

Lib sc. 9; 1972; PAPER C.

**Social Sciences : Emergence and Scope.**

(Classification problems. 56) (Social science series. 1).

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[The emergence of "Social Sciences" as a subject is traced with the aid of two standard dictionaries, a few standard schemes for library classification, two standard encyclopaedias, and a standard documentation serial. The scope of the subject "Social Sciences" is examined with the aid of the schemes for library classification, encyclopaedias and dictionaries. Lastly the propriety of using the term 'Sciences' is examined and confirmed with the aid of the Spiral of Scientific Method].

**ABBREVIATIONS USED:**

BC = Bibliographic Classification of H E Bliss  
CC = Colon Classification of S R Ranganathan  
DC = Decimal Classification of Melvil Dewey  
EC = Expansive Classification of C A Cutter  
LC = Library of Congress Classification of USA  
SC = Subject Classification of J D Brown  
UDC = Universal Decimal Classification of the International Federation for Documentation

**I Emergence : Evidence from Dictionary**

**11 NEW ENGLISH DICTIONARY**

The succeeding sections give relevant extracts from the *New English dictionary* Vol 9, 1919.

**111 Social**

Concerned with, interested in, the constitution of society and the problems presented by this: Illustrative passage,

1846 "The conception of a social science is due to M Comte" (*In Lewes: Biogr Hist Philos V4,P249*).

112 *Sociology*

The science or study of the origin, history, and constitution of human society; social science. Illustrative passage:

1843 "These are to constitute a new science to be called Social ethics on sociology" (*In Black Mag*, V8, P397).

1851 "The new science of sociology, as it is barbarously termed" (*In Fraser's Mag* V19, P452).

1873 "Sociology has to recognise truths of social development, structure and function" (*In Herbert Spencer: Stud social* V3, P59).

## 12 WEBSTER'S NEW INTERNATIONAL DICTIONARY

The succeeding sections give relevant extracts from *Webster's new international dictionary* (1913)

121 *Social Sciences*.— The science or sciences of all that relates to social conditions, the relations and institutions which are involved in man's existence and his well-being as a member of an organised community; sociology

122 *Sociology*.— The science of the constitution, phenomena, and development of society. Both the terms *Sociology* and the science, in its modern acceptation, date from Comte's discrimination of it in 1838 (See 1837 mentioned in Sec 13 Cat 2) as the science of associated life of humanity. After Comte, Herbert Spencer was the chief founder of the science, his application of the doctrine of evolution to social development and his view of society as a "Social organism" contributing the main impetus and trend to its modern development.

## 13 SOME OBSERVATIONS

The dictionary meanings extracted in sub sections of Sec 11 and 12 show that:

1 the Terms 'Sociology' and 'Social Science' have been used as near-synonyms in the past;

2 the Concept "Social Science" was brought into use by Comte in 1837;

3 the Term 'Social Science' appears to have been first used in English about 1874;

4 It appears to have come into general use only very much later; but

5 It is not having an entry in the supplement to the New English Dictionary published in 1933 — perhaps because it is a two-worded term; however,

6 The appearance of the term 'Social Sciences' in the 1913 edition of *Webster* should be taken to be significant.

**2 Emergence : Evidence from Schemes for Library Classification**

21 DC .— From Ed 1 (1876) onwards DC has been using the term 'Sociology' in the place of 'Social Sciences'. It was only in Ed 13 (1932) that the term 'Social Sciences' replaced the term 'Sociology' for denoting its Main Class "3". This was evidently done to respect the Canon of Currency (8).

22 EC .— Its 1891 edition mentions the Class "H Social Sciences".

23 UDC .— I have had no access to the earlier editions of UDC. It may not be wrong to presume that UDC had followed the example of DC.

24 LC .— It has a volume entitled "H Social Sciences". This should have been due to the influence of EC, as it is known that it more or less followed the literal notation of EC and the Main Classes enumerated in it.

25 SC .— Even from its Ed 1 (1906) SC has "L Social and Political Science" and "L000 Social Science".

Though the term 'Social Science' is used against the number "L000", by applying the Canon of Enumeration and it appears to have been used in the sense of "Sociology" and "Social Work". The term 'Sociology' does not occur at all (See Sec 55).

26 CC .— In Ed 1 (1933) CC included in its Main Subjects "Y Miscellaneous social science including Sociology". The first Rule in Chap Y of its Part 1 reads as follows:

"The subject divisions 'S' to 'X' and 'Z' represent the major Social Sciences. To make the divisions of Social Sciences totally exhaustive, the Subject Division "Y Miscellaneous Social Sciences" is introduced"

Ed 4 (1952) introduced the generic class "Σ Social Sciences", and it was placed between "S Psychology" and "T Education", thus at the head of the list of individual social sciences. But the number is being changed into "SZ" in the press copy of Ed 7. Further, in Ed 7 the Schedule of Main Subjects will group them under the four headings:

1 Distilled Main Subjects, many of which belong to Social Sciences;

2 Natural Sciences, and their applications;

3 Humanities and their auxiliaries; and

4 Social Sciences, and their auxiliaries and applications.

27 BC .— In the 1953 edition, BC appears to use the term 'Social Sciences' and the term 'Sociology' as equivalents. (See Sec 57).

**3 Emergence : Evidence from Encyclopaedia****31 ENCYCLOPAEDIA BRITANNICA**

Upto and until its 1961 edition, the *Encyclopaedia britannica* used the terms 'Social Sciences' and 'Sociology' as synonyms. For, in the article itself the heading is "Sociology"; but the Index has the entry "Social Sciences *see* Sociology". However, in the 1963 edition, the term 'Social Sciences' itself is used as the heading of a separate article, different from the article on "Sociology".

**32 ENCYCLOPAEDIA OF SOCIAL SCIENCES**

In 1930, Edwin R A Seligman, courageously named the Encyclopaedia edited by him as "Encyclopaedia of the Social Sciences"

**4 Emergence : Evidence from Documentation Serial**

The Documentation serial *Social science abstracts* started in New York in 1929, appears to be the first publication of that kind to carry the term 'Social Science' in its title.

**5 Scope as Found in Schemes for Library Classification****50 DEFINITION BY ENUMERATION**

Generally speaking, a scheme for Library Classification does not give a formal definition of a subject. But it follows the Canon of Enumeration (7). That is, under any subject it successively enumerates its divisions, if any. Thus a Schedule of subdivisions in a Scheme for Classification amounts to definition by enumeration.

**51 DECIMAL CLASSIFICATION (1965)**

3 Social Sciences	35 Public administration
31 Statistical method and Statistics	36 Welfare and associations
32 Political Science	37 Education
33 Economics	38 Commerce
34 Law	39 Customs and folklore

**511 Annotation**

1 "Statistical method" is itself a Main Subject. In CC. it is given as "BT Statistical Calculus", the term being according to the Canon of Currency (8). It is made adjunct to "B Mathematics", as it branched off from Mathematics, during recent years.

2 "Statistics" is only a common subdivision applicable to any subject.

3 The divisions of "35 Public Administration" appear to be

more suited to form divisions of "32 Political science" so far as the theoretical part goes, and to "93 to 99 History of different countries", so far as the actualities in different countries go.

4 The divisions of "36 Welfare and associations" are heterogeneous. "361 Organisation of Social Welfare", "362 Welfare Services to Special groups", and "363 Other services", can appropriately be regarded as applied subjects — Applied Sociology. Though these are not Pure Social Sciences, it is proper to put them collectively as an Adjunct Main Subject after the Pure Main Subject "Sociology". It is so done in CC by putting "YX Social Work" as an Adjunct Main Subject to "Y Sociology". But DC, has not enumerated Sociology as a distinct science under "3 Social Sciences". "364 Criminology", "365 Penology" "366 Association", "367 Social ethics", "369 Other kinds of associations" and "39 Customs and folklore" are fit to be brought together under the Main Subject "Sociology". It is so done in CC in the Main subject "Y Sociology".

#### 52 EXPANSIVE CLASSIFICATION (1891-3)

##### *Expansion 5*

H	Social Sciences	IG	Social service
HB	Statistics	IK	Education
HC	Economics	J	Political science
I	Sociology	JX, JY	Law

#### 521 *Annotation*

1 In the inclusion of "Statistical Calculus" and the exclusion of "Geography" and "History", EC had been perhaps influenced by DC.

2 "Geography" and "History", the auxilliary subjects, are not included in "Social Sciences".

#### 53 UNIVERSAL DECIMAL CLASSIFICATION

Same as for DC.

#### 54 LIBRARY OF CONGRESS CLASSIFICATION (1959)

H	Social Sciences	HB to HJ	Economics
HA	Statistics	HM to HX	Sociology

#### 541 *Annotation*

1 The divisions "HA1" to "HA48" together form "Statistical calculus"; and therefore they do not belong to the Class "H Social Sciences" (See Sec 51, Category 1).

2 The divisions "HA155" to HA4010" comprehend generalia statistical data. Thus they are out of place in the Main Subject "H Social Sciences". As a matter of fact, the Statistical data

pertaining to a particular subject are given among its sub divisions. For example, we have

HE 8727 Telephone Statistics  
 LB 2846 Educational Statistics  
 SF 235 Dairying Statistics.

3 The under mentioned subjects are not shown as subjects in the group of "H Social Sciences". They are not even enumerated consecutively:

C to F History J Political Science  
 GA to GC Geography K Law.  
 GF to GT Anthropology L Education  
 Z665 to Z997. Library Science.

These subjects also should be taken within the group of Social Sciences. This is an unhelpful scattering of the well recognised divisions of Social Sciences.

4 In the inclusion of "Statistical Calculus" and the exclusion of "Geography" and "History", LC had been perhaps influenced by EC.

#### 55 SUBJECT CLASSIFICATION (1914)

L	Social and Political Science	L200	Political Science
L000	Social Science		
L100	Economics	L400 to L700	Law

#### 541 Annotation

1 It is not known how "Political Science" and "Social Science" are clubbed together and denoted by the digit "L".

2 The Social Sciences—"Education" and the auxiliaries "Geography" and "History"—are not brought within the range of Social Sciences.

#### 56 COLON CLASSIFICATION

Note.— For the significance of asterisks at the beginning of certain Class Numbers in Sec 561 and 562, See Sec 563.

#### 561 Consecutive Main Subjects

*SZ	Social Sciences	*X	Economics
*T	Education	XV	National Economics
TYT	Educametry	XX	Industrial Economics
TZ	Geography and History	XYT	Econometrics
*U	Geography	XYV	Economico-cybernetics
UZ	History, Political Science and Economics	Y	Sociology
		*YX	Social Work
UZZ	History and Economics	YYT	Sociometry
*V	History	YYV	Socio-cybernetics
VX	Historical Source (as a pure discipline)	*Z	Law
		ZV	Law of war
*W	Political Science	ZX	International law

## 5611 Annotation

1 The Main Subject "U Geography" is a "Background subject" to the succeeding Main Subjects; and the Main Subject "V History" may be taken as Applied Political Science — that is Political Science-in-action. Therefore, they are included, among the Social Sciences, even as similar subjects in the region of natural sciences.

## 562 Scattered Main Subjects

The following Main Subjects belong to Social Sciences, though they stand scattered outside the range mentioned in Sec 561:

*2	Library Science	9p	Conference methodology
2T	Library Service	9s	Seminar methodology
2YT	Librametry	*9t	Comission methodology
8	Management science	9P	Communication theory
9b	Career	9Q	Symbolism

## 5621 Annotation

1 "2 Library Science" is as much a Social Science as "T Education" is, though it gives education, only informally. But under the pressure of the DC tradition of taking away "02 Library Science" from among the Social Sciences and including it among the Generalia Subjects, CC has also taken away "2 Library Science" from among the Social Sciences. "2T Library Service" is library science-in-action. Therefore, it is also included with in Social Sciences.

2 The other subjects are described in CC as "Distilled Main Subjects". The significance of this term is, by way of illustration explained in respect of "8 Management". The Pure Theory of Management has begun to attract literary warrant only in recent years. This theory has been distilled out, so to speak, out of the application of Management — Management-in-action — in several subjects. Though most of these subjects belong to the Social Sciences some lie outside them, for example, Hospital Management. Therefore, it has not been possible to make an invidious distinction among the Main Subjects of the Social Sciences and make Management Theory an Adjunct Main Subject of it. If this be done the Law of Impartiality (6) would be violated.

## 563 New Main Subjects

The ten Main Subjects marked with asterisks in Sec 561 and 562 had been enumerated even in Ed 6 of CC as Social Sciences.

564 *Newly Emerging Main Subjects*

The Notational System of CC is versatile enough to accommodate any newly merging Main Subject in Social Sciences, as in any other part of the schedule of Main Subjects, in their respective filiatory positions as determined by the Idea Plane, either among the

- 1 Range of consecutive Main Subjects; or among the
  - 2 Other Main Subjects,
- as warranted by its nature.

565 *Exclusion of Psychology*

The encyclopaedias would include Psychology among Social Sciences. Ed 1 (1933) to Ed 4 (1952) of CC also did so. This should have been largely due to the traditional inclusion of "Social Psychology" as a sub division of Psychology. In the tradition, this term included both the Psychology of a social group and the psychology of a person living within his own group or any other group. But the former should go with the Main Subject "Sociology" connoting the study of Social Groups. And the latter should go with the Main Subject "Psychology" connoting the psychology of individuals. The other schemes for Library Classification also respect this view.

57 *BIBLIOGRAPHIC CLASSIFICATION (1953)*

- 1 Summary of Main Classes. — "K Social Sciences"
- 2 Schedule
  - 21 Special Title Page. — "K Sociology"
  - 22 Synopsis. — "K Sociology" (with reference to History, Religion, and Applied Social Sciences) (Classes L-T, where
 

L	Histryology	R	Political Science
M to O	History	S	Jurisprudence and Law
P	Religion	T	Economics
Q	Social Welfare		

571 *Annotation*

1 The reference implies that the Main Classes mentioned under it are, so to speak, "near relatives" to social sciences, though not essential divisions of the same.

2 Of the near relatives "P Religion", is perhaps a "relative" of the farthest remove, in the light of what the other schemes enumerate under the generic name "Social Sciences".

3 The subject "J Education" is not mentioned even as a "near relative" of Social Sciences, though DC, UDC, and CC include it as a division of Social Sciences.

4 The Subjects "DQ to DT Geography" and "ZG Biblio-



grahy" to "ZY Libraries" are not mentioned even as "near relatives" of Social Sciences, but CC includes them.

#### 58 INTERNATIONAL CLASSIFICATION (1961)

##### J Social Sciences

Annotation .—

1 The divisions of "J Social Sciences" are mostly those mentioned by other schemes, except the following:

"JB" to "JC" representing "statistical calculus" and "statistical data". These do not belong to Social Sciences (See Sec 51, Category 1). This has been perhaps due to the influence of DC.

2 The undermentioned subjects are not shown as subjects within Social Sciences:

AG to AJ	Library Science and Library
D to F	History
G to I	Geography
K	Law
L	Economics
M	Political Science
NA to NN	Education
OA to OM	Business (= Management)

This is at variance from what most other schemes do.

#### 6 Scope According to Encyclopaedia

##### 60 FORMAL DEFINITION

As against definition by enumeration found in schemes for library classification, that in the encyclopaedias gives a formal definition of the scope of "Social Sciences".

#### 61 ENCYCLOPAEDIA BRITANNICA (1965)

Social Sciences are concerned with the orderly investigation of the behaviour of man in society with the aim of cumulating a body of relevant theory. Theories concerning group behaviour, whether economic, political or social, are legion. They are implicit in men's action, transmitted in customary beliefs and elaborated in literature. The distinctive quality of social science is that it attempts to formulate such theories unambiguously and in a way which permits the testing of theory against fact. Sociology is one of the several specialised Social Sciences.

#### 62 ENCYCLOPAEDIA OF SOCIAL SCIENCES

The following is the definition given by Seligman. the editor of its Ed 1, "Social Sciences .— Those mental or cultural sciences that deal with activities of individual as a member of a group"

All but one of the articles in this Encyclopaedia are germane to "Social Sciences". But the one on "Statistics" is an exception. It is really on Statistical Calculus, and therefore is not a division of Social Sciences. However articles on apparently foreign subjects, such as Mathematics, Linguistics, and Religion, deal only with their Sociological aspects. Therefore their inclusion is justified.

#### 7 IS THE TERM "SCIENCES" IN THE TERM "SOCIAL SCIENCES" APPROPRIATE?

##### 7a EARLY MONOPOLY BY NATURAL SCIENTISTS

The practitioners of the Natural Sciences had monopolised the term 'Science' for a long time. According to them a Science should be restricted to,

1 Subjects dealing with the physical world or its phenomena; or

##### 7b KARL PEARSON'S VIEW

"The material of Science is unlimited — every group of natural phenomena, every phase of social life, every stage of past or present development is material (for science) . . . The material of science is coextensive with the whole life" (2).

##### 7c AN OBJECTIVE TEST

A reviewer in *Nature* (1) of my inaugural address at the University of Delhi in 1947, and published as *Preface to library science* (1948) (5), had challenged the use of the term 'Library Science'. Curiously *Nature* had failed to raise the challenge when I first used the term 'Library Science' in the title of my book "Five Laws of Library Science" (1931). Probably it was missed because it was the first time when the term 'Library Science' was used in the title of a book.

##### 7d A STIMULUS

This criticism in the *Nature* could have been sufficiently met by merely citing Karl Pearson. But, it may be said that it was the opinion of one scientist against that of another. This led me to examine the connotation of the term 'Science' in an objective way.

##### 7e DEFINITION THROUGH SCIENTIFIC METHOD

The approach to the definition of the term 'Science' through the subject of study or the method of study has given only negative.

results. A positive help can be got by an examination of the mode of development of a subject in the universe of subjects. In this approach the term 'Science' is the name given to a subject whose development is characterised by a method called "Scientific Method" (3, 4). We should therefore begin with a description of Scientific Method.

#### 7f ASSUMED TERM

In the description of Scientific Method, we shall use the following as assumed terms:

- 1 Know, Knower, Knowee, Knowledge;
- 2 Senses, Sensation or Perception, Observation, Experimentation;
- 3 Intellect, Association, Reasoning, Logic, Inductive Logic, Deductive Logic;
- 4 Memory, Remembering, Recalling; and
- 5 Emotion, Feeling;

The mode of knowing with the aid of the faculties and methods mentioned in the last four sections is called *Kartru-Tantra* in Sanskrit. It means "Knower-Dependent".

Intuition or trans-intellectual, trans-sensory, trans-emotional, and trans-memory mode of directly knowing a thing-in-itself is called *Vastu-Tantra* in Sanskrit. It means "Knowee-Dependent".

#### 7g DEFINED TERM

1 Idea .— The product of thinking, reflecting, imagining etc got by the intellect by integrating with the aid of logic, a selection from the apperception mass, and/or what is directly apprehended by intuition and deposited in the memory.

2 Subject .— An organised or systematised body of ideas, whose extension and intension are likely to fall coherently within the field of interest and comfortably within the intellectual competence and the field inevitable specialisation of a normal person.

#### 7h UNIVERSE OF SUBJECTS

The Universe of Subjects is the sum total, at the moment, of such cumulated subjects. It is being continuously developed and added to both in extension and in depth. Different domains of the Universe of Subjects are developed by different methods.

#### 7j SPIRAL OF SCIENTIFIC METHOD

Scientific Method is characterised by a never ending spiral movement. It is schematically represented in the following

diagram. Each cycle implied in the Spiral will be followed in the clock-wise direction.

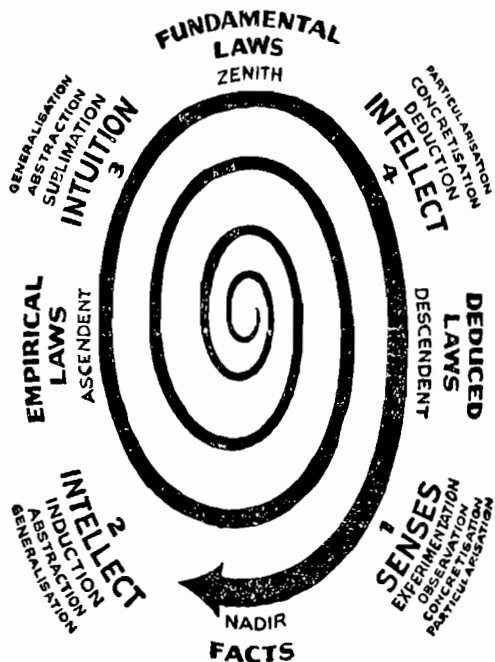


FIG. 1. Spiral of Scientific Method

#### 7k FOUR CARDINAL POINTS

For convenience of reference, the four cardinal points of the cycle in the Spiral are denoted by the terms 'Nadir', 'Ascendent', 'Zenith', and 'Descendent'. The nadir marks the accumulation

of facts experienced. The ascendent marks the accumulation of empirical laws derived from facts of experience. The zenith marks the fundamental laws sublimated from the empirical laws. The descendent marks the deduced laws implied in the fundamental laws.

#### 7m FOUR QUADRANTS

The four cardinal points give rise to four quadrants in each Cycle implied in the Spiral. For convenience of reference, the quadrants will be numbered 1 to 4 respectively, as follows: Quadrant 1 is the one between descendent and nadir; Quadrant 2 is the one between nadir and ascendent; Quadrant 3 is the one between ascendent and zenith; and Quadrant 4 is the one between zenith and descendent.

#### 7n QUADRANT 1: EXPERIENCING FACTS

Quadrant 1 corresponds to the stage in the development of a subject in the universe of subjects, conforming to Scientific Method, in which:—

- 1 Primary senses are used either in their native state or with the aid of instruments of various intensity of powerfulness;
- 2 Observations are made of knowees, either with or without experimental interference and conditioning; and
- 3 Facts are found.

#### 7p QUADRANT 2: INDUCTION AND GENERALISATION I

Quadrant 2 corresponds to the stage in which:—

- 1 Intellect is used either by itself or aided by machinery constructed to speed up the work of the intellect and to give relief to it in some measure;
- 2 Reasoning is made with the aid of inductive logic including normal equations and statistical and other calculus to boil down the numerous facts accumulated at the nadir to a small number of inducted or empirical laws — for example, Kepler's Law of Equal Area, in the motion of planets, boiled down from the facts recorded by Tycho Brahe — more easy to hold in memory than the multitude of the facts themselves; and
- 3 Inducted or empirical laws are formulated.

#### 7q QUADRANT 3: SUBLIMATION AND GENERALISATION 2

Quadrant 3 corresponds to the stage in which:—

- 1 Intuition of some intensity is used unmediated by the primary senses or the intellect;
- 2 The inducted or empirical laws stand boiled down to a very small number of fundamental laws — for example, Newton's Laws of Motion, to which many empirical laws such as the Kepler's

Laws are reduced at one stroke — more easy to hold in memory than the more numerous empirical or inducted laws; and

3 Fundamental laws are seized.

#### 7r QUADRANT 4: DEDUCTION FROM FUNDAMENTAL LAWS

Quadrant 4 corresponds to the stage in which:—

1 Intellect is used either by itself or aided by machinery constructed to speed up the work of the intellect and give relief to it in some measure;

2 Reasoning is made with the aid of deductive logic including general semantics, and mathematical and other calculuses to work out all the compelling implications of the fundamental laws;

3 The deduced laws are derived;

4 The derived deduced laws include one and all of the inducted empirical laws; and

5 The number of deduced laws exceeds that of the empirical laws, if the fundamental laws had been seized with intuition of adequate intensity.

#### 7s ENTRANCE INTO THE NEXT CYCLE

The Spiral of Scientific Method begins the next cycle thereafter, by re-entering quadrant 1. Two things happen at the stage of development corresponding to quadrant 1 in the new cycle:

1 Observations and experiments are made to verify empirically the validity of the new deduced laws; and

2 Further observations and experiments are made continuously and this leads to accumulation of new facts.

#### 7t DURATION OF VALIDITY OF FUNDAMENTAL LAWS

So long as the deduced laws are empirically verified to be true and the new facts are found to be in conformity to the implications of the fundamental laws, there is no further movement in the Spiral, and the fundamental laws hold sway and continue to be deemed helpful. But this seldom holds good for long. Disturbance arises sooner or later in almost all the Subjects in the universe of subjects as they get cultivated and developed. As and when new facts appear to contradict the fundamental laws, arduous effort is made to ensure absence of any kind of fallacy in the process of deduction, any kind of defect in the logic or the calculus used in the process, and any kind of fault in the experiment or observation or in the instruments used. When warranted, more powerful instruments of observation more exacting experiments, and sharper calculuses for deduction, are devised. Witness, for example, of mass-spectroscopy which dissolved an apparent contradiction to Dalton's fundamental

law about atomic weight, the devising of observations of star during total solar eclipse which removed an apparent contradiction to Einstein's Fundamental Law of Relativity, and the unceasing progress in the development of general semantics, and the mathematical calculus to make deductions penetrating and free from fallacies. Every effort should also be made to reinterpret the terms in the formulation of the fundamental laws with the aid of exegetics, so as to get out of them their fullest possible implications, lying hidden until the necessary empirical experience draws attention to it.

#### 7u DECLARATION OF CRISIS

Now and again, contradiction between the facts and the currently used fundamental laws persists, in spite of all the possible precautions to ensure absence of faults and fallacies in the collection of the facts and the inference of the implications of the fundamental laws, and inspite of every possible and proper use of exegetics. Then we have to recognise the existence of a new class of facts and declare the incidence of a crisis in the application of the Scientific Method.

#### 7v RESOLUTION OF CRISIS: NEW FUNDAMENTAL LAWS

Then, the new class of facts are accumulated at the nadir; and a new cycle gets into full swing and carries the Spiral of Scientific Method further. Work in quadrant 2 leads to a new set of empirical laws. Work in quadrant 3 leads to the seizing of a new set of fundamental laws. Work in quadrant 4 leads to a new set of deduced laws. Work in quadrant 1 is again started as before. This Cycle is liable to be repeated without end in many a subject.

#### 7w ILLUSTRATION OF RESOLUTION OF CRISIS

Newton's laws did not fit in with certain new facts found during the present century; and in this context, they ceased to be helpful hypotheses and gave place to Einstein's Law of Relativity. These two sets of laws belong to two different Cycles in the Spiral of Scientific Method. In CC, the comprehension of all Natural Sciences and their applications is scheduled as "A Natural Sciences"

#### 7x HYPOTHESES AND NORMATIVE PRINCIPLES

Any subject in the universe of subjects, irrespective of the idea or the method of study, admitting of the Spiral of Scientific Method in its development, is a Science. In the natural sciences, including the physical and the biological sciences, the fundamental laws are called "Hypotheses". They furnish a des-

criptive formulation of the facts of experience. In the Social Sciences, such as, education, political science, economics, sociology, law, and library science the fundamental laws are called "Normative Principles". They furnish an interpretative explanation of the facts of experience. The terms 'true' and 'false' apply only to facts and the empirical and deduced laws. They do not apply to hypotheses and normative principles — that is, to fundamental laws. These can only be described as helpful or unhelpful, according to as they fit in or not with the facts of experience.

#### 71 "SPIRITUAL EXPERIENCE", "FINE ARTS" AND "LITERATURE" NOT SCIENCES

The Main Subjects "Spiritual experience", and "Fine" arts including "Literature", are products of intuition with little play of intellect or sensory perception. Thus only Quadrant 3 occurs. The other three Quadrants do not come into action. And there is thus no Scientific Spiral at all.

#### 72 "RELIGION", NOT SCIENCE

In theology, the Zenith of the Spiral of Scientific Method is occupied by unalterable authoritative principles, often taken to be Revelations. Historically, even empirical experiences in the physical world, going contradictory to them, have been denied validity; indeed, history is full of instances of treating the assertion of such empirical experiences as heresy and of the cruelty meted out to heretics. Here the left half the cycle — Quadrants 2 and 3 — do not come into action. Exegetics is put to the severest strain to reconcile the authoritative principles at the zenith and the contradicting facts at the nadir. One of the extreme devices used in this exegetics is known as *Artha-Vada*. According to this, the occurrence of meaningless words, phrases, sentences and even paragraphs are postulated to occur in a text. These are deemed to be un-intelligible, and hence to-be-neglected as "noises" in the revealed texts occupying the zenith. *Mimamsa* in Indian philosophy furnish outstanding examples of extreme forms of reconciliation of this kind. Christian theology also does so. There is thus, no Scientific Spiral at all. Therefore, it is not a Science.

#### 73 "PHILOSOPHY", NOT SCIENCE

In Philosophy the Zenith of the Spiral of Scientific Method is occupied by intellectual constructs and not by intuitive apprehensions, though known as Hypotheses. Philosophy takes into consideration only deduced laws, facts of experience and empirical laws. If there is any crisis it is got over by changing the intellectual



constructs used as Hypotheses. Thus, Quadrant 3 does not come into action. And there is thus no Scientific Spiral at all.

74 "LINGUISTICS", "PSYCHOLOGY" AND "LITERARY CRITICISM"  
 "Linguistics" and "Literary Criticism" have completed Cycles of the Spiral of Scientific Method. Therefore, they are Sciences. But, they emanate from "Literature" and are auxiliaries to it. Therefore, it is necessary to keep them next to "Literature" which is not a Science. "Psychology" also has completed Cycles of the Spiral of Scientific Method. Therefore, it is also a Science. But, its historical origin was in Philosophy. Therefore, it is desirable to keep it next to Philosophy.

#### 75 HUMANITIES

The Main Subjects mentioned in Sections 71 to 74 are put together usually in a group of their own, denoted by the term 'Humanities'.

#### 76 EARLY RECOGNITION OF NATURAL SCIENCES

Natural Sciences were admitted as sciences, as tested by the use of the Spiral of Scientific Method in their development, much earlier than Social Sciences. This was because, in Natural Sciences.

1 Observation—corresponding to quadrant 1 of the Cycle—can be impersonal and nearly objective, subject only to the errors of observation admitting of correction by the curve of errors and the calculus of observations designed more than a century ago by Gauss;

2 Experiments—corresponding to quadrant 1—can be made without any let or hindrance in the case of physical sciences and with a minimum of mental revulsion even with the living bodies of the lower organisms; and

3 The mathematical and statistical calculuses, and logic necessary and sufficient to make induction and deduction—needed in quadrants 2 and 4 in Natural Sciences, had been forged a few centuries earlier and there has been a continuous sharpening of them;

4 Sublimation of the impirical laws into Hypothesis have been made in each of them; and 5 New Hypothesis have also been formulated to resolve crisis,

#### 761 *Applied Natural Sciences*

Some Applied Natural Sciences have completed at least one Cycle of the Spiral of Scientific Method, while the others have not yet done so. But an Applied Natural Science is a Pure Natural Science-in-action. Therefore, all Pure and Applied Natural Sciences should be kept in a group of their own.

**8 Social Sciences****81 DELAY IN THE RECOGNITION OF SOCIAL SCIENCES****811 Difficulty 1: Man Himself being the Subject of Study**

In the Social Sciences, unfavourable factors prevail in quadrants 1, 3 and 4:

1 In quadrant 1, observation is vitiated by the observed entity being man himself inducing obstruction in his mind to the pursuit of the subject;

2 Experimentation is difficult, if not impracticable, and even impossible when man himself has to be the subject of experiment; and

3 Even where it is attempted, it takes several decades to collect adequate data.

**812 Difficulty 2: Period for Experiment**

The period for experiment with humans has to be very long. For,

1 The life-span of a generation in humans is several decades, as against the short one of rabbits (used as laboratory animals) and of still lower organisms; and

2 The rate of multiplication is small among humans as against the fecundity of rabbits and phenomenally high fecundity of still lower organisms.

**813 Difficulty 3: Humane Consideration**

Humane considerations prevent experimenting with the human species.

**814 Difficulty 4: Delay in the Forging of the Necessary Statistical Aids**

Another difficulty has been the delayed emergence of statistical aids as shown below:

1 The statistical calculus necessary for work on humans, in quadrants 2 and 4 were either unknown or were found to be in a primitive state till about eighty years ago;

2 It was only in about 1890 that Statistical Calculus was developed and made fit for work, on humans, in quadrants 2 and 4, by Karl Pearson (1857-1936); and

3 Statistical Calculus, Operational Research, and other tools are being sharpened only today to a degree sufficient to make allowance for the vitiations, incidental to man and his society being the subject of study.

**82 FIVE SOCIAL SCIENCES QUALIFY TO BE SCIENCES**

As a result of the forging of such powerful tools, the development of many disciplines in the Social Sciences is becoming

progressively amenable to Scientific Method. As a result of this, many Social Sciences have completed atleast one Cycle in the Spiral of Scientific Method. Here are some examples:

*Note.* — For convenience of reference and for no other reason the CC numbers are used in the examples:

1 In the Schedules for "T Education" and "X Economics", CC mentions different Systems of developing the subjects. These give the successive sets of Normative Principles evolved in the formation of different Cycles in the Spiral of Scientific Method;

2 In "Z Law" there are different systems of Jurisprudence with their corresponding Cycles in the Spiral of Scientific Method;

3 "W Political Science" has experienced three Cycles in the Spiral of Scientific Method with the successive formulation of the Normative Principles.

1 "The King can make no mistakes", valid in a Monarchy;

2 "The Judiciary can make no mistake;" valid in a Republic; and

3 "The Legislature can make no mistake", postulated-in-legislative-action, a few years ago, in South Africa, when the Judiciary struck down some of the enactments involving discrimination against colour epeople.

4 "2 Library Science" entered the Spiral of Scientific Method on the formulation in 1928 and the publication in 1931 of the Normative Principles known as the Five Laws of Library Science.

#### 83 SOCIOLOGY

"Y Sociology" has only reached the stage of empirical laws; in due course it may complete the first Cycle in the Spiral of Scientific Method.

#### 84 SOCIAL WORK

"YX Social Work" is an applied adjunct to "Y Sociology". Therefore, it should go with Sociology. Consequently, it should also be included in the group of Social Sciences.

#### 85 SCATTERED SUBJECTS OF SOCIAL SCIENCES

In the other scattered subjects included in Social Sciences (See Sec 552), the Spiral of Scientific Method has not yet started. They are too recent for its start.

#### 86 GEOGRAPHY AND HISTORY

"U Geography" is only a background subject and "V History" is applied political science — that is, political science—

in-action. Therefore, it is doubtful whether the Spiral of Scientific Method is applicable to them; but they have to be given a place among the Social Sciences because of their being auxiliaries to them.

#### 91 Bibliographical References

*Note.*—

- 1 Col 1 gives the number of the reference.
  - 2 Col 2 gives the number of the Section in the text, where the reference is made.
  - 3 Col 3 gives the document referred to.
- 1 Sec 7c BRIGHTMAN (R). Review [of Preface to library Science]. (Nature. 164; 1949; 202).
  - 2 Sec 7b PEARSON (Karl). Grammar of science. Ed2. 1900. P12
  - 3 Sec 7e RANGANATHAN (S R). Five laws of library science. Ed 2. 1957. Chap 8.
  - 4 Sec 7e ——. Library science and scientific method. (An lib sc 4; 1957; 19-32).
  - 5 Sec 7c ——. Preface to library science. 1948.
  - 6 Sec 562 ——. Prolegomena to library classification. Ed 3. 1967. Chap DD.
  - 7 Sec 50 ——. ——. Chap GC.
  - 8 Sec 21 ——. ——. Chap GD.  
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