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**Relative Index and Chain Procedure.**  
(Cataloguing problems. 15).

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[The document finding system devised by Dewey took the form of a Classified Catalogue. Cutter's system took the form of a Dictionary Catalogue. The efficiency of both the systems was largely dependent on the procedure of constructing subject-headings to be used in them. Cutter gave a set of explicitly stated rules for this purpose. Dewey wanted the Relative Index to DC to be used as a substitute for the subject index. There was no explicit statement of the procedure followed by Dewey in the construction of the subject headings for the schedule-entries, used in the Relative Index. An examination of the Relative Index shows that Dewey's Procedure conforms to Cutter's Procedure to a large extent; but it introduces the novel feature of using distinctively the word or word-group having the "contextual function". Chain Procedure of Ranganathan is essentially different from Dewey's Procedure. In this procedure, the expressive name of a specific subject is represented in terms of its fundamental components. The sequence of these components is uniformly and uniquely determined in all cases, according to a set of postulates and principles. Each component is standardised. The Chain, having the "name-of-subject in standard terms" as the last link, is determined. The different kinds of links — such as, sought link, unsought link, and false link — are distinguished. A subject heading is derived from each of the sought links in the chain according to a set of rules formulated to suit the purpose in hand. Obviously, the class number for a compound subject also may form the basis for applying Chain Procedure; but this is not an essential feature of Chain Procedure. Dewey's Procedure and Chain Procedure mark two distinct successive stages of development in the theory of subject headings.]

**0 Introduction****01 FORM OF SUBJECT QUERY**

"Is there any document on the specific subject "X"; if so, what are they?" In this question, "X" stands for any name-of-subject. A subject-query in the library, ultimately takes this form. The document finding system, adopted by the library, must be equipped to respond to a query about any specific subject. The document finding system in the library takes the form of a Library Catalogue.

**02 SUBJECT QUERY AND OBLIGATION OF LIBRARY CATALOGUE**

To satisfy a specific subject query, the Library Catalogue has to provide information about the

- 1 Documents exclusively devoted to the specific subject;
- 2 Documents embodying subjects of extension greater than that of the specific subject, but having substantial portions devoted to it; and
- 3 Documents embodying subjects of extension smaller than that of the specific subject, but dealing with some facet of it.

The documents on the subjects collateral to the specific subject may contain some information, though indirectly, relevant to the purpose in hand. The Library Catalogue, therefore, is to provide further, the information about these documents.

**03 REALISATION OF IMPLICATIONS BY DEWEY AND BY CUTTER**

The full implication of the satisfaction of a specific subject query was simultaneously realised by Melvil Dewey and Charles A Cutter. This becomes evident from the study of the document finding system designed by each of them. It is interesting to note that the system proposed by Dewey was published along with that proposed by Cutter, as different parts of the same composite document (12).

The object of Dewey's system was the same as that of the Cutter's. But, the former suggested an approach basically different from what the latter did. While Dewey's system was a Classified Catalogue, Cutter's was a Dictionary Catalogue.

**04 FOUNDATION OF CLASSIFIED CATALOGUE**

A Classified Catalogue consists of two parts:

- 1 The Classified Part (Main Part); and
- 2 The Alphabetical Part (Index Part)..

An entry in the Classified Part is under the Call Number (Class Number + Book Number) of the document mentioned in the entry. Primarily, entries are arranged in the increasing sequence of the ordinal value of their respective ClassN umbers,

The source of the Class Numbers is a scheme for classification A classified arrangement based on a scheme for classification is expected to ensure a linear APUPA (Alien-Penumbral-Umbral-Penumbral-Alien) pattern at any point of the catalogue. But, the requisite portion of the Classified Part is not directly accessible to the reader. The alphabetical Subject Index provides the reader with the key (Class Number) to access. It follows, therefore, that the efficiency of a Classified Catalogue is largely dependent on the effectiveness of the scheme for classification and the procedure of constructing subject headings, on which it is based.

#### 05 FOUNDATION OF DEWEY'S SYSTEM

The scheme for classification forming the basis of the Classified Catalogue suggested by Dewey was his Decimal Classification (=DC). The scheme had an index to its schedule of subjects — simple and compound. He called it "Relative Index". Dewey wanted the Relative Index to be used as a substitute for the alphabetical subject index required to be prepared by the library as a supplement to the Classified Part. This suggestion saved the library from all the botheration and cost of preparing and maintaining its own subject index.

#### 06 SCOPE OF THE PAPER

There is no explicit statement of the procedure followed by Dewey in the construction of the Subject Headings for the schedule-entries, used in the Relative Index. This paper makes an attempt to distil out the procedure implied in the construction of the Subject Headings used in the Relative Index. In the next stage, it compares Dewey's Procedure with Cutter's Procedure to find out the distinctive feature of the former. Finally, it compares Dewey's Procedure with Chain Procedure of S R Ranganathan.

#### 1 Relative Index in Dewey's Words

For convenience of discussion, let us take note of what Dewey himself said about his Relative Index. The following quotation is from Ed 10 of DC. It may be noted here that the work of revision and enlargement leading to this edition was done by Dewey himself:

"Relative Subject Index.— The alphabetical Index, the most important feature of the system, is as complete as could be made by combining the headings of leading catalogs and bibliographies, and adding such as users of the system have found desirable in 17 years' experience. After all these efforts, new headings will still be needed, and will be added in each new edition.

"The Index is designed to guide both in numbering and in finding books in assigning numbers, the most specific head that will contain the book having

been determined, reference to that head in the Index gives the class number which should be assigned. Conversely, in finding books on any given subject, reference to the Index gives the number under which they are to be sought on the shelves, in the shelf list, or in the subject catalog. Whenever a new subject comes up, it and its synonyms, with the class number decided on, should be interlined in the Index, so that the classifier may be uniform with himself in future work.

"The index aims to give similar or synonymous words, and the same words in different connections, so that any person of intelligence will hardly fail to get the right number. A reader wishing to know something of the tariff looks under T, and at a glance, finds 337 as its class number.... If he had looked under P for protection, or F for free trade, or D for duties, or C for Customs, or under any other leading word relating to his subject he would have been referred to 337, or some one of its subdivisions.

"Had he looked for 'railroad' he would have found under it 16 separate entries, each preceded by a catchword indicating the phase of the subject in the scheme. The cataloguer knows to which of these heads his book belongs, and the reader knows in which of its phases he wishes to examine the subject. . .

"All topics printed in black-face type in the Index are further divided in the tables, where one may see the subheads. . .

"The greatest objection to a class catalog has always been the impossibility of knowing just where to put a book in cataloguing and just where to look for it when it is again wanted.

The Relative Index, with its catchwords, was designed and is found in use to meet both these requirements, for it insures that books on the same phase of any subject coming before the classifiers shall be assigned to the same place and that any reader seeking these books shall be referred to that place. . .

"Most names of countries, towns, animals, plants, etc. have been omitted, the Index containing only those which are in the tables. . ." (6).

## 2 Examples of Schedule-Entries with Corresponding Index-Entries

Let us further take note of some illustrations referred to by Dewey himself in relation to his Relative Index. Let the illustrations be presented in such a way that they become equipped to reveal the relationship between "Relative Indexing" and "Chain Indexing", as far as practicable.

### Set 1:

#### *Entries in the Schedule*

600	= Useful arts
620	= Engineering
625	= Railroad and road engineering
625.1	= Way and works
625.14	= Track: ballast, ties and tieplates, strains Including also rails and their accessories
625.146	= Monorail tracks

#### *Corresponding Entries in the Relative Index*

Monorail tracks engineering	= 625.146
Track road engineering	= 625.14
Ballast railway engineering	= 625.14

Ties, railroad	= 625.14
Tieplates railway engineering	= 625.14
Railroad engineering	= 625
Useful arts	= 600

**Set 2***Entries in the Schedule*

600	= Useful arts
620	= Engineering
625	= Railroad and road engineering
625.4	= Elevated and underground roadways, subways

*Corresponding Entries in the Relative Index*

Elevated railroad engineering	= 625.4
Railroad engineering elevated	= 625.4
Underground roads engineering	= 625.4
Subways road engineering	= 625.4
Railroad engineering	= 625
Useful arts	= 600

**3 General Conclusion about Relative Index**

The information furnished in Sec 1 and 2 above leads us to the following conclusions:—

1 Decimal Classification was chiefly meant for a Classified Catalogue.

2 Dewey wanted the Relative Index to be used as a substitute for the alphabetical subject index required to be prepared by the library as a supplement to the Classified Part.

3 The main sources of the subject headings in the Relative Index had been the leading catalogues and bibliographies of that time. The transformation of the name of a compound subject into a subject heading has naturally been influenced, in many cases, by the procedures followed in those leading catalogues and bibliographies.

**4 Dewey's Procedure for Constructing Subject Heading**

The subsections of this section contain the findings of an examination of the DC Schedule and of the Relative Index to distil out the implied procedure of constructing the subject headings for schedule-entries for compound subjects.

**41 USE OF CANON OF CONTEXT IN PRESENTING SCHEDULE ENTRIES**

Each schedule-entry is for a class (ranked subject). An entry for a class consists of two parts:

- 1 The class number; and
- 2 The name of the class (subject).

The entries are arranged among themselves in the increasing sequence of the ordinal values of their respective class numbers. This sequence discloses the hierarchy preferred by the scheme. In presenting a schedule-entry, the Canon of Context has been made use of. This means that the denotation of a term to denote a class in the schedule is to be determined in the light of the different classes of lower order belonging to the same primary chain as the class concerned. For example, while a schedule-entry occurs as "625.146 Monorail tracks", the denotation of the term 'Monorail tracks' is to be determined in the light of the classes represented by the class numbers 625.14, 625.1, 625, 620, and 600. The result of applying the Canon of Context may be expressed in more than one way — such as, "Monorail tracks in railroad engineering", and "Monorail tracks engineering". Similarly, the denotation of the term 'Elevated roadways', represented by the class number 625.4, may be expressed in more than one way — such as, "Elevated roadways in railroad engineering" and "Elevated railroad engineering". Again, the denotation of the term "Preservation of food", represented by the class number 664.8, may be expressed as "Preservation of food in chemical technology" or "Chemical technology of food preservation", and the denotation of the term "Food preservation", represented by the class number 641.4, may be expressed as "Food preservation in domestic economy".

#### 42 EXPRESSIVE NAME-OF-SUBJECT

For convenience of reference, let us denote the result got by applying the Canon of Context to a schedule-entry, by the term "expressive name-of-subject".

#### 43 "SPECIFICATION FUNCTION" AND "CONTEXTUAL FUNCTION"

Now, consider the following expressive names of subjects:

- 1 Monorail tracks in railroad engineering; and
- 2 Monorail tracks engineering.

In the first example, the specific function of the term 'Monorail tracks' may be distinguished from that of the term 'Railroad engineering'; of course, both of them share the general function of giving coextensive expression to the name of the specific compound subject. While the term 'Monorail tracks' provides the "specification" of the specific subject, the term 'Railroad engineering' provides its "context". For convenience of reference, we can denote the function of the term 'Monorail tracks' by the term 'Specification-function' and that of the term 'Railroad engineering' by the term "Contextual function". The words constituting an expressive name share these two functions among themselves. The word or word-group having the "specification

function" is represented by the last digit of the class number. But the word or word-group having the "contextual function" is represented by one or more digits among the rest of the digits in the class number.

44 TWO METHODS OF FORMULATING EXPRESSIVE NAME-OF-SUBJECT  
The formulation of an expressive name of subject admits of two distinct methods:

1 *Method 1.*— In Method 1, all the words in the expressive name-of-subject together constitute a compact expression to discharge both the functions—*viz.*, "specification function" and "contextual function". The expressive name "Monorail tracks engineering" is an example.

2 *Method 2.*— In Method 2, the word or word-group having the "specification-function" is quite distinct from that having the "contextual function". The expressive name "Monorail tracks in railroad engineering" is an example.

45 OBJECT OF RELATIVE INDEX

The object of the Relative Index is to provide necessary and sufficient number of index entries for each and every schedule-entry for a subject—simple or compound, provided the subject specified by it, is likely to be sought by the classifier or by readers.

46 BASIS FOR INDEX ENTRIES

The schedule-entry, in its original form, appears to have formed the basis for the index-entries for it. But in reality, the basis is always the "expressive name-of-subject" formulated by applying the Canon of Context to the schedule-entry concerned.

47 STEPS IN DEWEY'S PROCEDURE

The procedure, followed by Dewey to construct the subject heading for the schedule-entries for compound subjects, appears to consist successively of the following steps:

1 Step 1: Formulation of the Expressive Name-of-Subject

*Note.*— While the compound subject admits of both the methods of formulating the "expressive name-of-subject", Method 1 appears to have been preferred to Method 2. For example, (1) "Monorail tracks engineering" has been preferred to "Monorail tracks in railroad engineering"; (2) "Elevated railroad engineering" has been preferred to "Elevated roads in railroad engineering".

2 Step 2: Determination of the entry-part and preparation of ordinary entries

21 Step 21: While the expressive name-of-subject is formulated according to Method 1, the name as a whole constitutes

the entry-part; and the entry consists of the first word followed successively by

1 The rest of the words in the expressive name, in the sequence of their occurrence, and

2 The class number.

For example,

"Monorail tracks engineering 625.146" and

"Elevated railroads engineering 625.4"

22 Step 22: While the expressive name of subject is formulated according to Method 2, the word or word-group having the "specification-function" constitute the entry-part"; and the entry consists of the entry-part followed successively by

1 The word or word group having the "contextual function"; and

2 The class number.

For example,

"Preservation of food chemical technology 664.8" prepared on the basis of the expressive name-of-subject "Preservation of food in chemical technology" represented by the class number 664.8; and

"Preservation of food domestic economy 641.4" prepared on the basis of the expressive name-of-subject "Preservation of food in domestic economy" represented by the class number 641.4.

3 Step 3: Preparation of inverted entries

31 Step 31: While the expressive name of subject is formulated according to Method 1, and a word in it is decidedly more significant as an entry-word than others in it, an inverted entry is prepared under it. For example,

1 "Railway stations, care of 647.9631";

2 "Radioulnar joint, inferior 611.72741"; and

3 "Radioulnar joint, superior 611.72741".

32 Step 32. While the first ordinary entry has already been prepared according to Step 21, but another word in it appears to be significant as an entry word, an inverted entry is prepared under it. For example, "Railroad engineering elevated 625.4"; the first ordinary entry prepared being "Elevated railroad engineering 625.4".

4 Step 4: Preparation of entries for synonyms

While the entry-part of an ordinary entry already prepared, admits of a synonym likely to be sought by the classifier or by the readers, an additional entry is made by replacing the entry-part concerned by the synonym chosen. For example, "Poly-



cystina zoology 593.14" for "Radiolaria zoology 593.14".

**5 Step 5: Preparation of entries under compact expression for the entry-part**

While the entry-part of an ordinary entry already prepared, admits of a compact expression likely to be sought by the classifier or by readers, an additional entry is made by replacing the entry part concerned, by its compact expression. In a sense, this is also an entry for synonym. For example, "Food preservation chemical technology 664.8" for "Preservation of food chemical technology 664.8".

**5 Dewey's Procedure and Cutter's Procedure**

Let us now examine if there is any relationship of Dewey's Procedure of constructing subject heading with that of Cutter's. Here we have to take note of the fact that the context of Dewey's Procedure is different from that of Cutter's. While Cutter's Procedure is for the construction of the subject headings for a book, Dewey's procedure is for the construction of the subject headings for the schedule-entries.

**51 RULES OF CUTTER'S PROCEDURE**

Here are a few rules prescribed by Cutter and deemed to be pertinent to our context:

"161. Enter a work under its subject-heading, not under the heading of a class which includes that subject.

168. Of two exactly synonymous names choose one and make a reference from the other.

173. Carefully separate the entries on different subjects bearing the same name.

175. Enter a compound subject name by its first word, inverting the phrase only when some other word is decidedly more significant." (5).

**52 FINDINGS OF EXAMINATION**

It is quite evident that the subject headings constructed according to Step 21, Step 31 and Step 32 of Dewey's Procedure, in their own context, conform to Cutter's Rules 161 and 175. Further, the subject headings constructed according to Step 4 and Step 5, in their own context, conform to Cutter's Rule 168. Still further, a subject heading constructed according to Step 22, in its own context, conform to Cutter's Rules 161, 173, and 175. But a heading, constructed according to Step 22, appears to have some novel feature of its own. None of the Cutter's Rules gives any hint about the separate use of a word or word-group having the "contextual function" to construct the subject heading for a compound subject. This is, perhaps, a unique contribution of

Dewey. His Relative Index demonstrated the procedure for "Contextual Indexing".

### 53 PURPOSE OF EXAMINATION

The object of showing the relationship between Dewey's Procedure and Cutter's Procedure is not to establish that Dewey followed Cutter or Cutter followed Dewey. But, it is to show that in Dewey's Procedure, the theory of subject heading attained a significant development.

### 6 Chain Procedure

Now, let us take note of the essentials of Chain Procedure — that is, what it is concerned with, and what it involves according to its latest developments. Chain Procedure is primarily concerned with the derivation of subject headings for a compound subject embodied in a document. It aims at providing the necessary and sufficient number of subject headings for a compound subject to respond to all possible — general and specific — subject approaches of readers for the compound subject concerned.

### 61 STEPS IN CHAIN PROCEDURE

Chain Procedure involves the following Steps:

- 1 Determination of the specific subject of the document;
- 2 Naming of the specific subject expressively (= Expressive name-of-subject);
- 3 Representation of the name of the specific subject in terms of its fundamental components (= Name-of-subject in kernel terms);
- 4 Determination of the category (status) of each fundamental component according to a set of principles and postulates (= Analysed name-of-subject);
- 5 Transformation of the analysed name-of-subject by re-arranging, if necessary, the fundamental components, according to a few additional postulates and principles governing the arrangement (= Transformed name-of-subject);
- 6 Standardisation of each term in the transformed name-of-subject (Name-of-subject in standard terms);
- 7 Determination and representation of the Chain of which the name-of-subject in standard terms is the Last Link (= Determination of Chain);
- 8 Determination of the different kinds of Link — such as, Sought Link, Unsought Link, and False Link; and
- 9 Derivation of a Subject Heading from each of the Sought Links in the Chain according to a set of rules formulated to suit the Purpose in hand (1-4, 7, 9-11).

**62 VERSATILITY OF CHAIN PROCEDURE**

It may be noted here that "In fact, the Rules of Chain Procedure can be so framed as to yield several alternative patterns of arrangement of Subject Headings. Indeed, the versatility of the Chain Procedure is greater than what had been realised during the early years of its use. If any pattern of arrangement whatever, is clearly defined, a corresponding set of Rules of Chain Procedure can be framed. *All that the Chain Procedure does is to mechanise the process of deriving the kind of Subject Headings implied by the pattern and to secure consistency in the pattern*" (8).

**63 CLASS NUMBER AND CHAIN PROCEDURE**

The class number of a compound subject, constructed according to a scheme for classification, may form the basis for applying Chain Procedure. This is because, the Steps 0 to 4, in some form or another, are implied in the construction of any class number according to any scheme for classification. In such a case, Chain Procedure generally involves the following steps:

1 Representation of the Class Number in the form of a Chain, in which each Link consists of two parts—the class number and its translation—resulting in the name-of-subject in standard terms (See Steps 6 and 7 in Sec 61);

2 Determination of the different kinds of link—such as, Sought Link, Unsought Link, and False Link (See Step 8 in Sec 61); and

3 Derivation of a Subject Heading from each of the Sought Links in the Chain, according to a set of rules formulated to suit the purpose in hand (See Step 9 in Sec 61).

It is evident that the derivation of Subject Headings by Chain Procedure on the basis of a Class Number directly involves Steps 6 to 9 of the Steps involved in the Postulate Based Complete Chain Procedure, mentioned in Sec 61. In other words, a Class Number is not an essential condition for applying Chain Procedure; nor it is in any way dependent on a scheme for classification; this is the basic feature of Chain Procedure (1).

**7 Dewey's Procedure and Chain Procedure**

On the basis of the findings furnished in the earlier sections, the difference between Dewey's Procedure and Chain Procedure may be summarised as follows:

1 Dewey's Procedure is concerned with the derivation of subject headings for schedule-entries. Chain Procedure is concerned with the derivation of subject headings for subjects embodied in documents. There appears to be no evidence that Dewey was

conscious of the possible use of his Procedure for the purpose for which Chain Procedure is used.

2 Dewey's Procedure provides specific subject headings for a schedule-entry to respond to a specific subject approach only. Chain Procedure provides subject-headings for a specific subject to respond to both specific and general approaches. However, Dewey's Procedure is applied to each and every schedule-entry likely to be sought. Thus, Relative Index can respond to general approaches also. The context of and the methodology adopted by, the two procedures for providing for general approaches are different.

3 Dewey's Procedure closely conforms to Cutter's Rule 17 in naming a compound subject. But, it introduces the novel idea of using the word or word-group having the "contextual function" to name a compound subject in addition to the word or word-group having the "specification function". The formulation of the phrases for the "specification part" and the "contextual part" closely conform to Cutter's Rules. No definite principle is discernible as to the style of the wording of each part. Like Cutter, this operation, to a great extent, is governed by convention. For, Dewey writes of being influenced by the subject headings used by the leading catalogues and bibliographies of his time. Further, in Dewey's Procedure, the name of a specific compound subject, in most of the cases, may be either unipartite or bipartite depending upon the nature of the formulation of the phrase to denote it. The principle for ensuring uniformity in this matter is not explicitly stated. In Chain Procedure, the expressive name of a specific subject is represented in terms of its fundamental components. The sequence of these fundamental components is uniformly and uniquely determined in all cases. Each component is standardised.

4 Derivation of subject headings in Dewey's Procedure does not involve any determination and representation of the Chain of which the name of the specific compound subject is the Last Link. On the other hand, this is the basic feature of Chain Procedure.

5 In Dewey's Procedure, subject headings are not derived on the basis of the class number for the subject concerned. In Chain Procedure, subject headings may be conveniently derived on the basis of the class number for the subject concerned.

The differences summarised above indicate that Chain Procedure is *essentially* different from Dewey's Procedure. Cutter's Procedure is a significant development in the area of Subject Heading. Dewey's Procedure, and Chain Procedure of Ranganathan mark two distinct successive stages of development in the same area.

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