i>Tel (A2) into (A1)</i> <i>begins</i>	1	World <i>Tel (A2) into (A1)</i> <i>begins</i>
4	Asia	4	Europe
5	Europe	5	Asia
6	Africa	6	Africa
7	America	7	North America
8	Australia	8	South America
	<i>Tel (A2) into (A1)</i> <i>ends</i>	94	Australia <i>Tel (A2) into (A1)</i> <i>ends</i>

As viewed from the Idea Plane, "World" as a whole is the only Class of Order 1. There cannot be any other class of that order. Thus, the digits later than 1 would be fallow. The above table utilises some of the fallow digits by using them to represent the 5 Continents in the World. But as viewed from the Idea Plane, the continents are classes of Order 2. But, in the table, the World and the Continents appear to be classes of the same Order —viz, Order 1— when viewed from the Notational Plane. Such an organisation of an array in the schedule of classification is called a Telescoped Array. In the example, Array of Order 2 (=A2) stands telescoped into Array of Order 1 (=A1). Here is a formal definition of Telescoped Array.

### 5 Definition of Telescoped Array

Array of classes in a schedule of classification, made of co-ordinate and subordinate isolates, as viewed from the Idea Plane, but whose class numbers appear to be co-ordinate, as viewed from the Notational Plane.

## 51 EXAMPLES 2 AND 3

## Example 2

## Example 3

Botany			Zoology		
CC (AIN)	Isolate Term	UDC (AIN)	CC (AIN)	Isolate Term	UDC (AIN)
1	Cryptogam <i>Tel 1(A2) into (A1) begins</i>	21	1	Invertebrate <i>Tel 1(A2) into (A1) begins</i>	2
2	Thallophyta	22	2	Protozoa	31
3	Bryophyta	32	3	Porifera	34
4	Pteridophyta <i>Tel 1(A2) into (A1) ends</i>	35	4	Coelenterata	33
5	Phanerogam <i>Tel 2(A2) into (A1) begins</i>	41	5	Echinodermata	39
6	Gymnosperm	42	6	Vermes	51
7	Monocotyledon	52	7	Mollusca	4
8	Dictyledon <i>Tel 2(A2) into (A1) ends</i>	61	8	Arthropoda <i>Tel 1(A2) into (A1) ends</i>	52
			9	Prochordata and Vertebrata <i>Tel 2(A2) into (A1) begins</i>	6
			91	Prochordata	
			92	Fish	7
			93	Amphibia	76
			94	Reptile	81
			96	Bird	82
			97	Mammal <i>Tel 2(A2) into (A1) ends</i>	9



## 52 EXAMPLES 4 AND 5

## Example 4

## Example 5

Screw		Diagnosis in Medicine	
CC (AIN)	Isolate Term	CC (AIN)	Isolate Term
	<i>By Material</i>		<i>By Methods of diagnosis</i>
(b)	Steel	Z1	Clinical
	<i>Tel (A2) into (A1)</i>	Z2	Physical
	<i>begins</i>		<i>Tel (A2) into (A1)</i>
(c)	Mild		<i>begins</i>
(d)	Hardened	Z5	Radiation
(e)	Stainless	Z52	Ultra-violet
	<i>Tel (A2) into (A1)</i>	Z53	X-Ray
	<i>ends</i>	Z54	Gamma Ray
(f)	Nickel	Z56	Infra-red
(g)	Silicon bronze	Z5A	Particulate Radiation
(h)	Copper		<i>Tel (A2) into (A1)</i>
(j)	Brass		<i>ends</i>
(k)	Silver	Z6	Electrical
(m)	Gold	Z94	Pathological

## 53 EXAMPLE 6

## Diesel Engine

CC (AIN)	Isolate Term	CC (AIN)	Isolate Term
	<i>By Type of combustion chamber</i>	zP	Whirl type
zB	Side valve		<i>Tel 1(A2) into (A1)</i>
zD	Turbulent head	zR	<i>ends</i>
zE	Overhead valve	zS	Comet
zJ	Rover cylinder head		Divided chamber
zK	Swirl type		<i>Tel 2(A2) into (A1)</i>
	<i>Tel 1(A2) into (A1) begins</i>	zT	<i>begins</i>
zM	Induction swirl	zV	Pre-combustion chamber
zN	Compression swirl		Air cell
			<i>Tel 2(A2) into (A1)</i>
			<i>ends</i>

### 6 Violation of the Canon

Wherever telescoping of array is done, the Canon of Hierarchy is violated. This violation is deliberately done to satisfy the Law of Parsimony (See Chap DF). Telescoping of two consecutive arrays generally saves one digit in the Class Numbers for the class of the later order. Is this saving worthwhile? Yes, it is. For a Classificationist, saving of even one digit gives the same joy as the saving of a phoneme is said to give to the Grammarian. According to Panini, the ancient Grammarian of India, saving of a phoneme gives to a Grammarian as much joy as the birth of the first son.

### 7 Telescoping in Array in CC

CC practises Telescoping in Array quite often. In the schedules for a specialised subject of great intension, CC uses telescoped arrays. The telescoping of arrays should not be done light-heartedly. It requires great foresight based on experience. One should not attempt telescoping of one array into the early array unless and until one is dead certain that the fallow digits in the earlier array will be permanently fallow.

## CHAPTER JF

### MIXEDNESS *Vs* PURITY

#### 1 Canon of Mixed Base

The Base of the Notational System of a scheme for classification should use two or more species of digits.

#### 2 Canon of Pure Base

The Base of the Notational System of a scheme for classification should use one and only one species of digits.

#### 3 Choice Between the Canons

The choice between the two opposing canons is determined by the total number of classes in the scheme for classification on the one hand, and, on the other, by the physiology of the eye and psychology of memory (See Sec HB6). In making the choice, Table 2 of Sec HD2 will be of help.

#### 4 Pure Base

We make the following inference from the above-mentioned Table 2.

1 If the number of subjects is less than  $6 \times 10^5$  (that is, 600 thousands), a Pure Base of Indo-Arabic numerals can be chosen; and

2 If the number of subjects is less than  $2 \times 10^8$  (that is, 200 millions), a Pure Base of Roman capitals can be chosen.

#### 5 Mixed Base

We make the following inference from the above-mentioned Table 2:

By using a mixed notation of Indo-Arabic numerals, Roman capitals, and Roman smalls, we can give distinctive class numbers to  $3 \times 10^{10}$  (that is, 30,000 millions) subjects.

#### 6 Classification of Subjects

The number of subjects is certainly far above 200 millions. Therefore, even a pure base of Roman capitals is not suitable for the classification of subjects. To give each subject a distinctive class number—in other words, to avoid homonyms in classificatory language, as prescribed by the Canon of Homonym (See Sec JC1)—the Mixed Base of Indo-Arabic numerals, Roman capitals, and Roman smalls, is easily indicated. Even schemes which began with a pure base, have begun to use a Mixed Base. Even the great capacity of 30,000 millions of this notational system will prove in-

adequate, as the number of subjects cannot be limited to any number however large.

#### 61 SUPPORT TO MIXED NOTATION

E C Richardson had stated, even at the beginning of the century, that an ideal notation is one "using mixed symbol but with a predominantly decimal base". And also that "every practical system sooner or later does make use of both letters and figures" [156]. Sayers quotes this statement and endorses it [163]. According to Bliss, there is psychology as well as common sense behind this statement [16]. In 1955, the advantages of mixed notation in the classification of subjects and the gravitation towards it of practically every scheme for classification were stressed by me as convener of the FID/CA [67].

### 7 Schemes for Classification

#### 71 DECIMAL CLASSIFICATION

##### 711 EDITIONS OF DC EARLIER TO ED 13

DC has been using a pure base of Indo-Arabic numerals in its earlier editions—up to Ed 13.

##### 712 EDITION 13 OF DC

In Ed 13 of DC (1932), the use of Roman capitals was recommended to individualise the dramas of Shakespeare.

##### 713 EDITION 14 OF DC

But in Ed 14 (1942), it introduced a touch of mixed notation by allowing the use of a dash of Roman capitals in a few places such as the following:

1 We have the following note under 375 Curriculum

"Methods of teaching individual subjects, also textbooks, may be kept with educational literature by adding letters to 375 as follows: A general, B educational value of specific subjects, C place in curriculum, D methods of teaching specific subjects, E textbook.

"Example

375.32 B Educational Value of Political Science

375.32 C Place of Political Science in the Curriculum"

##### 714 EDITION 16 OF DC

In Ed 16 of DC (1958), Roman capitals were used for Alphabetical Device in several places.

Example

334.68 A4 Agricultural producers' co-operatives

598.8 T8 Passeriformes belonging to Turdid family

629.287 L7 General servicing of Lincoln cars

## 715 EDITION 17 OF DC

In Ed 17 of DC (1965), the use of Roman capitals is recommended in Geographical numbers and in Language tables.

## Example

741 093 P4 Penobscott river region

741 093 B3 Bangor (Town)

4A0 Arabic language

In introducing Example 3, the following note occurs.

"If it is desired to give local emphasis and a shorter number to a specific language, place it first by use of a letter or other symbol". [46].

This implies that the ordinal value of the Roman capitals is less than that of Indo-Arabic numerals, though it is not explicitly stated.

## 72 UNIVERSAL DECIMAL CLASSIFICATION

UDC allows the use of Alphabetical Device to specify individual names. It prescribes, "To do this, the appropriate names or initials (in brackets, if desired) and/or numerals have to be added [to the host class number].

## "Example

1 (Hegel) Hegelian Philosophy

820 (Shak) Works of Shakespeare

92 (Schil) Biography of Schiller" [26]

## 73 OTHER SCHEMES EXCLUDING RIDER'S

EC, LC, SC, CC, and BC have used a mixed base from the very beginning. CC has the longest base of 56 digits.

## 74 RIDER'S INTERNATIONAL CLASSIFICATION

Though designed as late as 1961, RIC uses a pure base of Roman capitals, with class numbers of 3 digits only. The capacity of its notational system is only 26 (=17,476). But, surely, the number of subjects cannot be tied down to the low figure of 17,576 even in a generalist library. This is evidenced in the schedule of RIC itself. For, almost every other class number in the schedule violates the Canon of Homonym and stands for several subjects (*See Sec JC41*).

## CHAPTER JG

### FACETED Vs NON-FACETED NOTATION

#### 1 Canon of Faceted Notation

A Faceted Notational System should be used when the

1 Length of the base of the notation is about 10 and the universe is likely to contain more than a million or more entities or subjects; and

2 Length of the base is about 56 and the universe is likely to contain 1,000 millions or more entities or subjects.

#### 2 Canon of Non-Faceted Notation

A Non-Faceted Notational System may be adequate when the

1 Length of the base of the notation is about 10 and the universe is likely to contain not more than a million entities; and

2 Length of the base is about 56 and the universe is likely to contain not more than 1,000 million entities.

#### 3 Annotation

In a sense, it is the capacity of the two opposing notational systems that determines the choice between them. It has been shown in Sec HD2 that the capacity of a Non-Faceted Notational System, even with as long a Base as 56, can only provide about 10,000 million class numbers. On the other hand, Sec GD3 shows that a notational system with an average of four facets can provide as many as 1,000 trillion class numbers. In the Universe of Subjects, the number of subjects is known to be very large—going beyond 1,000 trillions rather than lingering behind below 10,000 millions.

#### 4 Inadequacy of mere Block Notational System

When the number of entities or subjects is very large, and consequently the class number runs to more than 10 digits, one might feel that the physiology of the eye and the psychology of the memory would be satisfied by throwing the class number into blocks of 3 digits without any meaningful connecting digits. But, instinctively, whenever the number of digits in a class number is large, some improvisation is made to make the blocks more distinctive and more meaningful. For example, in the numbering of motor cars it has been found convenient to use Roman capitals for the three digits or so to represent the region, and add a second block of numeral digits to indicate the serial number of the car within the region. So also in a big city—for example, London—where the number of telephones exceeds a million, instinctively the first

block is made of letters and the second block of numerals and to make the first block show the region and thus become meaningful.

### **5 Helpfulness of Faceted Notation**

As it has been stated in Sec HB7, a Faceted Notational System uses meaningful connecting digits. A connecting digit is meaningful in the sense that it shows the character of the idea or the set of characteristics represented by the block succeeding it. This helps the mind at the stage of finding out the class number of an entity or subject and also at the stage of finding the appropriate subjects amidst which an entity or book containing the subject has to be replaced if old, and has to be found a place if it is new.

## CHAPTER JH

### CO-EXTENSIVENESS *Vs* UNDER-EXTENSIVENESS

#### 1 Canon of Co-Extensiveness

In a class number, digits should be added successively so as to represent the measure of incidence of even the very last characteristic in the succession of characteristics, admitted by the universe classified and relevant to the purpose of the classification.

This Canon implies the definition of the term 'Co-extensiveness' when applied to classification of documents. It means "The representation in a class number of the measure of incidence of each of the relevant characteristics of the subject embodied in the document classified" [65].

#### 2 Canon of Under-Extensiveness

In a class number, it is not essential that the digits should be continued so as to represent the measure of incidence of the later characteristic in the succession of characteristics, admitted by the universe classified and relevant to the purpose of the classification.

#### 3 Close and Broad Classification

##### 31 SCHEME FOR CLOSE CLASSIFICATION

A scheme for classification in which the class number of a subject is not used as the class number of any of its subdivisions or of its co-ordinate divisions.

##### 311 SCHEME FOR MINUTE CLASSIFICATION

Alternative name for 'Scheme for Close Classification'.

##### 312 INDIVIDUALISATION

Representation of a subject by a co-extensive class number.

##### 32 SCHEME FOR BROAD CLASSIFICATION

A scheme for classification in which the class number of a subject is used also as the class number of each of its subdivisions or its co-ordinate divisions.

#### 4 Example

SN	Subject	CC Ed 7	DC Ed 17	RIC
1	Diseases of stomach	L24;4	616.33	UJK
2	Gastritis	L24;415	616.333	UJK



SN	Subject	CC Ed 7	DC Ed 17	RIC
3	Functional disorder	L24;45	616.332	UJK
4	Gastric indigestion	L24;453	616.332	UJK
5	Disorders of secretion	L245;4	616.332	UJK
6	Gastric ulcer	L245;474	616.334	UJK

#### 41 ANNOTATION

411 The use of very "Broad Classification" and thereby flouting the Canon of Co-Extensiveness by RIC can be easily seen from the above table.

412 The table also shows that DC conforms to the Canon of Co-Extensiveness to some extent though not fully and tends towards Close Classification up to a point in respect of macro subjects.

413 Finally, the table shows the greater respect of CC to the Canon and its greater tendency towards the Minute Classification.

#### 5 Incidence of Homonym

The above table shows that the Canon of Homonym cannot be satisfied unless the Canon of Co-Extensiveness is satisfied. Therefore, most of the remarks made in "Chap JC Homonym in the Notational System" are applicable here.

#### 6 Evolution of Co-Extensiveness

##### 61 TILL NINETEENTH CENTURY

Historically, in the far off centuries, books were grouped into a few broad divisions such as, "History", "Law", "Science", "Dogma", and "Legends". And within each group arrangement was alphabetical. This happened even in the days of Assyrian clay tablets. Gesner (1545) had 24 classes, Brunet (1809) had 40 classes.

##### 62 DECIMAL CLASSIFICATION

In 1876, DC provided 1,000 classes. But subjects began to multiply and subjects of increasingly narrower intension appeared in books. The result was that even these 1,000 classes merely meant "Broad divisions" once again; and the persistence of alphabetical or accession arrangement within each of them mixed up subjects too promiscuously to be of help. The very helpfulness of having as many as 1,000 classes arranged in a helpful sequence was responsible for bringing to notice in an arresting way the unhelpfulness of such mix-up within each class.

Dewey found his creation, too, going down very soon to the status of "Broad Classification". But his decimal fraction notation

was a powerful weapon and he used it incessantly to go on increasing the number of classes and thereby making DC fit for "Close Classification" again and again. He brought out edition after edition, the size swelling on each occasion. By 1927—that is, in about half a century—he had brought out 12 editions. The number of classes had gone beyond 40,000 and the size of the schedule had grown from 12 pages to 683. And yet the race between the multiplication of subjects and the editions became even keener. In another five years, what was regarded as "Close" enough in 1927 was threatened once again with reduction to the status of "Broad Classification". Quite undaunted, DC strained its weapon of decimal fraction notation still further and took its thirteenth birth in 1932 reclaiming its right to be called "Close Classification". This time it had swollen to 907 pages of schedule listing over 54,500 classes. It had yet to see another edition again in 1942 with a further increase in size. The obesity of the DC Numbers had crossed the limits of comfort and yet the cruel book-world went on racing ahead, putting forth new subjects and challenging it to swell still further at the peril of being again reduced in status to "Broad Classification".

### 63 COLON CLASSIFICATION

CC has provision for co-extensive class numbers for more than a billion subjects. But, today, classification has extended its interest into the universe of articles in periodicals—from macro subjects to micro subjects—in order to serve specialist readers to the full satisfaction to Laws of Library Science. This has increased the manifoldness of the number of subjects to be classified. But, fortunately, the foundations of CC as they are today—postulates and principles at the near seminal level—have enabled it to evolve a method for finding a co-extensive class number to any minute subject whatever. This is now being expressed by the statement "CC has the necessary potentiality for Depth Classification".

### 7 Temporary Expediency

But the potentiality cannot be made an actuality overnight. When the proliferation of the new subjects is becoming immense in every subject-field, it takes time to get the schedules of classification refined sufficiently to reach co-extensiveness in the case of all the new micro subjects. But classifying work cannot wait for the refined schedules to be established. Therefore, any new micro subject has to be represented—though temporarily—only by an already existing class number whose extension approximates as closely as possible to the true extension of the new micro subject. This is a practical necessity until the refined schedule produces fully co-extensive class number.

Incidentally, this leads to the concept of "Ultimate Class".

**71 ULTIMATE CLASS OF A SUBJECT**

Class of the smallest extension, in the preferred scheme for classification, in which the subject can be placed.

**72 CLOSENESS OF APPROXIMATION OF ULTIMATE CLASS**

In relation to many subjects, the ultimate class in DC is generally a closer approximation than that of RIC; and that of UDC is a closer approximation than DC. Generally, the ultimate class furnished by CC, into which a new subject can go, makes approximation closer to extension of subject than that furnished by any other schemes in vogue today.

**8 Desperate Compromise**

In respect of Broad Vs Close Classification, there is a tendency towards a desperate compromise. According to it, there should be two different schemes for Close Classification—one for macro subjects and a totally different one for micro subjects—that is, for depth classification or bibliographical classification, as it is called (*See Chap MC*). This compromise is based on the failure of the foundations of the schemes for classification in vogue till about 1925 being unsuited for depth classification. But analytico-synthetic classification guided by postulates and principles—which is faceted in its structure—has sufficiently resilient foundations to carry the load of depth classification as well as classification for macro subjects (*See also Chap MC and MD and Part R*). The time has come to organise research along these lines instead of adopting the hasty compromise which will dissipate the research potential within the library profession.



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