CLASSIFICATION OF ENVIRONMENTED ENTITY

DEEP CLASSIFICATION, 30

Till now classification schemes have been confining themselves largely to entities in normal environmental conditions. But literary warrant has begun to grow in respect of entities habitually in or being brought into abnormal environmental conditions. Efficiency in point-pointed documentation service and depth classification calls for abnormally environmented entities to constitute isolates to be provided with distinctive isolate numbers. Experiments were made in meeting this problem by Phase Device and Facet Device. These did not give helpful results. The fact that an Environmented Entity is a (W) and not a (W) led to the final solution that it should be accommodated in zone 4 of Array of Order 1 in [1P1]. To prevent formation of homonyms, Subject Device had to be differentiated from Environment Device by the insertion of "Ω" (Zero) immediately after the starter bracket. This device opens up a vast vista for investigation which will help enrichment of all analytico-synthetic schemes such as CC and UDC. The construction of a comprehensive schedule of numbers by Environment Device should be taken on hand for the natural sciences and social sciences.

S. R. RANGANATHAN

0 CASES FOR STUDY

Micro documents of the kind where the Canons of Expressiveness and of Helpfulness call for representation, in the class numbers, of the special environmental conditions in which an Entity is studied, have begun to emerge. Samples of such micro documents are given below:


Lambda anomaly with peak at 227.7°K and an additional anomalous region near 320°K.

Note: Terbium 227.7°K to 320°K is the environmented entity. The focus for environmental device is 227.7°K to 320°K.


Note: Individualisation of alpha brass is to be done in zone 2, but it must be amplified by environment device to denote 4.2°K.

3 YASYDA (J.) and YOKOYAMA (N.). Research on the planting in spring of bulbs normally planted in the autumn. Sci rep, Fac Agric Okayama Univ 1957, N 10, 51-66. Tulip bulb and daffodil reacted unfavourably. There was a difference of 30 days in the time of flowering.

Note: Here bulbs normally planted in autumn is the environmented entity. The focus for environment device is Autumn; or is it the intra-faceted Autumn-Spring?

4 COTTLE (W. H.) and CARLSON (L. D.). Regulation of heat production in cold-
Only cold-adapted rats could increase heat-production sufficiently to maintain body-temperature as the test chamber was cooled.

Note: Cold-adapted rat is the environmented entity. Cold is the focus to be used for the environment device.

Relationship between spectator and performer, seemingly face to face, in mass media is designated as a para-social environment.

Note: Para-social group is the environmented entity. Para-social is the focus to be used for the environment device.

They are still few and far between. A volume of each of three abstracting periodicals had to be scanned through many entries before the above-mentioned five documents could be spot out. However, there is every indication that literary warrant is tending to increase to an appreciable extent. The co-extensive and expressive classification of these documents has not been attempted in this paper as the necessary investigation has not yet been made to enable the establishment of the schedule for Environment Device. The purpose of this paper is only to lay bare the existence of the problems of Environmented Entities, and to do some loud thinking in facing the problems and to call for research in this area.

INTRODUCTION

11 Ecology

No entity can escape reaction to and of environment. The total reaction to the whole environment has been studied for long in the case of living organisms. The field of this study is denoted by the term "Ecology". This term covers the technique as well as the results of study. Every scheme of classification has provided a place for it. The following table illustrates it:

<table>
<thead>
<tr>
<th>Ecology in</th>
<th>CC</th>
<th>BC</th>
<th>UDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>G:5</td>
<td>EL</td>
<td>577.4</td>
</tr>
<tr>
<td>Botany</td>
<td>I:5</td>
<td>FF</td>
<td>581.5</td>
</tr>
<tr>
<td>Zoology</td>
<td>K:5</td>
<td>GG</td>
<td>591.5</td>
</tr>
<tr>
<td>Medicine</td>
<td>L:5</td>
<td>HI</td>
<td>644</td>
</tr>
<tr>
<td>Sociology</td>
<td>Y:95</td>
<td>KTA</td>
<td>30:577.4</td>
</tr>
</tbody>
</table>

In CC, the distinctive digit in the isolate number is 5. The whole isolate number may be 5, or 95, or 995 etc. according to the context of the host Basic Class.

12 Technique of Ecological Study

In the physical sciences, study is usually confined to the "ecology" of an entity in relation to one element in the environment, at a time. For example, we have the study of conduction, convection, contraction, elongation, chemical action, etc. These isolates often lay emphasis on methodology and techniques in the pure sciences of physics and chemistry. Of late, a considerable literary warrant is getting created in regard to the technique of creating and maintaining abnormal conditions in physical environment and studying entities in such environment. For example, we have...
CLASSIFICATION OF ENVIRONMENTED ENTITY

In CC, subjects like these are called "Specials". The array of isolates of Specials is usually telescoped into the array of isolates of [1P4] i.e. First Round, First Level Personality. The Specials are accommodated in the penultimate octave of zone 3 of that array.

13 Application and its Results

It is helpful to accommodate the application of the techniques to a particular entity or class of entities and the results thereof, in the class to which the entity belongs. Normally, the literary warrant of the past was mostly confined to the application of the techniques to the study of an entity lying within an environment of normal kind - such as normal temperature and pressure (NTP) in physics, normal field factors in psychology, normal social factors in education, familiar political conditions, normal social pattern among or within social groups, and so on. There is also some literary warrant in regard to the techniques and their applications to the study of an entity normally living within an environment of an abnormal kind, such as deep-sea animals, sherpas acclimatised to Everest conditions, and social groups living in a state of prolonged tension.

14 Normally Abnormal Environment

Some provision has been made in most schemes for giving a distinctive place for documents dealing with entities whose normal environment is abnormal as viewed from the angle of the environment to which mankind is generally accustomed.

141 Biological Sciences

Literary warrant in biology, botany and zoology has already led to such a position.

Isolate Term | CC  | BC  | UDC  |
-------------|-----|-----|------|
Ecological groups (illustrative) | G95 | EMJ | 577.47 |
Land organisms | G954 | EMN | 577.476 |
Subterranean | G9544 | EMN | 577.476(24) |
Desert | G9542 | EMP | 577.472 |
Hydrobiology | G955 | EMT | 577.472(26) |
Marine biology | G9555 | | |
Atmospheric organism | G958 | | |

142 Sociology

Literary warrant in sociology has already led to such a provision.

143 Methodology in CC

The methodology used in CC is that of quasi-isolates. Quasi-isolate is a characteristic other than the favoured first characteristic for division, which is used to arrive at regular isolates. In the biological sciences, quasi-isolates are accommodated in the second octave of zone 2. Thus we have "G95 Ecological groups". In sociology, quasi-isolates are accommodated in the first octave of zone 2. Thus we have "Y3 Groups by residence".

Isolate Term | CC  | BC to KCL | UDC  |
-------------|-----|-----------|------|
By residence | Y3  | KCI to KCL | 301.485.2 |
Rural | Y31 | KCK | 301.485.2(-202) |
City | Y35 | KCI | 301.485.2(-201) |
Refugee | Y394 | QYV | 301-058.53 |
Emergence of New Concepts

Of late, literary warrant has begun to emerge in the study of an entity placed in an environment abnormal to it. The object of this study is to invite attention to the classificatory problem arising out of this new literary warrant. As usual, this problem did not take a recognizable shape in the early stages. Therefore, such newly emerging documents had been placed provisionally either with ecological groups as shown in 141 and 142 or in general ecological studies pertaining to the Main Class of the entities. In doing this, there has always been a slight sense of uneasiness for the classifier and unhelpfulness for the reader. The time has come to study the problem objectively and to find out methods of separating the two classes of literature. It is only by their separation that the efficiency of pinpointed documentation service and of the depth classification needed for it can be increased. This separation is precipitated by defining "Environmented Entity" as a new concept in the theory of classification.

2 ENVIRONMENTED ENTITY

21 Case Study

The approach to this problem begins with the assumption that the attributes of an entity may vary with its environment. Its behavior too varies with it. For example, the physical state of any piece of matter varies with the temperature and pressure amidst which it exists. Pressure and other factors being normal, oxygen is in a gaseous state at normal temperature; it is a liquid at 119°C; and it is a solid at 219°C. So also, iron is a solid at normal temperature; it is a liquid at 1535°C; and it is in a gaseous state at 3000°C. The phenomenon of "superfluidity" and other "odd behaviour" of a substance in near-absolute zero in temperature has been brought to notice by Low Temperature Physics. So also, the disintegration phenomenon at solar and super-solar temperature is now being studied. The behavior of the body of a living organism depends on the pressure at which it exists. A deep-sea animal, accustomed to the high pressure of its normal environment, is ill at ease when brought to the surface; its body may even burst by its internal pressure not being counteracted by the external pressure. On the contrary it needs considerable training and safeguard for a person to work as a frog-man. The abnormality in the functioning of the bodily organs and of the mind as one climbs up to Mount Everest are traced to the abnormality in several environmental factors such as temperature, pressure and oxygen-content of the atmosphere. "Fish out of water" and "Drowning man" are popular phrases used to indicate behavior in severely unfamiliar environment. "Aviation medicine" in essence connotes the attributes and the behavior of the human body in the environment characterised by abnormal speed of translation, and frequency of spinning, and bumping. The system of psychology known as "Field psychology" seeks to explain mental attributes in terms of the factors of the total environment. Rousseau's Emile is a study of education in a theoretically conceived environment. Indeed, "Nature vs Environment" is an inexhaustible theme for study. Apart from physical entities, living organisms and persons, even in the case of a social group, attributes and behavior vary not only with the physical and the biological character of its environment, but also with its psychological and sociological character. Indeed, we speak of "forest civilisation", "river valley civilisation", "desert civilisation".

22 Statement of the Problem

For brevity, an entity whose attributes and behavior are studied while within an abnormal environment, which is not normal to it, shall be called "Environmented Entity". The problem is:

1. to find a helpful place for an "Environmented Entity" belonging to any host class; and
2. to provide an isolate number for the "Environmented Entity" which will implement the decision about its place.

3 IDEA PLANE

Finding a helpful place for an environmented entity calls for work in the idea plane. In
this work, the concept of (W) (Whole) and (W) (not Whole) will be of use.

31 Whole Entity

(W) denotes any entity taken as a whole in the universe to be classified. In classifying the universe on the basis of a relevant characteristic, we arrive at a set of subclasses. Let us call each such subclass a Subclass of Order 1. In classifying a Subclass of Order 1 on the basis of another relevant characteristics, we get a set of Subclasses of Order 2. By repeating this sufficiently often, a stage will be reached when no further subdivision yielding subclasses of Whole entities will be possible. divided successively on the basis of a chain of characteristics such as user, size, and brand. At the end of such a chain, the cycles in a subclass will be all alike and no further classification will be possible. We regard the cycle as a whole as a manifestation of the fundamental category Personality.

32 Organ of Entity

Further subdivision will only give subclasses made of organs of different kinds of the typical entity of the subclass being subdivided. These organs are, obviously, (W). It goes into the make-up of the distinctive personality of the entity. Generally speaking, the organs of one type of entity differ from those of any other type of entity. For example; a Hind Cycle will have its wheels, free-wheel, frame, gear, etc. as its organs. By repeating this classification into organs, suborgans etc. sufficiently often, a stage will be reached when further subdivision yielding subclasses of organ will not be possible. For example, the subclass of spokes of the wheels of cycles cannot be further subdivided, on the basis of organs. Each of the organs may itself be regarded as a manifestation of the fundamental category Personality. The whole entity is said to be [P1] or a personality of level 1. An organ of the first remove is a [P2] or a personality of level 2, and so on.

33 Constituent of Entity

Further subdivision will only give subclasses made of materials of different kinds out of which the entity as a whole or any organ of it is built up. For example, the spokes may be made of steel and some other materials. Steel is not an organ of the spokes. It is only a material constituent of them. We regard materials in such a context as a manifestation of the fundamental category Matter.

34 Arrays and Facets

In the idea plane, we regard the subclasses formed of materials to constitute a [M] or Matter Facet. The subclasses formed of the Matter of first remove are said to constitute a [P2] or Personality Facet of Level 2. The subclasses formed of the organs of second remove are said to constitute a [P3] or Personality Facet of Level 3. And so on. The subclass formed of wholes are said to constitute a [P1] or Personality Facet of Level 1. In this facet, the subclasses of first remove from the original i.e. total universe of the entities, are said to constitute the Array of Order 1. The subclasses of first remove from an isolate in the Array of Order 1 are said to constitute an Array of Order 2. And so on. Thus any isolate, which is a (W) belongs to [P1]. It may occur as an isolate in the Array of Order 1, or in an Array of Order 2, or in an Array of Order 3, and so on.

35 Status of Environmented Entity

The status of an isolate comprehending Environmented Entities with one and the same kind of environment is determined by the fact that it consists of Wholes. This means that it is an isolate in [P1]. Even there, it belongs to Array of Order 1.

36 What Zone in the Array?

The next issue to be decided is "To what zone of the array should an environmented isolate be assigned?" Even before zone analysis was made for the first time, the sheer pressure of literary warrant had led to a cer-
tain practice, which more or less conforms to the theory now being developed. This is discussed in detail in Ranganath’s Depth Classification. Efficiency table (An lib sc, 1, 1954, 8) and in Ranganathan’s Prolegomena to library classification, ed 2, 1957, sec 362-368. The conclusion was summarised in 1957 in Report 7 to FID/GA. The following version of it will be of help in dealing with environmented entities.

<table>
<thead>
<tr>
<th>Zone</th>
<th>Octave</th>
<th>Sector</th>
<th>Nature of the Isolates Accommodated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>Common isolates</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>2</td>
<td>Special isolates by enumeration on the basis of preferred first characteristic</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>3</td>
<td>Special quasi-isolates, i.e. characteristics themselves by enumeration</td>
</tr>
<tr>
<td>2</td>
<td>Penultimate</td>
<td>4</td>
<td>Specials by enumeration</td>
</tr>
<tr>
<td>3</td>
<td>Last</td>
<td>5</td>
<td>Systems by alphabetical device</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>Common isolates by subject device</td>
</tr>
</tbody>
</table>

37 Agriculture and Medicine

Literary warrant calling for environmented isolates has developed in recent years in some main classes, such as Agriculture and Medicine. Before the theory in this paper was developed, there was no guiding principle to accommodate this class of literature. They were therefore accommodated in sector 4. But the presentation of Specials and Environmented Entities in one and the same sector has been somewhat irritating. In spite of the irritation, failure in the notational plane perpetuated such a presentation. The failure in notation made difficult progress of work in the idea plane also. For example, the definition of the term "Specials" was not sufficiently sharp. The isolation of "Environmented Entity" as a distinct concept was itself delayed. Now that the isolation has been made in the idea plane, the notational plane has been obliged to implement it. This pressure of the idea plane has made the notational plane yield a helpful result.

4 NOTATIONAL PLANE

41 Zone 4

The pressure of literary warrant in regard to the isolates accommodated in sectors 1 to 5 is sufficiently great to deter us from disturbing the use to which they have been put. This leads to the consideration of zone 4 as a possible region for the settlement of Environmented Entities. There is a certain appropriateness in doing so. For, the factors of environment by which an entity is environmented can be many in number. Therefore, it may be helpful to denote that factor in the verbal plane and to represent it in the notational plane by Subject Device. This factor also will favour the placing of Environmented Entities in zone 4.

42 Environment Device

The use of packeted notation for Environmented Entity as well as for division by Subject Device qua Subject Device may theoretically land one in homonym - a serious fault to be avoided in classificatory knowledge. But, it looks as if this conflict may not arise in practice. However, by way of abundant caution, it is proposed to signify that a packeted number is number for environmentedness by inserting a 0 (zero) immediately after the starter bracket. The use of a packeted number with 0 (zero) as the first digit after the starter bracket will be called Environmented Device.

43 Exercise of Freedom

We need not always use Subject Device for indicating environmentedness in all cases.
We can adopt the Favoured Category Principle and enumerate the cases with considerable literary warrant. This will lead to over-all economy in notation. But we should insert a 0 (zero) as an indicator digit immediately after the starter bracket, as the digits a, b, c...x, y, z can occur as the first digit in a packeted number using Subject Device qua Subject Device.

### 44 Examples

<table>
<thead>
<tr>
<th>Isolate Term</th>
<th>CC Old</th>
<th>CC Proposed</th>
<th>BC</th>
<th>UDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dry farming</td>
<td>J9D</td>
<td>J(od)</td>
<td>UADR</td>
<td>631.586</td>
</tr>
<tr>
<td>Soilless farming</td>
<td>J9S</td>
<td>J(os)</td>
<td>UAVR</td>
<td>631.587</td>
</tr>
<tr>
<td>Polar medicine</td>
<td>L9J</td>
<td>L(op)</td>
<td>HPVP</td>
<td>616(98/99)</td>
</tr>
<tr>
<td>Tropical medicine</td>
<td>L9H</td>
<td>L(ot)</td>
<td>HPZ</td>
<td>616(213)</td>
</tr>
<tr>
<td>Aviation medicine</td>
<td>L9T</td>
<td>L(0D53)</td>
<td>HPVM</td>
<td>613.693</td>
</tr>
<tr>
<td>War medicine</td>
<td>L9V</td>
<td>L(0MV4)</td>
<td></td>
<td>613.693</td>
</tr>
<tr>
<td>Industrial medicine</td>
<td>L9X</td>
<td>L(OM7)</td>
<td>HPVC</td>
<td>613.6</td>
</tr>
<tr>
<td>Industrial medicine (textiles)</td>
<td>L9X9M7</td>
<td>L(OM7)</td>
<td></td>
<td>613.6:677</td>
</tr>
<tr>
<td>Industrial medicine (wool textiles)</td>
<td>L9X9M72</td>
<td>L(OM72)</td>
<td></td>
<td>613.6:677.3</td>
</tr>
<tr>
<td>Industrial medicine (brick-laying)</td>
<td>L9X9MD13</td>
<td>L(OMD13)</td>
<td></td>
<td>613.6:693.2</td>
</tr>
</tbody>
</table>

### 45 Enumeration vs Device

Alternative CC numbers are shown against Aviation Medicine and War Medicine, just to point out the procedure to be followed in the case of a new subject of the nature under consideration. Until a short isolate number is given in an enumerated schedule, a classifier can construct his own number by Subject Device. The number got by enumeration will be shorter than the one got by Subject Device. But it will take away the autonomy of the classifier. For this reason, the over-all authority in charge of the development and the maintenance of a scheme of classification should provide an enumerated schedule only in cases which have accumulated much of literary warrant. This is of course to be the general attitude in all cases involving the issue Enumeration vs Device.

### 46 Sector 6

Zero occupies the first place in the ordinal sequence of digits used in the notational system of CC. Therefore a packeted number used in Environment Device will have precedence over any other packeted number. Therefore, normally the sector of an Array, got by Environment Device, will be sector 6.

### 47 Follow-up Work

The old CC numbers given in the table in section 44, are to be discarded, as it is now possible to distinguish a special from an Environmented Entity. It is necessary to scan all the existing schedules of Specials from this angle and transfer every Environmented Entity included in them from the sector 4, i.e. the Penultimate Octave of zone 2, to sector 6, i.e. the first octave of zone 4.
5  ADDITION OF A NEW DIMENSION

The decision arrived at in the idea plane and the method prescribed for implementing it in the notational plane are expected to give a more helpful sequence than hitherto. The use of the Subject Device in the construction of number by Environment Device gives great Hospitality in Array. In fact, a new dimension has been added. This will enable us to carry depth classification to a deeper level and to provide co-extensive numbers in an ever-expanding group of subjects. The clarification of the difference between "Specials" and "Environmented Entities" is another incidental advantage.

6  FIRST APPROXIMATION

In the first attempt to meet this problem, the help of Phase Relation and Phased Class Number was sought. The phase relation was taken to be that of Influence. For example,

<table>
<thead>
<tr>
<th>Industry</th>
<th>LogM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aviation</td>
<td>LogD53</td>
</tr>
<tr>
<td>Tropical medicine</td>
<td>LogU.192</td>
</tr>
</tbody>
</table>

But it has been felt all along that the effect of environment is more intimate than the loose or vague implication involved in Phase Relation. It is this feeling - particularly keeping that feeling alive without suppression - that has led ultimately to the concept of Environmented Entities and Environment Device.

7  SECOND APPROXIMATION

The second attempt to meet the problem was to make the environment a Facet. It was difficult to decide the fundamental category of which it can be taken to be a manifestation. That it was not Time, Space, or Energy was obvious. Of the remaining two fundamental categories, Personality was ruled out, because environment is not an organ of the entity environment. It was finally decided to take environment to be a manifestation of Matter. But it was not happy. This was the feeling in the idea plane. The notational plane came to help at this stage. It gave a warning against taking away any of the sectors or zones in the Matter Array of Order other than the first, for any use other than the enumeration of Isolates of Matter qua Matter. It has been stated in section 2 of my Report 7 to FID/CA of 1957, which was on the Classification of Commodities and Services, that the number of Isolates to be accommodated in the Matter Array of Order 1 is unusually large. It is too large to be managed even by Group Notation with a restricted base. It was estimated in section 23 of that Report that, by using all the sectors from the second onwards - those belonging to zones 2 to 4 - the number of isolate numbers available was of the order of 10^10. All these places have to be reserved for enumeration of Commodities and Services.

8  FINAL SOLUTION

The resistance - vague from the idea plane and definite from the notational plane - led to a more careful examination of the status of an Environmented Entity. As shown in section 3, the concept of (W) and (W), was applied. This showed that an Environmented Entity is a (W) and should therefore be accommodated by improvising a New Array if need be, but not by a New Facet. Having decided this, it came to mind that the Array of Order 1 in [1F] - that is the First Round, First Level Personality Facet - was already a Telescoped Array and that the Array of Environmental Entities should be telescoped along with the Arrays of Systems, of Specials, and of the normal Array of Enumerated Isolates of [1F].

81 Favoured Environment

No entity can at any moment be un-environmented. This implies that the isolate number for every entity should have a part got by Environment Device. But this can be made unnecessary by a convention in the case of the environment which has or likely to have the largest literary warrant in any given context. The convention is to omit in the isolate number the part pertaining to en-
environment in such a case. There is a precedence for it. In S. Parthasarathy's paper "Diffuse treatment of systems and specials" (Optional facets 16 in the Annals part of Abgila 3, 1953, 7-10), it has been decided to omit the digit(s) for indicating Systems in the case of the Favoured System. The System with the largest literary warrant is called the Favoured System. The class number of the exposition of a Basic Class according to the Favoured System, is not loaded with System Number. This has been explained in Ranganathan's Prolegomena to library classification, ed 2, 1957, Sec 36711. Similarly we can speak of Favoured Environment and omit the part pertaining to environment in the isolate number of a Favoured-Environmented Entity. Thus there will not be need to apply the Environment Device in the majority of Documents, particularly in books.

82 Work to be Done

"Environmented Entity" is a helpful concept. It is necessary in depth classification. The Environment Device described in this report will give helpful results in documentation work and documentation service. This device opens up a vast vista for investigation. The Environments Numbers used in the examples in this report are only tentative ones improvised for making the exposition a little concrete. They should not be taken as a final. A comprehensive schedule of Environment Numbers should be constructed for use in various contexts. This is a basic work to be done in the immediate future. Perhaps, the construction of the schedule of Environment Numbers will be facilitated if the schedule for the Posteriorising Matter Common Isolates is constructed earlier. The Indian National Committee for Cooperation with FID/CA is now engaged in constructing the latter schedule. Once this is done, the Environment Device can be adapted to any scheme of classification. This will be particularly easy in the case of analytico-synthetic schemes, such as Colon Classification and Universal Decimal Classification. This will be of help in sharpening the depth classification of subjects not only in the Natural Sciences but also in the Social Sciences. We should also investigate the problem in the Verbal Plane in establishing class Headings by Chain Procedure, arising out of Environment Device.