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**Sequence of Component Ideas in a Subject.**  
(Classification problems. 52).

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[The postulate of Absolute Syntax — that is, the sequence in which the component ideas of Compound Subjects going with a Basic Subject usually arrange themselves in the minds of the majority of normal intellectuals — was proposed in 1966. It has been suggested that the syntax of facets in a subject should parallel the Absolute Syntax. The use of the Wall-Picture Principle in securing this is indicated. The helpfulness of such a facet syntax in developing a self-perpetuating, fairly stable, consistent, and versatile scheme for classification for the universe of subjects, is discussed. The biological basis for the postulate of Absolute Syntax is mentioned. The close analogy of the trend of development of the grammar of classificatory language to that of the studies of the theory of syntax and generative grammar for natural language in the last two decades is pointed out with illustrative examples. The possibility of inter-conversion of the name of subject expressed in one natural language into another *via* the Class Number based on the General Theory of Library Classification, using a computer, is mentioned.]

**1 Sequence of Component Ideas in a Subject**

Library classification essentially involves the arrangement of components of compound subjects in a linear sequence and representing each subject uniquely using a language of ordinal numbers. Classifying is thus equivalent to transforming the  $n$ -dimensional configuration of the vast ever-developing universe of compound subjects into a linear configuration. An arrangement of all the compound subjects in a sequence helpful to a majority of readers requires keeping invariant every immediate-neighbourhood-relation among all the subjects while transforming the  $n$ -dimensional configuration in a line. The difficult problem of invariant arises here. The number of compound subjects going

with even a single Basic Subject is too large to be arranged without the aid of guiding principles. The classificationist can keep invariant one and only one of the many immediate-neighbourhood-relations found in the  $n$ -dimensional configuration of compound subjects. Determining which component should this be and which components should come respectively as remove 2, as remove 3, etc, on the basis of conjecture of different classificationists as to what is helpful to the majority of readers would not yield a consistent pattern of arrangement of components in all compound subjects. But such a consistency in pattern is helpful and necessary to reader, classifier, and classificationist as well. In finding a solution to this problem Ranganathan's General Theory of Library Classification bypasses the phenomenal level of isolate ideas by diving deep to the near-seminal to grasp something more stable and practicable. (See also Sec 7 and its subdivisions of Paper P in this issue).

## 2 Absolute Syntax

### 21 POSTULATE

The sequence in which the component ideas of compound subjects going with a Basic Subject usually arrange themselves in the minds of the majority of normal intellectuals may be called Absolute Syntax of ideas among intellectuals. It is conjectured that such a syntax of ideas exists. It may not coincide with the linguistic syntax — that is, the syntax of words in all languages. This postulate helps in deriving principles for sequence of component ideas in a subject.

### 22 SUGGESTION FOR INVESTIGATION

At the International Conference on Scientific Information (Washington DC) (1958), Ranganathan had suggested that "to help in the establishment of fairly long-lived helpful scheme for classification, a team of epistemologists, psychologists, linguist, reference librarians, classificationists, and statisticians should investigate the way in which the human mind thinks today — that is, the Syntax of Facets that will give the greatest satisfaction to the greatest number of readers" (18). In 1966, in his valedictory address to the Maryland Symposium on Relational Factors in Classification, Ranganathan named the Syntax of Facets that satisfied the majority of readers as Absolute Syntax (17). Following this, in a report to FID/CR in 1967, I had written as follows: "A subject is generally the product of human thinking. It presents an organised pattern of ideas created by the specialists in a field of enquiry. It will be useful to examine whether there is an absolute sequence among the constituents of the subjects going with a Basic Subject parallel to the sequence of the thought process

itself, irrespective of the language in which the ideas may be expressed, and irrespective of the cultural background or other differences in the environment in which the specialists — as the creators as well as users of subjects — may be placed . . . If such an absolute sequence of the entities in the universe of subjects could be discovered, it will be a valuable step for the design of abstract model of a classification for subjects" (12). The statement in the last sentence has been interpreted by Foskett as if it related to the sequence among the subjects (7). It should not be interpreted in that way. Only the sequence of component facets in subjects going with a Basic Subject was meant to be considered.

### 23 SCOPE OF THE PAPER

The suggested investigation by a team of specialists as mentioned in Sec 22, is yet to take place. However, several helpful results have been derived on the basis of the idea of Absolute Syntax of Ideas among normal intellectuals. This paper mentions some of the publications and reports of findings of research in other subjects which appear to lend support to the use of the postulate of Absolute Syntax in classification.

### 3 Biological Basis

#### 31 PATTERN ON COMBINATION OF IDEAS

An idea is generally a product of intellectual activity. Intellectual activity is known to be controlled by brain. There is considerable similarity in the structure, and therefore, in the function of the brain in most of the normal human beings. Piaget and Inhelder (15) point out that "It is possible to show the similarity between Piaget's description of sensory-motor structure and Chomsky's deep structure of language" (See Sec 41). Thus, the majority of the normal human beings have more or less a similar mode of thinking and learning — that is, in forming ideas and in combining them to build subjects. It is further believed that biologically man has not changed to any appreciable extent since he became *Homo sapiens*. For, the structure of the genetic material in the normal human being has not appreciably changed since then.

#### 32 KILPATRICK

The educationist William H Kilpatrick writes: "It is generally believed that man has not developed biologically to any significant manner or degree since he became *Homo sapiens*; culturally, yes — greatly so; biologically as regards mind, no, not as far as we can tell" (9).

#### 33 RUSSEL

Or again, Bertrand Russel writes: "There had been a

time when there were biological improvements in brain capacity with corresponding advancements in genetic capacity. But that time ceased some 500,000 years ago" (22).

#### 34 MODE OF THINKING AND LEARNING

From the statements quoted above, it can be inferred that:

1 The mode of thinking/learning among normal intellectuals is substantially similar;

2 The mode of thinking/learning among normal intellectuals has remained substantially in a similar pattern for several thousands of years; and for this reason

3 The probability of a sudden change — that is, a mutation — in the mode of thinking/learning of a majority of normal intellectuals in the immediate future is quite low.

#### 4 Analogy from Studies in Linguistics

The development of the grammar of classificatory language has a close parallel in the studies of the theory of syntax and generative grammar for natural language, in the last two decades. Some features of these studies are mentioned in the succeeding sections.

#### 41 UNIVERSAL LINGUISTIC FORM

The work of Chomsky (1) Katz, Fodor and their followers (6, 8) has emphasised that the acquisition of a language, given its level of complexity and abstraction, would be impracticable without the child having an *innate knowledge* of certain *universal linguistic principles*. It has been shown further that such innate principles are available and *a priori* languages everywhere have the same general form as a reflection of the intrinsic structure of the mind. The existence of a "natural order of thought" is a widely held conjecture among several scholars for several centuries now. But the view of some grammarians that this natural sequence of ideas is mirrored by the sequence of words is now said to be incorrect. The deep structure of a sentence is shown to be different from its surface structure although they may stand in a precise relation to one another.

#### 42 DEEP STRUCTURE AND SURFACE STRUCTURE

The deep structure of a sentence determines its semantic content while its surface structure determines its phonetic interpretation. Chomsky points out that a useful generative grammar will largely deal with mental processes that are far beyond the level of actual or even potential consciousness. It is concerned with the creative aspect of the use of language in expressing combination

of component ideas — that is, “make infinite use of finite means” according to Humboldt (2). McNeill commenting on Bailey’s work says: “Since innate ideas are not arbitrary, deep structures are universal among languages. In Bailey’s theory child and adult speech converge beautifully at the most crucial level — at the level of deep structure where meaning is organised — and diverge elsewhere, at the level of sound” (10). Analogous examples from classificatory language are given in Sec 63.

#### 43 REPRESENTATION OF DEEP STRUCTURE

##### 431 *Leibniz’s Ideal Language*

The development of an ideal language in which each simple idea is represented by a single symbol and an algorithm is provided for their combination to represent complex ideas was a cherished dream of Leibniz. The compilation of a universal encyclopaedia containing a summary of all human knowledge systematically arranged was a related project. In a modified form the idea of Leibniz was developed by Frege, Whitehead, and Russel into a system of mathematical logic to serve as a grammar of all science.

##### 432 *Whorf’s Hypothesis and Ranganathan’s Fundamental Categories*

In his classic work on language, Whorf states: “Every language contains terms that have come to attain cosmic scope of reference that crystallize in themselves the basic postulations of an unformulated philosophy . . . such are our words ‘reality, substance, matter’ and . . . space, time, past, present, future” (24). This compares closely with the postulate of Five Fundamental Categories — namely, Personality, Matter, Energy, Space, and Time. — of Ranganathan’s General Theory of Library Classification. The need for this dive to the near-seminal level has been discussed in other papers.

##### 433 *Basic Components*

In linguistic notation a sentence is a Noun Phrase (NP) and Verb Phrase (VP) bracketed together, with no constituent intervening (NP, VP). Between NP and VP a relation of predication may be defined. The deep structure of every language is built up on this relation apparently without exception (11). Further, the deep structure of a sentence stands in a precise relation to its surface structure. These relations are the transformations. “Real progress in linguistics consists in the discovery that certain features of given languages can be reduced to universal properties of language, and explained in terms of these deeper aspects of linguistic form” (4).

## 5 Preferred Sequence of Components

### 51 EXAMPLE

Chomsky gives the following example of the analysis of the English Verbal Auxiliary to illustrate a helpful sequence of components (5):

"A Verbal Auxiliary Phrase would contain Tense — *Past* or *Present* — may contain a Modal, and the *Perfect* and/or *Progressive* Aspect, the elements being arranged in the sequence mentioned. This rule can be stated in the following form using conventional notation :

Aux → Tense (Modal) (*Perfect*) (*Progressive*) . . . . . (1)

Rule (1) is a sort of generalisation of eight rules that analyse the element Aux into its eight possible forms. Stated in full, these eight rules would involve twenty symbols, compared to the four (not counting Aux in both cases) in rule (1). The difference in the number of symbols is a "measure of the degree of linguistically significant generalisation" achieved in a language in which the Auxiliary Phrase is expressed in the forms given in list 1, as compared with a language in which the Auxiliary Phrase is expressed in the forms given in list 2.

#### List (1)

Tense  
Tense Modal  
Tense *Perfect*  
Tense *Progressive*  
Tense Modal *Perfect*  
Tense Modal *Progressive*  
Tense *Perfect Progressive*  
Tense Modal *Perfect Progressive*

#### List (2)

Tense Modal *Perfect Progressive*  
Modal *Perfect Progressive* Tense  
*Perfect Progressive* Tense Modal  
*Progressive* Tense Modal *Perfect*  
Tense *Perfect Modal Progressive*

### 52 CHARACTERISTIC OF NATURAL LANGUAGE

Regularity and consistency in pattern as exemplified in list 1 "are those found in natural languages, and are of the type that children learning a language will expect". On the other hand cyclic patterns as exemplified in list 2, "though perfectly genuine, abstractly, are not characteristic of natural language, are not of the type for which children will intuitively search in language materials and are much more difficult for the language-learner to construct on the basis of scattered data or to use". That is, with list 1 the learner of the language will be able to derive rule 1 by generating the full set with their semantic interpretation. However, when given scattered examples from list 2 the learner will not be able to formulate the general rule in his grammar.

## 6 Facet Syntax

### 61 IN RELATION TO ABSOLUTE SYNTAX

It has been suggested that the sequence of component

facets in compound subjects — that is, the Facet Syntax — should parallel the Absolute Syntax of Ideas. For, then, the pattern of component ideas in compound subjects is likely to be

- 1 Helpful to a majority of normal intellectuals;
- 2 Consistent in pattern in all compound subjects going with different Basic Subjects;
- 3 Stable and continue to be helpful to a majority of intellectuals at least in the near future — that is, until a mutation in the mode of thinking takes place;
- 4 Free from the aberration due to variation in linguistic syntax arising from the use of the verbal plane in naming subjects; and
- 5 Of help in probing deeper into the pattern of human thinking and combination of ideas.

#### 62 IN PRACTICE

A number of principles have been formulated and explicitly stated for securing a sequence of component facets in compound subjects going with a Basic Subject helpful to a majority of readers. These principles have been used extensively for several years now in designing schemes for classification of subjects, in classifying, and in other contexts — such as, the arrangement of ideas in the text of a book or article. One of the Principles for Helpful Sequence is the Wall-Picture Principle. It states: "If two facets A and B of a subject are such that the *concept behind B* will not be operative unless the *concept behind A* is conceded, even as a mural picture is not possible unless the wall exists to draw upon, then the facet A should precede the facet B" (16). It has been found that the Wall-Picture Principle

- 1 Secures a sequence of component ideas in a subject helpful to a majority of normal specialists in the subject;
- 2 Is, among the Principles for Helpful Sequence, the most ubiquitous in its application; and
- 3 Can be deemed as the master principle for helpful sequence because the other Principles for Helpful Sequence are derivable from or are corollaries to, it.

It may, therefore, be said that the syntax of component ideas in a subject resulting from the application of the Wall-Picture Principle parallels the Absolute Syntax of Ideas. Further, the sequence of ideas resulting from the application of any of the other Principles for Helpful Sequence conforms to that derivable by the application of the Wall-Picture Principle itself. However, in a particular context, the use of one of the other principles may be more convenient than to work with the Wall-Picture Principle.

## 63 EXAMPLE OF FACET SYNTAX AND LINGUISTIC SYNTAX

The following table presents the Facet Syntax and Linguistic Syntax in English, French, and German for two subjects:

SN	Language	Name of Subject in natural language	Facet Syntax based on Postulates and Principles particularly the Wall-Picture Principle
<b>1 Subject 1</b>			
11	English	Antibiotic treatment of bacterial diseases of lungs in children	Child Medicine. Lung, Bacterial disease. Treatment. Antibiotic
12	French	Traitement antibiotique pour les maladies bactériennes du poumon des enfants	Medicine de Enfant. Poumon. Maladie-Bactérie. Treatment. Antibiotique
13	German	Antibiotische Behandlung von Bakterialkrankheiten der Lunge der Kinder	Medizin den Kind. Lunge. Krankheit-Bakteria. Behandlung. Antibiotik
<b>2 Subject 2</b>			
21	English	The sociology of alcoholism among middle class people in developing countries, 1950-70	Sociology. Middle class. Alcoholism. Developing countries. 1950-70
22	French	La sociologie de l' alcoolisme parmi la bourgeoisie dans les pays en voie de développement	Sociologie. Bourgeoisie. Alcoolisme. Pays en voie de développement. 1950-70.
23	German	Die Sociologie des Alkoholismus in den Mittelstand der Entwicklungslander	Sociologie. Mittelstand. Alkoholismus. Entwicklungslander. 1950-70

631 *Annotation*

The Facet Syntax — that is, the sequence of the facets — derived on the basis of the postulates and principles, particularly the Wall-Picture Principle of the General Theory of Classification — is the same for each subject in each of the three languages, although the linguistic syntax differs.

## 64 BASIS OF A GENERALISED FACET STRUCTURE

641 *Preferred Facet Sequence*

Consider the Subject 2 given in the table in Sec 63:

"Sociology of alcoholism among middle class people in developing countries, 1950-1970".

Following the analogy of the example in list 1 given in Sec 51, and using the principles for facet sequence, the subjects

arising from the combination of the component facets contained in this subject can be represented as follows: using the conventional symbols for Basic Subject and the five Fundamental categories.

Sociology (BS)  
 Sociology (BS), Middle Class (P)  
 Sociology (BS); Alcoholism (M)  
 Sociology (BS), Developing countries (S)  
 Sociology (BS) '1950-1970 (T)  
 Sociology (BS), Middle class (P); Alcoholism (M)  
 Sociology (BS), Middle class (P), Developing countries (S)  
 Sociology (BS), Middle class (P) '1950-1970 (T)

Sociology (BS), Middle class (P); Alcoholism (M), Developing countries (S)  
 Sociology (BS), Middle class (P); Alcoholism (M) '1950-1970 (T)  
 Sociology (BS), Middle class (P); Alcoholism (M), Developing countries (S) '1950-1970 (T)

It is possible to derive from the above a generalised version of the structure of compound subjects as indicated below:

(BS)	(BS), (P),(S)
(BS), (P)	(BS), (P) '(T)
(BS), (M)	(BS), (P);(M), (S)
(BS), (S)	(BS), (P); (M) '(T)
(BS), (T)	(BS), (P);(M).(S) '(T)
(BS), (P); (M)	

In fact, the Generalised Facet Structure for compound subject (21) is a generalised model that could be developed by representing subjects going with different Basic Subjects using the Principles for Helpful Sequence of facets.

#### 642 *Cyclic Permutation*

The following cyclic permutation of facets exemplifies the form given in list 2 mentioned in Sec 51.

Sociology, Middle class, Alcoholism, Developing countries, 1950-1970.

Middle class, Alcoholism, Developing countries, 1950-1970, Sociology.

Alcoholism, Developing countries, 1950-1970, Sociology, Middle class.

Developing countries, 1950-1970, Sociology, Middle class, Alcoholism.

1950-1970, Sociology, Middle class, Alcoholism, Developing countries.

Sociology, Alcoholism.

Alcoholism, 1950-1970.

Middle class, Developing countries, Sociology.

For reasons similar to those given by Chomsky (See Sec 51) such a permuted form of representing subjects going with a Basic Subject cannot be as helpful to the majority of readers as the facet sequence reflecting the normal mode of combination of ideas

by the majority of readers mentioned in Sec 641. The formulation, from out of such permutation, of a general principle for facet sequence as an aid in the search for subjects of interest is difficult.

## 7 Conclusion

### 71 CONSISTENT SEQUENCE OF FACETS

The General Theory of Library Classification developed in India, incorporating the idea of Absolute Syntax, prescribes the use of the same set of postulates and principles for the design and development of a scheme for classification as well as for classifying a subject. Thus, when the components of a compound subject are assembled in the prescribed sequence for facets, by taking the components from the appropriate schedules — of Basic Subjects, of special isolates for that subject and of common isolates — it will parallel the sequence of facets derived at Step 5 in the postulational method of classifying applied to that subject (20). This sequence of facets is likely to parallel more closely the Absolute Syntax of ideas and, therefore, will conform to the sequence of ideas preferred by a majority of normal specialists in the subject.

### 72 INTERCONVERSION

In Sec 63, the similarity of the Facet Syntax for a subject expressed in three different languages was demonstrated. The entries in the schedules of Basic Subjects, and of the isolates can be prepared in different languages, with the design of the scheme itself conforming to the postulates and principles of the General Theory of Library Classification. Given the Class Number for a subject, it is fairly easy to translate it into any of the languages in which the Basic Subjects and isolates are expressed in the schedules. The expression of the subject in the translated-to language will be meaningful as shown in Sec 63 because the subject will be structured according to the preferred sequence of component ideas. Thus, a Class Number synthesised using a scheme for classification designed on the basis of the General Theory of Library Classification, can be an effective "switching language" (19).

### 73 USE OF COMPUTER

After the subject of a document is analysed into the kernel terms it is possible to synthesise the Class Number for the subject with the aid of a computer by a schedule look-up procedure. It is not necessary for the input of kernel terms to be in the face structure sequence. This has already been demonstrated for fairly complicated subjects (14, 23). Using a multi-language schedule, the translation of the name of a subject as represented

in the Class Number, from one language to another with the aid of a computer can be done (13).

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