The Logical and Epistemological Foundations of Sociology in the Philosophy of F.S.C Northrop

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B. A., University of Costa Rica, 1970

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ABSTRACT

The Logical and Epistemological Foundations of Sociology in the Philosophy of F.S.C. Northrop

by Francisco Escobar, Ph.D., May 17, 1992

Filmer S. C. Northrop was born in 1883. Studied at Beloit, Yale and the University of London Imperial College of Science and Technology. He was professor of Law and Philosophy at Yale. Published *The Logic of the Sciences and the Humanities* and *The Meeting of East and West*, among many books and articles. An expert in epistemology, his method of analysis is a search for the discovery of the first principles of knowledge and the rigorous logical relationship between those principles and the whole body of doctrine. It provides a method of thinking as much as it provides a system of thoughts.

This dissertation explores those elements of Northrop's philosophy which deserve the attention of sociologists. His philosophical ideas about the logical and epistemological categories of knowledge provide the social scientist with the training to think deductively and to avoid the misunderstandings derived from the use of common sense language, disregarding logical and conceptual distinctions. This systematic study offers the opportunity to gain a fertile system of thought, and consider the new theory of the social sciences as a portion of it.

To the memory of Sakari Sariola,

thinker, sociologist and teacher,

with gratitude.

ACKNOWLEDGMENT

This dissertation would not have been possible without the continuous intellectual support and sustained aid of the late Professor Sakari Sariola, the director of this study, Professor F.S.C. Northrop, whose epistemological theory of sociology is the central topic of this work, and Professor Shirley Harkess, distinguished teacher, member of my doctoral committee and Graduate Studies Director of the Department of Sociology, whose genuine interest and understanding support allowed me to overcome insurmountable difficulties. Professor Northrop has enhanced my spiritual life with his profound wisdom and knowledge and his unique, gentle, personal kindness. It was through his works and memorable conversations that I was able to bring into a totality the human experience, nature and God.

I would like to give special thanks to my wife Lorena, who aided me with her loving support in this unique mental journey and to my daughter Ariadna, and my son, Franco, who have planted their smiles along this hard intellectual exercise. Also to my parents Carmen and Enrique who gave me the gift of their loving care. And in Kansas, I would not have made it through the student years without the generous support of my sister Meri, my brother -in- law Andrew James and my dear nephews Federico and Alejandro, those Schlagels that I'll always keep in my heart.

It would be endless to express my gratitude to all those who enriched my experience while working with Professor Northrop in Harvard and Boston College. I am particularly grateful to Professor Jose Simoes da Fonseca, who shared with me his unique science developed in the School of Medicine at the University of Lisbon, taking the philosophical epistemology of Northrop to its highest experimental level. Gratitude is also expressed herein for the help and encouragement given by Professors César Hernández, Robert Antonio, David Willer and Charles Stansifer.

Dr. Peggy Barlett, Dr. Juan del Aguila and Dr. Ricardo Gutiérrez-Mouat made unforgettable my academic experience as visiting professor at Emory University, along with my friends Dr. Jane L. Collins and Dr. Michael D. Painter.

Thanks to Dr. Rigoberto Lanz and all the distinguished academic hosts at the Universidad Central de Venezuela. Dr. Patricia Rosenfield and Dr. Peter Ruderman gave me the unique opportunity to do research under the World Health Organization support.

At the Universidad de Costa Rica, my gratitude to those select fellow sociologists, university faculty and students who made 25 years of academic work a profound spiritual experience, in spite of those who chose to block my path.

Throughout those years I have treasured the priceless contributions of those human beings I have had the gift to meet. In my retreat, I keep you all in my soul.

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INTRODUCTION:
A SKETCH OF FILMER STUART CUCKOW NORTHROP, HIS WORKS AND ITS RELATION TO SCIENTIFIC SOCIOLOGY

AUTHOR'S UNIVERSITY OF KANSAS EDUCATIONAL BACKGROUND

During my years of education in the Sociology Department at the University of Kansas, several intellectual influences shaped my conceptions, interests and conclusions on diverse sociological topics.

Important influences are those coming from the works of David Willer, César Hernández Cela and Sakari Sariola. Professor Willer **(1)** initiated me into the fundamental problems involved at the very basis of the methodology and theoretical construction in sociology. Dr. Willer made clear the fallacies involved in a purely empirical social knowledge and set the basis for a precise formulation of a cognitively valid alternative position. Willer's works make apparent the necessity to stand on a solid epistemology to look at the theoretical and methodological problems of sociology. After Willer's thorough critical analysis of the actual methods and theories, the present writer was convinced that purely comparative analysis of methodological procedures and formulated theories is useless in gaining a proper evaluation of their cognitive value.

Professor Hernández's work provided me with the idea that at the foundation of sociology there was a philosophical inquiry; epistemological and axiological problems were at the heart of the matter and required an extensive examination of metaphysical issues in philosophy. The specific relations between the sociological theories and methods, and the totalizing conceptions of reality, were substantially evidenced. It was imperative to have a philosophical education for a critic of Sociology.

Professor Sariola **(2)** contributed decisively with his systematic examination of society from the strategic point of view of the phenomena of power, centered around the dilemma of polity versus society, government versus people, etc., and the properties of socio-political systems. The conception of social change in terms of the continuous emerging dialectical corrective

process leads to the intriguing inquiry about the "guiding principles," their emergence, and the mechanisms that connect them from the radically conceptual level to the observable behavioral level. Within this theoretical frame, ideologies in their relation to power become relevant at the basis of the social fabric. The property of power as a capacity to impose on others rules and principles that regulate their responses in social interaction and restrict their choices, assigns to the sociological inquiry the task to search into the nature of those normative elements, rules and principles, involved in the phenomenon of power.

All these, and many other valuable contributions from the faculty, including Professor Shirley Harkess studies on specific sociological issues of Latin America and gender, and Professor Robert Antonio's works on phenomenology, lead me to find the work of the American philosopher, logician, natural scientist and legal student, Filmer S.C. Northrop, most enlightening.

One of the main problems confronted by the newer generation of social scientists is the lack of mental training to think deductively and to avoid the gross misunderstandings derived from an indiscriminate use of pure common sense language, disregarding logical and conceptual distinctions. Only a philosophical education, especially careful about the logical and epistemological categories of knowledge, can correct this problem.

This is precisely one of the contributions of Northrop's works when read and studied by social scientists.

Once this training is gained by applying oneself to the disciplinary study of his works, a most fertile and rich system of thought is laid down in a prodigiously vast work. Northrop's philosophy presents, as a portion of the whole philosophical system, a new theory of the social sciences. The major purpose of this study is to present a systematic exploration of those elements of his philosophy which deserve the attention of sociologists.

A BIOGRAPHICAL SKETCH (3)

Filmer S.C. Northrop was born in Janesville, Wisconsin in 1883 and received his Bachelor of Arts degree from Beloit College in 1915 with a major in history.

During his studies at Yale, Northrop further developed his interests in the "first principles" of any system of knowledge or any discipline. Just as at Beloit College, he realized that there "is no fully understood history without philosophy." At Yale, where in 1919 he received an M.A. in Economics, he began to see that social theories rest on certain fundamental pre-suppositions about "facts." This intellectual trait was further demonstrated in his graduate work at Harvard where he received a second M.A., this time in Philosophy in 1922 and a Ph.D in the Philosophy of Natural Sciences in 1924. His doctoral dissertation was entitled "The Problem of Organization in Biology" and involved both careful research in biochemistry under Professor Lawrence J. Henderson and also philosophical clarity under Professor William Ernest Hocking, has remained a life-long friend. He studied the philosophy of mathematical physics under Alfred North Whitehead at the University of London Imperial College of Science and Technology.

Professor Northrop's teaching career was primarily at Yale. He was an Instructor of Philosophy at Yale in 1923. His promotion to full Professor took place in 1932. He was chairman of the Department of Philosophy from 1938 to 1940. Then, in 1947, the Yale Law School bestowed upon Northrop a rare honor, granting him the sterling Professorship of Philosophy and Law, a special chair for distinguished academicians in related fields who have something to offer a broader understanding of the problems of law. He held this honor from 1947 until June 1962 when he reached his 68th year and the retirement age. Among other temporary teaching positions, he also held visiting Professorships at the University of Iowa, the University of Michigan, the University of Virginia, the University of Hawaii, the National University of Mexico and the

Australian University of Melbourne. Northrop was president of the Society of the History and Philosophy of Science in 1948 and of the Eastern division of the American Philosophical Association in 1952. In 1949, in appreciation of his understanding of the culture of Mexico, the Mexican government decorated him with the Order of the Aztec Eagle. His contributions to political science were partly recognized by political scientists in 1953 when the American Political Science Association gave him the Wendell Wilkie Award for his book, The Taming of the Nations. In 1962, the American Council of Learned Societies honored him in their annual awards for distinguished accomplishment in humanistic scholarship. Several foundations, including the Guggenheim and Wenner Grenn Foundations, also generously supported his research work. Thus, the latter foundation for anthropological research sponsored several of his projects, including the international symposium headed by him at Burg Wartensetin, Gloggnitz in Austria in 1962, which was held to investigate the epistemological problems of cultural anthropology. Finally, the U.S. government in 1958 sent him as the United States representative to the 13 -nation South-East Asian Round Table Conference on Traditional Cultures and Technological Progress held at Bangkok, Thailand.

The fundamental characteristic of Northrop's thinking is his simultaneous acceptance of the dynamic changes in the world of science while still maintaining that man's metaphysical theories can be cognitively meaningful.

Northrop's highly competent scholarship in mathematics, natural science, social disciplines, humanities and arts makes it possible to bring his analysis away from purely ungrounded speculation. His restless search for the first principles of knowledge allows him to transmit the powerful empirical knowledge down to the last conclusions within the different fields of science, humanities, religion and art.

His early interest in the philosophical problems of science is demonstrated by the nature of his first book, Science and First Principles **(4)**. In this work he clearly states the theme that persists in all of his later works, i.e, the theoretical implications of any scientific discovery are just as important as its practical applications. In summarizing his objectives in writing this first published work, Northrop states:

> Science proceeds in two opposite directions from its many technical discoveries. It moved forward with the aid of exact mathematical formulation to new applications, and backward with the aid of careful logical analysis to first principles. The fruit of the first movement is applied to science, that of the second theoretical science. When this movement toward theoretical science is carried through for all branches of science we come to first principles and have philosophy. This book is a product of the last movement. Stated bluntly, it aims to determine precisely what contemporary scientific discoveries in many different branches of science reveal, and what all this means for philosophy **(5)**.

As his philosophical inquiry began to evolve from his own first principles, Northrop also became more and more interested in the problems of social science, without giving up his interest in the natural science. Both The Logic of the Sciences and the Humanities **(6)** and The Meeting of East and West **(7)**, which were first published in 1946, are works which are the products of this stage of his intellectual development. After the appearance of The Logic of the Sciences and the Humanities, Northrop's work further showed an increasing concern over both descriptive and normative problems in the study of politics. This did not mean, however, that he abandoned his broader concern with other disciplines, but that the immediate focus of his academic attention became for a time the "facts" of politics.

The Taming of the Nations **(8)** and European Union and United States Foreign Policy **(9)** were attempts at political analysis. As important and widely read as these two works have been, they are vastly oversimplified statements of his political philosophy. For an understanding of the first principles of Northrop's politics no one can afford to ignore The Complexity of Legal and Ethical

Experience: Studies in the Method of Normative Subjects **(10)** and Philosophical Anthropology and Practical Politics, **(11)** as well as his articles in many law journals. These two bodies of socio-political theory in turn should be examined also as extensions of Northrop's broader conception of life and existence. A synthesis and summary appear in Man, Nature and God **(12)**.

Filmer S. C. Northrop is basically an expert in epistemology. His method of analysis is a search for the discovery of the first principles of knowledge and the rigorous logical relationship between those principles and the whole body of doctrine. This is the reason that his philosophical system is not just a speculative ingenious construction, but a rigorous mental effort of analysis and synthesis. It provides a method of thinking as much as it provides a system of thoughts. Here we find the clue for the amazing effectiveness of his logic when applied to the social sciences.

METHOD OF THIS STUDY

The method followed by the present writer to approach the material submitted in this work is here described:

1)For a whole year a thorough library research was undertaken. It produced the first complete collection of papers concerning:

a) Books published, articles in journals and separate publications, chapters, essays and contributions to other books or edited collections, reprints from informal addresses or recorded participation in scholarly debates, academic and personal correspondence;

b) books, portions of books, articles, book reviews, comments, etc., on Northrop's works;

c)other books, articles, publications, by other authors, concerning Northrop's works or substantially important as evidence on Northrop's ideas;

d)personal correspondence with the present author;

e)lectures, papers, outlines, private conversations and verbal communications during the seminar taught by Northrop at Boston College Law School, fall semester, 1976, with the present writer as his Assistant.

f) Unpublished, unfinished works and manuscripts.

The main purpose of this work is to rescue the rich contribution of Professor Northrop to the logic and methodology of the social sciences, in particular to sociology, scattered over a large number of publications. The task is to structure systematically all these ideas, keeping the specificity of the topic as much as the generality of its philosophical framework.

The method adopted to meet this purpose was: 1) to gather all the available material, 2) to proceed to a detailed analysis of each publication chronologically in order to specify: a) the progressive unfolding of the ideas, and b) the systematic structure adopted by these ideas. This thesis brings into its text what is considered essential for the understanding of each particular point. The richness of illustrations, restatement, examples, figures or substantial findings has been eliminated and the reader is referred to the complete bibliography at the end of the thesis, or at the corresponding footnote.

The present writer's idea is to make available for students of sociology and philosophy of science, the epistemology of physical and mathematical knowledge and legal, interpersonal, normative and evaluative judgments. This is the reason why it was preferred to select the most essential material relevant to each point.

Actual quotations have been included in the text whenever a point requires the original, precise words and style of Professor Northorp, or when the content is so controversial that the reader may judge for himself on the basis of the original text.

READING PROFESSOR NORTHROP'S WRITINGS

Some cautions are in order to the reader who is not familiar with Professor Northrop's writings.

Northrop feels that ordinary language is often inadequate for fresh philosophical insights. Although he does not claim that only a new and mathematical language can provide accurate means of communication, he uses ordinary language in a very elaborate and involved manner.

The problem of understanding him is further complicated by his use of ordinary words, to which he often assigns a radically different meaning. The word "intuition" is a good example. Intuition or "intuitive knowledge" is often associated with introspection or "hunches." But Professor Northrop follows the usage of Einstein in his use of intuition, as most contemporary European thinkers, to refer to the immediate comprehension not only of ideas but of sense data as well. Whenever there are concepts which have sense data as referents, Northrop uses the term "intuition" just as readily as in the case of the private images of our own consciousness. Northrop also assumes, like many other authors, that in approaching one of his works his readers are familiar with some of his previous works. Consequently his articles studied in isolation will often seem bewildering.

Finally, one should be prepared for Northrop's frequent repetitiousness. Like many others who offer "new approaches" to various areas of knowledge, Northrop is concerned about being accurately understood if not praised. For this reason he feels impelled at times to state and restate his theses while approaching philosophical problems from the vantage point of political science, sociology, physics, anthropology and several other disciplines.

There is as yet no major secondary work which attempts to explicate or clarify, much less critically evaluate, the philosophy of F.S.C. Northrop.

Some of the soundest reviews of Northrop's works and ideas have been done by scholars who are not Americans. This is not particularly surprising, since Professor Northrop has something to say philosophically on almost every major culture in the world. Also, many of his writings have been translated into several languages and his articles have appeared in foreign scholarly journals. The Meeting of the East and West, for instance, has already been translated into Japanese, German and Spanish. This work is fairly well known in academic circles in various parts of the world. Jose Gaos, the noted Mexican philosopher and literary critic, is high in his praise of Northrop's basic approach to cultural problems. In particular, he speaks approvingly of the latter's analysis of the culture of Mexico that appears in The Meeting of East and West. Gaos is also hopeful that Northrop's work will eventually be more and more influential **(13)**. Professor Gaos also notes that the very subject matter of Northrop's inquiry in the area of the relationship between the "sciences" and the "humanities" is itself almost infinitely complex. Consequently, Gaos is more willing to be patient with and receptive to Northrop's complex analysis. Gaos also seems to feel that the exercise of patience and receptiveness in this case is well worth the effort, since Northrop has something to say which is fresh and significant in the study of philosophy.

NORTHROP'S CONTRIBUTIONS TO SOCIAL SCIENCES

Professor Northrop is not merely another socio-religious polemicist. Neither is he merely a special pleader for hypothetical worlds nearer to his own "subjective" heart's desire. His social and political theories are based on his philosophy of science, which in itself is a remarkable journey in human inquiry.

Henry Margenau, Professor of Natural Philosophy and Physics at Yale University, cites several areas of the philosophy of science where Northrop's works are important. In his work The Nature of Physical Reality, Margenau gives high praise to Northrop's clear tracing of the intellectual movement which began with Newtonian physics and led to Lockean empiricism which in turn influenced social and political thought. Margenau notes:

> Northrop points out interestingly how Locke's philosophy is a natural sequel to Newton's physics. This gives perhaps the clearest perspective in which Locke's epistemology can be viewed and indicates at the same time its science bound limitations**(14).**

Margenau also takes note of other aspects of Northrop's philosophy as "appropriate" explanations of various aspects of modern scientific procedure. These include the concepts of "epistemic correlations" **(15)** "concepts by postulation" **(16)** and Northrop's work together with Harold Burr **(17)** of Yale's Anatomy Department, in the area of applying field theories in mechanics and electrodynamics to some problems in biology (18). Northrop's theorizations in science are partly based on intense and detailed study of the theories and methodologies of Albert Einstein and Alfred Northrop Whitehead. Although he was a close student of Whitehead, Northrop felt that in certain areas Whitehead's epistemology was inadequate and that Einstein gave a more clear and reliable theory. One such major area was the theoretical explanation of the simultaneity of spatially separated events. Northrop's views on Whitehead appear in scattered fashion throughout his work. It is interesting to note that Einstein himself had great respect for Northrop's scholarship in the philosophy of science in general and in Einstein's own method in particular. Speaking of Northrop's article on "Einstein's Theory of Knowledge" (19) as well as another article by a different author, Einstein states:

> The essays by Lenzen and Northrop both aim to treat my occasional utterance of epistemological content systematically. From these utterances Lenzen constructs a synoptic total picture, in which what is missing in the utterances is carefully and with delicacy of feeling su pplied. Everything said therein appears to me convincing and correct. Northrop uses these utterances as point of departure for a comparative

> critique of the major epistemological system. I see in this critique a masterpiece of unbiased thinking and concise discussion, which nowhere permits itself to be diverted from the essential.

Since part of Northrop's social and political thought hinges on his understanding of Einstein's science, it is also important to take note of the fact that Einstein's understanding of the epistemologically different "stages" of science is similar to the views of Northrop. Northrop is at times attacked for his scientific "positivism" especially when dealing with "human values" **(20)**. Yet Northrop, like Einstein, is neither simply a positivist nor merely another non-positivist. In both men, different cognitive theories play a part at different points in scientific endeavor. In speaking of this in connection with the previously cited essay by Northrop, Einstein explains this paradoxical epistemological position thus:

> He [the scientist] therefore must appear to the systematic epistemologist as a type of unscrupulous opportunist: he appears as realist insofar as he seeks to describe a world independent of the acts of perception; as idealist insofar as he looks upon the concepts and theories as the free inventions of the human spirit (not logically derivable from what is empirically given); as positivist insofar as he considers his concepts and theories justified only to the extent to which they furnish a logical representation of relations among sensory experiences. He may even appear as Platonist or Pythagorean insofar as he considers the viewpoint of logical simplicity as an indispensable and effective tool of his research. All of this is splendidly elucidated in Lenzen's and Northrop's essays**(21).**

Apart from natural scientists, an increasing number of social scientists and theorists are likewise beginning to evaluate the contributions of F.S.C. Northrop. Within the social sciences he is a controversial figure in several disciplines. In the area of anthropology David Bidney has probably provided one of the most careful evaluations thus far of his work. Although Bidney has some reservations about certain particular aspects of Northrop's approach to culture, generally speaking he feels that Northrop's method "demonstrates that the professional philosopher has something significant to say on questions of cultural presuppositions" **(22).**

Like Bidney, Professor Ethel M. Albert of the University of California at Berkeley is impressed with Northrop's contributions to theoretical anthropology.

Speaking of his Philosophical Anthropology and Practical Politics, she says:

> Primarily political theory and philosophy, Professor Northrop's latest book is relevant to anthropology both because it assigns a critical role to the study of cultural philosophies featured in the title and because it contains, in effect though not in name, a theory of culture change and a conception of applied anthropology. Viewed from the unique perspective of Professor Northrop's theory, the relevant anthropological concepts assume new and problematic forms**(23).**

Albert, like Bidney, is skeptical of some of Northrop's claims, but she also states:

> Because his book is so rigorously logical and so intellectually honest, Professor Northrop has succeeded in making abundantly clear some of the real confusions and conflicts in the relations of the Western and non-Western world, as much in anthropology as in politics. The conflict between cultural pluralism or relativism and the necessity to be identified with one's own culture is becoming increasingly apparent in anthropology; the problems of applied anthropology are forcing attention to the over-compensatory character of relativism as an antidote to ethnocentrism; and the imbalances in anthropological thinking consequent upon insufficiently acknowledged philosophical commitments have barely begun to be redressed.

Clyde Kluckhohn feels that Northrop's analysis of the need for objective and "scientifically" discovered human norms is an important contribution. As Kluckhohn puts it:

> It is the great merit of F.S.C. Northrop to have pointed out the essential generalization: "The norms for ethical conduct are to be discovered from the ascertainable knowledge of man's nature, just as the norms for building a bridge are to be derived from physics**(24).**

Apart from anthropologists and sociologists **(25)** Northrop's works have been subjected to scrutiny by several political scientists. Professor William C. Havard of Louisiana State University takes note of the fact that Northrop is one of very few American scholars who have attempted to explore the area of what he calls "political anthropology" **(26).** He goes on also to claim that:

> ...the notion of political anthropology which stirred Professor Northrop's imagination does raise theoretically relevant questions about the nature of politics and suggests the initial steps in a method of inquiry appropriate to these questions**(27).**

Several other scholars, including T.I. Cook, are impressed with Northrop's attempt to broaden the study of politics. In reviewing Ideological Differences and World Order, Cook says:

Yet in a real sense this is a book for, and needed by, the political scientist. For...our subject as a whole has tended to become narrow, its practitioners divorced...from fructifying immersion in the whole stream of culture, one of the sources of strength of the great political thinkers of the past**(28).**

Northrop's descriptive methodology in the study of politics has already achieved some recognition. William H. Riker of the Center for Advanced Study in the Behavioral Sciences refers to this in the following passage dealing with Northrop's method.

> Certainly one should praise him for his emphasis, appropriate from a philosopher of science, on the necessity of deductively formulated, non-normative theory as a pre- requisite to descriptive investigation. Far too many political scientists and anthropologists blithely rely on so-called induction, which, as Russell once remarked, is just another name for guessing **(29).**

In Northrop's attempt to apply his descriptive methodology to actual political problems, however, he faces a considerable division of opinion among students of politics. For instance, Northrop's emphasis on the importance of basing political institutions on cultural "living law" has been praised by several writers in the areas of jurisprudence and foreign policy. Drew Middleton, in one review, feels that Northrop's analysis of the prerequisites for the political integration of Europe are especially noteworthy. He goes as far as to say that "no political planner has made a clearer, more incisive case for integration than this."

Doubtlessly the best study on Northrop is the dissertation thesis written by J. Chaudhuri: "The Politics and Jurisprudence of F.S.C. Northrop" **(30)**, 1964; a systematic exploration of those elements of his philosophy which deserve the careful attention of scholars in the fields of political theory and political science." In the words of its author, "this has been so far the most rigorous, thorough and intelligent attempt to approach the fundamental ideas of Professor Northrop and their application to a social scientific field."

The other work available on Northrop is the doctoral dissertation, "Theory of Political Unity in the Philosophy of F.S.C. Northrop" **(31)** by Samuel Rohio, 1970. This study is devoted "to explore the basis and hence the requisites of unity in any society." Specifically the political unity, taking the philosophy of Northrop as a source to provide the specifications and implications for a valid conceptual framework useful for the correct conceptualization and understanding of political unity.

Few works written by social scientists deserve mention. Most of them are based on gross misunderstandings of Northrop's ideas or complete ignorance of epistemology, logic and philosophy of science.

The article "The Validation of Normative Social Theory," **(32)** written in 1950 in the Journal of Philosophy by Jessie Bernard, is interesting to read as a good sample of how the lack of mathematical and natural science, as much as the lack of serious training in rigorous formal deductive thinking, can lead a social scientist to miss fundamental points.

The same superficiality can be confirmed by reading the article, "A Sociological Evaluation of the Meeting of East and West" **(33)** by Frank E. Hartung. This analysis does not go beyond the secondary amendments of detail, without substantive discussion of the main theses.

Perhaps the best article written on the particular topic of Northrop's idea of science is the one published in Chemistry in Canada, November 1950: "Profile of Northrop's views on scientific methodology" **(34)** by J. Ansel, Chief Chemist of the Grain Research Laboratory, Winnipeg.

COMMENTARY ON CHRONOLOGICAL PRESENTATION OF NORTHROP'S WORK.

In this dissertation, I have chosen to present particular works of Professor Northrop chronologically rather than thematically or substantively for an important reason. Having had the unique opportunity to read all of his writings chronologically. I have learned that his whole intellectual development follows a progressive pattern. His first preoccupation to investigate the foundations of human knowledge in general, through the examination and analysis of specific instances of scientific knowledge of nature and society, led him to start by publishing his fundamental ideas, the basis for all his further investigations.

It was his custom to publish the results of a particular research effort, showing its relationship with previous ideas to confirm, disconfirm or modify them, as well as to relate the new findings to other cognitive fields upon which the findings had a bearing.

This way, every new publication was simultaneously a critical revision of former ideas, an enriching restatement of prevalent and related ideas, and the formulation of central questions for further, deeper intellectual studies.

I have chosen those few works closely related and centrally relevant to sociology as the scientific study of the social human behavior. My specific goal in doing this is to make available to the sociologically minded reader, the epistemological system and the theoretical and methodological logics provided by F.S.C Northrop, without going through the extensive and complex total work of this philosopher.

I have kept in mind the reader's need to get the necessary conceptual information to understand the progressively more complex and abstract ideas of the author. It is my hope that the chronological presentation will do this important function for the reader.

I need not to underline the deep spiritual meaning this dissertation work has had for me. I found in S.C. Northrop the richest and most profound academic and scholarly mind, but also the most sensitive, gentle and humane man I have ever met.

During the preparation of this dissertation thesis, I enjoyed the unique privilege of being his research and teaching assistant in the Law School at Boston College. For several months, every morning I had several hours of conversation on all topics involved in this thesis and Professor Northrop himself had the singularly gracious kindness to read and write his comments, observations and corrections on the draft. We also exchanged a prodigiously voluminous correspondence on specific points of his epistemology, as well as sociological theoretical issues. He also made available to me his personal private archives, sharing some valuable correspondence he exchanged with leading philosophers, scientists, writers and artists of the world.

NOTES

(1) We refer to David Willer, Scientific Sociology: Theory and Method (New Jersey: Prentice Hall, Inc., 1968).

(2) Sariola's ideas on these topics were part of his lectures as Sociology professor at Kansas University.

(3) For a complete account of biographical details, see "The Politics and Jurisprudence of F.S.C. Northrop." Dissertation Thesis. University of Oklahoma, 1964, Chaudhuri, Joyotpaul. Epecially Chapter One.

(4) F.S.C. Northrop, Science and First Principles (New York: The Macmillan Company, 1932).

(5) Ibid., p. ix.

(6) F.S.C. Northrop, The Logic of the Sciences and the Humanities (New York: Meridian Books Inc., 1959). Hereafter referred to as The Logic of the Sciences.

(7) F.S.C. Northrop, The Meeting of East and West: An Inquiry Concerning World Understanding (New York: The MacMillan Company, 1960).

(8) F.S.C. Northrop, The Taming of the Nations: A Study of the Cultural Bases of International Policy (New York: The MacMillan Company, 1953).

(9) F.S.C. Northrop, European Union and United States Foreign Policy (New York: The MacMillan Company, 1954).

(10) F.S.C. Northrop, The Complexity of Legal and Ethical Experience: Studies in the Method of Normative Subjects (Boston: Little, Brown and Company, 1959).

(11) F.S.C. Northrop, Philosophical Anthropology and Practical Politics (New York: The MacMillan Company, 1960). Hereafter referred to as Philosophical Anthropology.

(12) F.S.C. Northrop, Man, Nature and God. A Quest for Life's Meaning. (New York: Simon and Schuster, 1972).

(13) José Gaos, "Un Método para Resolver los Grandes Problemas de Nuestro Tiempo," Cuadernos Americanos, A9o VIII, Vol. XLV, Mayo-Junio, 1949, p. 111.

(14) Henry Margenau, The Nature of Physical Reality: A Philosophy of Modern Physics (New York: McGraw-Hill Book Company, Inc., 1950), p. 48.

(15) Ibid., p. 63.

(16) Ibid., p. 132.

(17) Ibid., p. 205.

(18) H. S. Burr and F.S.C. Northrop, "The Electro-Dynamic Theory of Life," Main Currents in Modern Thought (September-October, 1962), Volume 19, Number 1, p. 4.

(19) Paul Arthur Schlipp (ed.), Albert Einstein-Philosopher-Scientist, Vol. II (New York: Harper and Brothers, 1959), p. 624.

(20) Max Radin, Review of Ideological Differences and World Order, New York Times, March 27, 1949, p. 7.

(21) Paul A. Schlipp, op. cit., p. 684.

(22) David Bidney, Theoretical Anthropology (New York: Columbia University Press, 1953), p. 169.

(23) Ethel M. Albert, Review of Philosophical Anthropology and Practical Politics, American Anthropologist (October, 1960), p. 1157.

(24) Clyde Kluckhohn, Mirror for Man (Greenwich, Connecticut: Fawcett Publications, 1960), p. 218.

(25) See Pitrim A. Sorokin, Social Philosophies of an Age of Crisis (Boston: Beacon Press, 1951), pp. 145-158 and 244-259.

(26) William C. Havard, "The Method and Results of Political Anthropology in America," Archiv Fur Rechts --Und Sozial Philosophie ARSP, XLVII/3, 1961, pp. 395-415.

(27) Ibid., p. 397.

(28) T. I. Cook, American Political Science Review (December 1949), p. 1268.

(29) William H. Riker, "Review of Philosophical Anthropology and Practical Politics," The American Political Science Review Vol. LV (March 1961), p. 155. See Huntington Cairns." Review of The Complexity of Legal and Ethical Experience," New York Times, December 6, 1959, p. 24. And Drew Middleton, Review of European Union and U.S. Foreign Policy, New York Times, December 26, 1954, p. 3.

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CHAPTER II
WESTERN BACKGROUND OF COGNITIVE OBJECTIVITY IN SCIENCE

FOUNDATIONS OF NORTHROP'S PHILOSOPHICAL SYSTEM

Filmer S.C. Northrop formulated a comprehensive philosophical system bringing together natural, cultural and legal philosophy while seeking modes of legal and religious reconciliation among disparate factions that are both politically and culturally organized.

His epistemological position provides a scientifically specifiable distinction between the acquired culturally determined ideas and the spiritual-physical capacities of the human person to create epistemic correlations.

His thought provides ways to recast the theories of law into a viable, philosophically and scientifically sound and unified "natural law" that will enable all persons, everywhere and at all times, to realize their common universal endowments within the context of their unique cultural environments. Within his frame of ideas, the final recognition of this commonality need not disturb essential cultural values that now exist. A fundamental dynamic can be brought into play by the vehicles of neurophysiological science, legal theory and a new form of religious awareness that may provide a solid basis for nation state reconciliation while simultaneously protecting essential cultural and special purpose ideological commitments.

Our purpose is focused on that portion of this philosophical system which refers to sociology, specifically to the problem of the logical foundation of this science and its meaning within the totality of human knowledge.

The difficulty emerges when one realizes that the philosophical interests of F.S.C. Northrop are varied, and the disciplines involved in his system difficult to be mastered as he does it. It is very dangerous in the case of this particular thinker to miss completely a particular point if the whole system and its logic is not kept in mind. In order to avoid that risk, our rule will be to refer

specifically to the particular points relevant to the immediate topic and to remit the reader to the voluminous works where the author has presented a detailed discussion of those theses. Otherwise, the task would be endless and would overflow the limits of a dissertation.

A very important characteristic of the work of Northrop is the rigorous and logical consistency of the whole philosophy. Its gradual chronological growth is also important. We will proceed chronologically in the presentation of his ideas. This method will bring us naturally to his most recent elaborations that culminate with the seminar taught by Northrop in Boston College in the fall of 1976, with the present author as his assistant, and the personal conversations and study of his latest elaborations and syntheses.

Our main task is to provide a clear, accessible and systematic statement of Northrop's promissory contributions to be used by social theorists and researchers, reestablishing the dialogue between philosophy and science that has been most fruitful for the development of Western civilization.

In January 1925, in the article "Relativity and the relation of Science to Philosophy," in The Monist, Vol. XXXV, No. 1, Northrop announced what should be one of the fundamental elements in his philosophical enterprises: to bring science and philosophy "into a more intimate relationship" (1).

Northrop argues that philosophy needs the concrete evidence that science would provide, because there are problems which cannot be solved by the special science alone.

In order to work as a special science, any science has to draw from philosophy conclusions with reference to the general characteristics of nature and fact as a whole. Philosophy has to

depend upon science for the particular findings attained, in order to be free to study the general characteristics of fact as a whole.

> If philosophy is to meet these demands [of science] placed upon it by science, it becomes evident that it must include the findings of science in its subject matter, and take on the spirit and method of science in its procedure. By this last statement we mean that it must apply to the study of the general characteristics of nature or fact as a whole which is its domain, the same empirical methods of description and observation and analysis which a special science applies in the special part of fact which is its field. Only when the philosopher by a use of this method is able to give to a science conclusions based on a direct description of the facts and their relations in question, can philosophy provide science with anything better than that which science can get for itself. For a scientist can enter into a dialectical argument, or a rationalistic discussion of the possibilites. He can even infer a conclusion from the partial aspect of the situation which is before him. The only conclusion from philosophy sufficient for his demands must rest upon any dialectical or other rationalistic method, but instead upon a direct first-hand empirical observation and description of the facts in question. Only a philosophy strictly scientific and empirical in its method can meet the demands of science **(2).**

Northrop states that "an ethics or a philosophy of religion which does not deal seriously and directly with the facts of science never meets the outstanding issue and challenge which ethics and religion face today" **(3).**

His central preoccupation is the present historical fact of modern social, international religious life based on answers about the nature of existence as a whole, which are based on only part of the available evidence. The special natural sciences have reached a limit and cannot go forward until the togetherness of things catches up with our study of the discreteness of things.

> ...the very specialization of the natural sciences is revealing the problems of science as insoluble in terms of the discrete particular systems to which a special science limits itself, and is thereby indicating the necessity of another science which will study the bearing upon a particular system of that system's relation to the other particular systems which make up the whole universe **(4).**

There arises the question as to the field and function of philosophy.

> It has already become evident that philosophy is or should be a special science, similar to any other special science, differing, not in the method which it uses, but in the special field which it studies. Whereas biology for example specializes on the concrete detailed characteristics of certain individual systems in nature, namely living organisms, philosophy specializes on the general characteristics of nature or fact as a whole. While the one gains in intensive concreteness and detail, it loses in extensiveness and relatedness, and while the other gains in extensive concreteness and relatedness it loses in local detail and intensive concreteness.
>
> Both are alike in having a special region of fact, with reference to which by the same identical method, the ultimate entities and relations involved are being determined. In this respect philosophy is a science. It is the science which has as its field the general characteristics of nature or fact as a whole.
>
> But philosophy is more than a special science. It is in addition that which makes it philosophy. That is, it has the additional function which is not inductive and analytical, but deductive and synthetical of bringing its findings as a special science, with the findings of the other special sciences to give a comprehensive conception of the whole of fact, both as to its general and as to its specific characteristics **(5).**

Northrop arrives at the central conclusion in his philosophy: the empirical method in philosophy is the only method that will produce sound philosophy.

After a philosophical system has been built, when two explanations differ, unless there is some body of data or some datum or fact to which one can appeal, there is no way to tell which is true.

Finally, Northrop proposes a philosophy which will include the findings of science in its subject matter and take on the spirit and method of science in its procedure.

Such a philosophy, according to Northrop, would function as the special science which has as its field the general characteristics of fact as a whole; and the logical discipline which attempts through a synthesis of its own findings as a special natural and moral science, to state the ultimate entities and relations constituting the real.

THE ETHICAL FACTOR IN SOCIAL BEHAVIOR

In April 1928 (Religious Education, v. 23), **(6)** important ideas appeared that will become the clue to understand Northrop's conception of the ethical factor in individual and collective behavior and its role as normative theories embodied in social and cultural customs and institutions and in legal systems.

He advocates a thorough survey of the fundamental principles of science and for a tracing of them back to the conceptions of man and of nature which they imply. In considering the principles of science, Northrop finds two groups: those principles presupposed in the methodology of science; and those principles involved in the conclusions reached by means of that methodology.

The only principle which seems to apply to all cases of scientific work amounts to the assertion that science attempts to determine our conception of anything by a study of verifiable facts.

The consequence of this principle is to locate the test for truth in factors concerning which men can agree, instead of the subjective impressions, opinions, and unverifiable intuitions, around which custom, prejudice and ignorance cluster.

This principle enables science to progress, correcting its errors and gradually transforming the habits of thought and action of its followers into those truth-seeking attributes of life which Plato called divine.

A unified science bringing together the separated masses of information and principles, bearing upon one another, and traced back to the basic conception of the nature of things which they imply, would be the basis for the formulation of an adequate theory of values.

On March 8,1930, in his article "Greek Thought," in New York Saturday Review, we read: "There is no such thing as a good act apart from scientific knowledge of the facts which the act in question involves, and a consideration of those facts in the light of the first principles of science. Technical knowledge must be combined with dialectic. The good life is not something to be attained by being continually reminded that one has a soul, or by an act of faith which is supposed to bring that soul into privileged relation with the Deity. No such easy roads to the good life were ever offered by Plato and Aristotle. Only the person who understands the science of his day and has climbed the dialectical ladder, and undergone the conversion of soul which the discipline of its scientific methods entails, to discover the basic first principles of science which reveal the details in the light of the whole, can lead to a good life" **(7)**.

The first time that Northrop mentions his arguments on the issue of the role of normative and factual social theories in culture, and their relation to social behavior, is in Saturday Review of Literature, Sept. 8, 1938 **(8)**. In a book review of Science for a New World by Sir J. Arthur Thompson, edited by J. G. Crowther, Northrop refers to the article "Sociology as a Science," whose author was Christopher Dawson, lecturer in Cultural Evolution at Exeter U. College **(9)**.

> This is the most needed and most timely article in the book. It faces the question of the sense in which there can be science of society and attempts to designate its subject matter. In the case of astronomy, the answer is a reasonably definite sense in which it is true to say that there is an objective system of the heavenly bodies to be observed, quite independent of what we think its structure may be. But in the case of sociology the situation is by no means so clear. Consider our own society at the present moment. Would anyone say that President Roosevelt, in the social rules he lays down, is discovering an intrinsic order which is in society, in the sense in which the spiral distribution of astronomical matter is in the heavens? Yet, certainly these ideas of President Roosevelt are determining the structure and character of society. Thus, the question arises whether society is not a state of mind as much as a state of nature. Or, to put the point in another way, in astronomy the fact determines the theory, whereas in sociology is there not a very important sense in which the theory determines the fact? If this be true, then there can be no genuine sociology until ideas which determine the cultural pattern of a given epoch are considered.

> Whether this be true or not need not concern us here. The point to note is that the beginning of scientific wisdom is not the mere collection of facts, but the determination of the kind of fact one must possess in order to understand the subject-matter one is treating. Until this preliminary essentially philosophical analysis is carried through, no science really finds itself.

PRINCIPLES OF SCIENCE

In 1931, Science and First Principles **(10)** was published, wherein Northrop presented the findings of his natural philosophy. Because of technical philosophic and scientific nature of this work, we must restrict ourselves to the last chapter, "The Foundations of Experience and Knowledge," where the philosophic outlook is laid down that provides an epistemological ground for Northrop's later analysis of cultural and social science.

This work specifies the requirement for a general and introductory conception of the nature of man as the consideration of physiological, logical, psychical and epistemological aspects of human nature. The nature of the Rational is studied by Formal Logic and Pure Mathematics; Awareness in Man is studied by Pure Introspective Philosophy; and Epistemology takes care of the investigation of the basis and mechanics of knowledge in the human being as a Knower.

Insofar as the human person is nature expressing itself in one of its parts, these previous aspects of man's nature cannot be separated from the basic entities and relations that conditions Nature's character and behavior.

From the study of Henderson's physiological and chemical findings **(11)**, Northrop concluded that the human person is psychochemical steady state, and that this state is dual in character. There is the equilibrium between internal and external factors, and there is the equilibrium between this balance and other organic and inorganic systems, which the nervous system and its externally and internally grounded organization control. For Northrop, when a person is in thermodynamic equilibrium, that person is dead.

The American physiologist, C.M. Child discarded the idea of a biological gradient and formulated a theory that prescribes that the living thing is a physicochemical system which includes the rest of nature, in part, as its very constitution, and is so intimately and essentially related to other similar organic and inorganic systems by the congestion introduced by Northrop's idea of the macroscopic atom **(12)**, that the character of the environment must register itself in the specific internal and more local constitution of the local organism. If this is admitted, then these are the summarized steps which connect the specific organization of living things with the macroscopic atom, which is the ultimate unifying organizing principle in nature.

1) The specific symmetry and form of living things is determined, in part at least, by the physiological gradient.

2) The one source of organization is the order of nature, and calls for some source of that order. The analysis of the special structure of this order forced Northrop to locate it in the macroscopic atom.

3) The macroscopic atom operates through the order of nature to condition the specific organization of living things.

> ...the structure of the nervous system and the direction of its growth is associated with the physiological gradient, and that the dominant portion of the central nervous system is located at or near the upper dominant end of the gradient. In man this dominant portion of the nervous system is the cortex of the brain. Thus in terms of the action of external factors upon the raw hereditary materials we can understand why man is an organized physico-chemical system with a nervous system dominated and coordinated by the cortex of his brain.
>
> Certainly if such a system were conscious, its consciousness would be located extensively in nature as well as relatively to this particular body, since the nervous system is an equilibrium between the raw protoplasmic materials within, and external nature.

> Furthermore, the body itself is really an equilibrium involving the whole of nature. Thus, knowledge must have both an absolute and a relative character, absolute in so far as man and his nervous system has its basis in the whole of nature, which is common to all local systems and standpoints; relative, to the extent that the purely local and atomic permutation record themselves in his neural constitution. Only by understanding the relation between neural organization and the general physicochemical organization of man and nature can one hope to understand knowledge **(13).**

These ideas led Northrop to find that two polar principles (pluralistic permutability and monistic rigidity) exhibit themselves in the human central nervous system. In him, both the microscopic and the macroscopic foundations of nature come to articulate expression.

THE HUMAN PERSON.

The human is born of a synthesis of atomic opposites in a mixture of constancy and change. "Grounded in the private compounds of his chromosomes and in the foundation of physical nature, he is at once here and everywhere. Midway between the melting pot of formless microscopic atomic flux and the mold of eternal rigid macroscopic physical form, he exists with one root of his nature in time, and the other in eternity and the constancy of the form and order of macroscopic nature."

The next important consideration is about the logical character of the human person. Northrop rejects the addition of a non-physical entity to the matter of scientific theory, regarded as mental or spiritual substance as the source of reason. This conception leads to the problem of explaining how a non-physical mind can be connected with and control the collection of moving atoms of a physical body.

In the Greek theory of mind it was discovered that the rational was identical to form. Pure mathematics and formal logic have investigated its specific character. This is why the work of

Russell, Whitehead, Hilbert, Sheffer, Lewis and Wittgenstein on the foundations of mathematics and logic is important.

As a consequence of his theory of the macrocosmic atom, Northrop lays down the evidence for nature as a mixture of order and chaos in which the order predominates any macroscopic regions, the chaos in the microscopic ones, and both come to articulate expression on the molar levels. This happens because the macroscopic atom opposes the many changing relational forms with one necessary unifying form. Because the form of the macroscopic atom is the form of a physical substance, it exhibits its effects in observed physical nature. Then it is understandable how the forms of the atomic entities, known only by reason, give rise to the sensory forms in the world of observation.

Human person has come out of inorganic nature, and exhibits in himself or herself, the peculiar opposition and synthesis of necessary, externally-imposed order and internally-conditioned, changing relatedness.

The particular attributes of human mind is its natural capacity to think inconsistently as well as consistently.

Northrop resolves the paradoxes concerning the truth or falsity and the consistency or inconsistency by distinguishing between two systems of logic.

1) When we are talking about the consistency of a set of postulates or the truth of a given proposition, we are asserting relations between relational forms.

2)Complex nature exhibits relational forms to us.

3) Because they arise in two externally related atomic sources, they may or may not be consistent system. A form of the possible, which we use to assert the existence of asimilar form in the actual, may or may not have the same formal properties as the form of the actual. Hence truth and error arise. But these opposing relational forms are necessary consequences of forms which are attributes of atomic substances.

> In short there is no inconsistency whatever in conceiving of nature as constituted of many microscopic atoms with changeless compatible properties. Nevertheless, given such a system, complex nature with a complex merging of relational forms in microscopic regions must exist. In this fashion our theory accounts for the existence of inconsistent forms in the mind of man without forcing mind and imagination and inconsistency out of nature, and at the same time provides us with a consistent theory of inconsistency. From this it follows necessarily that the factual test for consistency is not valid except for macroscopic regions. Inconsistency is impossible only in primary nature, or the world of being; in complex nature, or the world of existence, inconsistency exists. In fact, rare indeed is the individual who is not a walking contradiction **(14)**.

Human thought is both fixed and changing, exactly as his neural organization is a mixture of rigidity and flexibility. The human mind is less rational than macroscopic inorganic nature. The human person is partially rational is one of nature's products.

> Of such materials is man. Truly he is physiological being in the original Greek sense of that term, a mixture of matter and form, of physis and logic.
>
> With such a contribution he enters life. Being in part macroscopic and necessary, he is fated with the compulsion of necessity, and being in part kinetic and possible, he can make both himself and his environment other than they are. Being constituted of primary substance he himself is a primary cause, and hence, makes a difference in things.
>
> But only in the realm of ideas does real freedom exist, for only there does the kinetic microscopic principle operate freely in one's conscious experience. But what more than this could man desire, for forms, being physical, can affect the actual. The physical foundation of all forms renders ideas tremendously important. In fact, they are the only things which matter. All else is fate. At last we understand why one's

> philosophy of the first principles of science has had such an important effect on history.
>
> But even with ideas man must be scientific to be happy. For ideas though physical must reckon with things as they are. All forms are not forms of the possible. It is for this reason that true ideas are necessary for a successful use of the possibles, and that man cannot live happily or effectively, in the world of art or of nature, without science.
>
> But neither can man be truly happy without art. For the microscopic tendency of his nature must be given expression. The possibles have other uses than those involved in science in its discovery of the actual that is necessary; there have rights of their own. Precisely because of the peculiar rational character of his own nature man must be both scientist and artist in order to be himself. Einstein plays his violin **(15).**

In dealing with the problem of consciousness, Northrop points out that the only theory compatible with the denial of consciousness is one which entails no distinction between nature as conceived by scientific theory and nature as actually observed.

Greek inorganic science was led to conceive of nature as a system of unobservable geometrical and logical forms. The difficulty arises here about this conception. If nature is a system of ideal forms which only reason can grasp, why does the observed world of sensation exist?

a) If the answer is that the world of forms, known by reason and defined by scientific theory is the real world, and that the world of sensation, which we observe, is an appearance.

b)Then a conscious subject must exist as an additional natural factor with which the real world of forms combines to give rise to the sensible world of appearances.

In order to reconcile the obvious presence of colors and sounds and pains and pleasures with the equally obvious extensive facts of stuff and change, the task is defined as the determination of the relation between the psychical factor in nature and the physical and formal properties of the atoms and their fields of Northrop's theory.

Let us consider in detail this subtle elaboration keeping as close and loyal to the original text, given the thoroughness and complexity of its logical argumentation.

In one sense, atoms stand in the relation of otherness to the knowing subject. But in another sense, human being is these entities in one of their many equilibria.

> ...For the knower is a man. Hence, when one senses what it is to be oneself, the atoms of our theory are joined to the knowing subject by the relation of identity; one knows the atoms which constitute oneself and nature by being immediately aware of what it is to be them. Now, I am conscious. Hence they must be also. Thus we discover that the subjective and psychical factor, which the presence of colors and sounds reveals, is an inherent property of the atoms of our theory. Man has a subjective character and is conscious, as he is rational and physical, because the ultimate atomic entities of which everything is constituted have psychical as well as physical and formal properties. Man is conscious because he is the entities of the macroscopic atomic theory in one of their many particularizations, which the pluralistic principle of this theory necessitates, and these atoms are inherently conscious. And observed nature is more than physical and formal nature, and is in part constituted by the perceiving subject, because the ultimate entities which constitute both it and its part, the observer, combine psychical with physical and formal properties in its synthesis.
>
> Hence, because colors and sounds, and pains and pleasures are in part psychical, it by no means follows that they are illusions or mere appearances, for even the psychical, which is necessary factor in their existence, is as ultimate and irreducible and essential a property of atomic nature, as the psychical and the formal **(16).**

The conclusion is that "minds as well as the objects of their awareness are constituted by one common system of atomic entities which possess physical, formal, and subjective psychical properties."

In order to specify precisely what consciousness is as opposed to its content, the task is to determine the specific character of the conscious or psychical. The method is the following:

1) The psychical exhibits itself not merely in the mind of man, but also objectively in observed nature.

2) It combines with the physical and formal conditions of observed nature to give colors and sounds and tertiary qualities. Otherwise there would be no difference between the world of physical theory and the world of observation.

3)The precise contribution and nature of the psychical in observed nature is that reminder of observed nature that physical and formal does not produce.

So, the psychical is that in observed nature which the physical and formal properties of the entities of the macroscopic theory do not condition. That remainder conditioned by the psychical is the bare indeterminate experienced quality that is made determinate by the physical and formal principles. This way we discover the specific nature of the psychical to be bare indeterminate experienced quality.

Experienced quality in its bareness and indeterminateness is the immediately given quality or observed nature, abstracted from that which makes one of its instances or parts different from another. Perception introduces an element of bare quality which must be experimented to be known, and which is so determinate that no deductions can be made from it.

THE KNOWING-KNOWN SUBJECT

Both the knowing subject and known object are complex factors constituted of a common set of atomic entities which possess physical, formal, and psychical properties.

The distinction between the psychical and the psychological is essential. "The psychical is the psychological with the formal or logical, which makes it determinate, removed."

This theory of the psychical has some consequences: 1) that because of the barely psychical can only be known in itself, aside from its presence in objective observed nature when the knower and the entity or entities which the psychical qualifies are identical, and 2) that because the human

person is all the atoms which the psychical qualifies in one of their many particularizations, it follows that the only system in which the barely psychical should exhibit itself to man in its own purity, unmixed with the psychical and the formal, is himself. So, if this theory is true, man will find a quality of being in himself which he finds immediately in no other system which he knows. It is consciousness.

When one cuts off or abstracts from all physical and formal effects upon oneself and turns back into the pure experience of one's own being, one finds informal the very definition of the psychical already given: bare indeterminate experience. It is of this that the mystic speaks as the most certain and intense of realities, yet cannot transmit it to others.

Northrop finds himself with a meaning for the distinction between consciousness and the content of consciousness. Consciousness is bare indeterminate experienced quality. Its content is the determinateness added by the physical and formal properties of complex macroscopic-microscopic atomic nature.

> ...the conscious experience of an electron or the macroscopic atom will be radically different from that of man. In fact, precisely because the content of consciousness is determined completely by physical and formal conditions it follows necessarily that it will have little in common in an electron, a crystal, an amoeba, an anthropoid ape, a moron, or in an educated person. And for the same reason, since the physical and formal conditions of the content of their consciousness have so much in common, it follows that men will have a community of experience and feeling among themselves that does not occur in conjunction with other organic or inorganic systems.
>
> It has been usual to identify the psychical with an entity called mind, or the soul, which is supposed to exist in addition to matter and body. All such identification rest upon the failure to recognize what the precise nature of the psychical is. The momento we find it to be bare indeterminate experienced quality this is not out of the question. In the first place, we are confronted with a quality rather than an entity. Secondly, since we have entities in the atoms of our theory, to which this quality can be attributed, the principle of parsimony forbids the introduction of any more. But even if this objection were waived the identification of bare experienced quality with an entity would be

> impossible. For to be an entity other than a physical substance a thing must have some determinations to distinguish it from that substance, and this is precisely what the psychical does not possess.
>
> It is in this failure to recognize that the pyschical, the physical, and the formal are equally ultimate attributes of the atoms of which both nature and mind are constituted, that the gulf between Eastern and Western civilization has its basis. Generally speaking, the West has centered upon the physical and formal attributes of reality; whereas the East has contracted more and more on the psychical; each identifying its object of attention with all that is real, and regarding the interests of the other as misguided or illusory. Precisely because the physical and the formal differentiate our experience, Western civilization has become increasingly complex and technical, leading on to an apparently endless series of problems which threaten to destroy human initiative; and because the psychical in its purity, is indeterminate, Eastern civilization has tended to move away from all differences to the bare experience called Nirvana in which the oneness of experience is grasped without its confusing specificities. It is to be noted that the Easterner who loses himself in Nirvana, and the negation of all that is specific, is as objective as the Westerner who masters physics to rear his steel mills, for bare indeterminate experienced quality is in objective nature as universally and unequivocally as the physical and formal which gives it its determinations. This leads us to appreciate why the Easterner tends to regard his pure experience to be the essential, and the physical and formal novelties which interest the Westerner, as but its incidental irrelevances **(17).**

The philosophical consequences of this conception is nothing less than to bring the issues of life aligned on a new front. Truth is not the triumph of the "spiritual" over the "material." Instead, the end of life is to be achieved by a proper adjustment of the possibles and the actual which enable all three basic attributes of human nature, physical, formal and psychical, to attain the fullest expression.

The human and his or her good must not be identified with but one or two attributes of reality. The psychical, the formal and the physical are equally real. The transcendental significance of this theory can be appreciated when Alfred North Whitehead, in his most mature work, "Process and Reality," adds a footnote that says: "this theory of the derivation of the basic uniformity requisite for congruence, and thence for measurement should be compared with that

of two deeply interesting articles: **(i)** "The Theory of Relativity and the First Principles of Science", and **(ii)** "The Macroscopic Atomic Theory," Journal of Philosophy, Vol. XXIV, by Professor F.S.C. Northrop of Yale. I cannot adjust his doctrine of a "macroscopic atom" to my cosmological outlook. Nor does this notion seem necessary if my doctrines of "microscopic atomic occasions" be accepted. But Professor Northrop's theory does seem to be the only alternative if this doctrine be abandoned. I regret that the articles did not come under my notice till his work had been finally revised for publication" **(18).**

This philosophy of the human person culminates in the synthesis of those factors whose relatedness determine the human nature. Formulating this synthesis, Northrop writes:

> ...Like observed nature he is a synthesis of the psychical, physical, and formal properties of the metaphysical. In him the microscopic atoms and the macroscopic atom come into equilibrium, to produce not merely formed body with its polar opposition of the necessary and the possibles, but also to add bare indeterminate experienced quality to the determinateness given by the physical and the formal, thereby allowing metaphysical nature to constitute observed nature. His uniqueness centers in his peculiar and most complex physical organization. His body, because it represents a most delicately balanced adjustment, and because of its internal relation to the rest of nature, records and in part contains the macroscopic characteristic of nature in itself, thereby permitting an exceptionally rich and ever increasing experience.
>
> In man, nature through the operation of its pluralistic localizing principle, and its monistic macroscopic principle has found a particularization of itself in which its trinity of ultimate properties, and its polar opposities are merged without giving one complete ascendency. Thus he had the rigidity of the stone coupled with the fluidity of the whirlpool, the static mold of necessity merged with the flow of possibility and creativity, the mortality of time stamped with the mark of eternity, the heritage of ignorance, together with the capacity for learning, and the power to pierce to the physical and formal depths and intricacies of things combined with a sense for aesthetic surfaces. Synthesis of the physical, the formal, and the psychical, mixture of the flux of the temporal and the constancy of the eternal, carrying within himself the psychical sense of the Easterner, the overt physical emphasis and activity of the Modern, and the logical sense of the Scholastic and the Greek, he is able if he will, to share and appreciate the experience of all peoples and all reality at once but an insignificant speck in a tremendous

> cosmos, and the created synthesis of every ultimate attribute of everything that is **(19)**.

In this work, Northrop specifies the respective books in Euclid's "Elements" and the specific natural mathematical sciences to which each refer apart from which the natural philosophies of, for example, Democritos, Parmenides and Anaxagoras, the platonist Eudoxus, Plato and Theatetus by Professor S. Samburschy cannot be understood.

The scientific problems of Greek science revealed the connection between the mathematical problems of a general mathematical theory of geometry and arithmetic and the fundamental metaphysical problem of the one and the many.

This ground metaphysical problem came down the ages to Cantor's foundations of modern mathematics, and links together Greek and modern philosophic inquiry.

The importance of this fact to sociology is that it provides a concept of the objective same-for-all percievers (Logos-is) of the human person and nature as a first and necessary cognitive requirement for interpersonal "Logos": the "idea of the Good" for juridicial, correlative rights-obligations, evaluative imputation or "right" judgments. The method by which this natural scientific "is" for nature defines the first necessary condition for an ought for legal science and the humanities is specified on page 339 of "The Logic of the Science and the Humanities."

Zeno asked the crucial question: Do the points have extension or are they without magnitude? If the points have extension, there can be only a finite number of them in a finite magnitude and the Anaxagorean principle would be invalid. If the points have no extension, even an infinite number of them will give no magnitude whatever. The assumption that nature is an extended continuum is contradicted.

Democritos attempted to solve the paradox by postulating that any finite interval must be constituted of a finite number of extended indivisible points. This implied his basic distinction between what scientific theory conceives nature to be and what to our senses it appears to be. So, what is a discontinuos association of atoms appears to us as a continuum.

In the case of Democritos the discovery of arithmetically incommensurable magnitudes provided a scientific criterion for the distinction between the rational and the non-rational. The rational world as conceived by scientific theory contains no incommensurable and can be expressed in terms of ratios because it is constituted completely by atomic arithmetic units. The irrational world is the world of sensation, source of incommensurables. In the scientific foundation of Plato's philosophy the five regular solids of Theatetus, known with the mathematical intellect, were correlated with perceived earth, air, fire, water and the ether given in the world of sensation. The five regular solids were analyzed into common atomic geometrical plane figures out of which they are constructed. The three regular plane figures given in Book 12 of Euclid, out of which the five regular solids can be constructed, can be divided into smaller triangular figures. This way the mathematical theory of Nature was found as applicable in details to every concrete object and process in the universe. The elemental atomic triangles would provide the few elemental "ideas" to understand everything. The source of authority for political and cultural theory is to be found in the mathematical and natural sciences. A dependable theory of the state rests upon a dependable philosophy. A dependable philosophy can command free assent and agreement because it rests upon the objectively determined concepts of the natural sciences which are independent of the sophistical variations in human opinion. The statesman must be a philosopher who arrives at the intellectual outlook which defines his cultural "idea of the good," through the study of arithmetic, stereometry and astronomy.

The Greek empirically verified, mathematically astronomical theory led to the conception of the entire universe as a single system of perfect geometrical spheres related to each other, as is their distance by irreducible ratios.

Plato placed astronomy as the last of the empirical sciences which one studies in applying "dialectic" or formal logic to the scientific concepts to produce a consistent systematic intellectual outlook which constitutes the idea of the Good.

This idea of the good is all the mathematical "ideas" considered in their irreducible order and unity as "the one." The word "good" has no meaning by itself. Before man has climbed the dialectical ladder, there are no independently and intuitively given absolute known values.

There are no ethical ideas existing independently of the fundamental concepts of natural science. The "idea of the good" is not an independent idea within one's philosophy.

The metaphysical problem of the one and the many is in the heart of the matter. If reality is nothing but many, no appeal to one's practical experience, inner consciousness or logical presuppositions, will release one from complete skepticism in knowledge, relativity in ethics, chaos in politics and unqualified pluralism.

The reason is that unrestricted pluralism leaves the knowing subject other than the object of knowledge except itself. There would be no justification for the supposition that one's ideas hold for anybody else or correspond to the formal character of anything beyond the knower. Opinion of one person on any subject is as good as that of another. No ideas holding for all exist to provide an agreement necessary to constitute government.

The necessary conclusion is that if knowledge is possible and there is to be some measure for humans necessary to distinguish social good from social evil, the knower must be, in part at

least, one with what he knows. The universe, binding man within it, must be in some irreducible sense a unity.

Ideas are transcendental because they are discovered only in nature. They are irreducible mathematical ratios which constitute the determinate character of all natural objects, including man.

The fundamental ideas were in man as potential objects of knowledge from the beginning. There is no meaning for the existence of man apart from the wider logos of the whole universe. The local character of an individual man is but one factor in his nature. Hence only by knowing the mathematical structure of the whole universe does man come to a full knowledge of himself.

The conception of the self in its relation to the universe, established as a scientific truth which is independent of the variation in human opinion, possesses the authority necessary to command common agreement. Any conduct out of harmony with it seems incorrect or bad. Any conduct in accord with it seems correct or good. So, logos, the mathematical structure of the universe, is the first and necessary condition for an interpersonal "logos." This is a meaningful and cognitively verified "idea of the good" measured in an individual personal behaviour. When the scientific conception of the nature of things has been accepted and specified, retionale the is understood as an unconscious basis for one's acts and the "idea of the good" becomes a frenzy as well as theory.

Northrop remarks that in this frame of ideas, introspective experience reveals nothing but the emotional embodiment of the relative opinions of the moment. The experience of daily life and social phenomena reveals the obvious presence of many different people with diverse and conflicting opinions. It reveals that social institutions and movements in which individuals participate, embody and exemplify these conflicting opinions.

An appeal to all these elements suggests to us that the pluralistic principle is primary. There is no hope of gaining interpersonal, meaningful, ethical or political theory which will command common agreement and consent by appealing only to introspective psychology or to inductive factual customs of people expected by both a) and b). The method for doing this is specified (1) in a diagram on page 339 of "The Logic of the Sciences and the Humanities," and (2) for the evaluative "ought" of jurisprudential legal science on pages 148-149 of the "Symposium Volume," Cont. Am. Phil. Second Series, Edited by J. E. Smith (1970) London.

NOTES

(1) Filmer Northrop. "Relativity and the relation of Science to Philosophy". The Monist (January, 1925) Vol. XXXV, No. 1, p. 1

(2) Ibid., p. 9

(3) Ibid., p. 10

(4) Ibid., p. 13

(5) Ibid., p. 14

(6) Filmer Northrop, "Basic Asumptions of science", Religious Education (April, 1928). Vol. 23., p. 293.

(7) Filmer Northrop, "Greek Thought," New York Saturday Review (March 8, 1930) Number 33.

(8) F. Northrop, "Science for a New World," Saturday Review of Literature (Sept. 8, 1934), p. 19.

(9) Chrystopher Dawson, "Sociology as a Science" in Leopold Infield, The World in Modern Science. New York: G.P. Putnam's Sons, 1934.

(10) Filmer Northrop, Science and First Principles. New York: The MacMillan Company, 1931.

(11)L. J. Henderson. "The Order of Nature." Harvard Press.

(12) C. M. Child. Physiological Dominance and Physiological Isolation, etc. Roux Archiv 117. and The Origin and Development of the Nervous System." U. of Chicago Press.

(13) F. Northrop Science and First Principles. New York: The MacMillan Co. 1931, p. 222-223.

(14) Ibid, p. 245.

(15) Ibid., p. 246-247.

(16) Ibid., p. 253-254.

(17) Ibid., p. 260-261.

(18) See Alfred North Whitehead, Process and Reality. New York: The Free Press, 1957.

(19) Northrop, op. cit., p. 265-266.

CHAPTER III
THE SOCIAL THEORY

A CRITICAL ANALYSIS OF SOCIAL THEORY.

In 1935 an article on Pareto's general sociology **(1)** appeared in the Virginia Quarterly Review. In this work, Northrop came into an intimate acquaintance with a particularly complex and classic case of sociological theory.

Northrop proceeded in his analysis starting with Pareto's purpose to establish a theoretical science of sociology. As an engineer familiar with equilibrium in heterogeneous systems, Pareto carried over into sociology the ideas and methods developed by Gibbs in his physical chemistry. Following Gibbs, Pareto considered that for a mature science, fundamental concepts should be formulated theoretically in precise terms with specific methodological and logical connections to determined inductively given facts. **(2)**

Pareto is led to conceive society as an equilibrium, composed of individual "social molecules." These molecules manifest themselves as the "residues." These are of two types: those dependent upon, and those independent of, other residues. The dependently related are joined by "ties." Residues, or the "instincts" and "psychic states" which they "manifest," in turn "manifest themselves through derivations," which are "indication of the forces acting on the social molecules." They give rise to changes of form in society which are called "real movements," were some "tie" between "dependent residues" hypothetically supressed, the movements that would occur are termed "virtual movements" and "reactions."

A given state of a system is a state of equilibrium if an artificially subjected change in the system, different from the change which ordinarily undergoes, results in a reaction which immediately returns the system to its normal state.

The derivations do not determine the social equilibrium, they merely indicate the direction, or the tangent at a given point to the direction, in which the forces are acting, while also manifesting the residues which are the significant forces. By the compouding of residues (accompanied by their attendant derivations), the form of society results by a kind of composition of forces. The analytical formulation of a formal technique for representing these forces and their compounding is one of Pareto's most important contributions.

The social system as a whole has "properties." One is "utility." It is a concept replacing vague notions like "prosperity." The essentials in its definition are (a) norm arbitrarily chosen, and (b) an upper bound, in the mathematical sense of the term, for a series of quantities gained by measuring certain factors which the society in question actually exhibits.

Pareto admits into "scientific sociology," the distinction between fact and value ("benefit"). His concept of "utility," together with the technical formal method developed in connection with it for handing the difficult question of "norms" and "benefits," is his second important contribution.

Important distinctions arise between utility for the individual, utility of and for the community, and utility for different individuals. Failure to observe them has certainly misled previous sociologists and reformers. Pareto regards the problems of combining utilities as one of the major problems of the social sciences.

Numbers gained by social studies cannot be summed unless they refer to commensurable units. "The utilities of various individuals are heterogeneous quantities, and a sum of such quantities is a thing that has no meaning; there is no such sum and none can be considered." If there is to be science of sociology along the lines he proposes, a method must be found for reducing utilities to homogeneous quantities which can be summed.

In terms of this abstract system there are two ideal extreme states: a) The equilibrium is determined entirely by "sentiments;" b) Logico-experimental theory holds sway. Animal societies are close to the former type; a scientifically controlled society would correspond to the latter type. The existence of a rational society now is a mere fancy of sentimentalists, Pareto holds. Prejudice prevents reason operating even when known. Also the rational principles are not known, since the relevant data are the heterogeneous utilities and these are neither known nor capable yet of rational treatment.

His "psychic states" have nothing to do with introspective factors. An immediately previous clause concerning the "psychic" states of people revealed in historical material.

Instead of first-hand psychic states observed by a psychologist, Pareto assigns second-hand characteristics to people of the ancient past, who only exists in his imagination as he reconstructs them from newspaper clippings and classical texts. Not once in getting his "facts" does Pareto leave the armchair in his study.

This is the "scientific sociology" of Pareto on its inductive side. Because the newspaper clippings and the classical texts are before him in the strict objective sense of the word, he believes that the societies and individuals which he constructs in his imagination are objective in the same sense, and that by "basing" his research upon "such psychic states" he has made an objective science out of sociology.

The fundamental factors are the residues. But there is no exact correspondence between derivations and residues. Derivations conceal the residues. The task is to get from the derivations to the residues.

Pareto never defines the crucial relation of the formal properties of the manifestation of "instincts" and "sentiments that constitute the residues." The formal properties of these relations of "manifestation" have the clue to the precise methodological procedure which can insure an objective scientific test for the existence of residues.

Northrop acknowledges the merits of Pareto's account of scientific method, his rejection of metaphysical theories having their "criterion for truth outside experience," his recognition that systematically and precisely formulated theory is necessary in any science, and his attempts to draw upon the physical sciences to construct such a theory for sociology.

The most important point seems to be that Pareto realized the need of the distinction between fact and value or "benefit," trying to develop a formal analytical technique for relating while distinguishing these two aspects of social phenomena. It is to this conceptual relationship, without confusion between fact and value, that a very important portion of philosophical work of Northrop is addressed.

ANALYSIS OF CONCEPTS

In the late 30s, Northrop formulated the foundations of his epistemological distinctions and conceptual classification in a essay that was later published in 1944 in the collection of essays, "Philosophy East and West," by Charles A. Moore. This work is "the Complementary Emphasis of Eastern Intuitive and Western Scientific Philosophy" **(3).**

Northrop said that in order to determine the relationship between diverse things, it is necessary to express each in terms of a common denominator. Comparative analysis of different philosophical theories and systems, which contrast as sharply as those of the East and the West, requires an unambiguous, commensurable terminology in which to express them.

A scientific or philosophical theory is a body of propositions. A body of propositions is a set of concepts and falls into different types according to the different sources of their meaning. The designation of the different types of concepts should include as a special case any possible philosophical theory.

Northrop starts with the notion of concept: a term to which a meaning has been assigned. Then he specifies the two major ways in which this assignment can be made. The otherwise meaningless term may be: 1) associated denotatively with some datum or set of data which is given denotatively; or set of data which is given immediately; or 2) may have its meaning proposed for it theoretically by the postulates of the deductive theory in which is occurs. These two basic types of concepts are called "concepts by intuition" and "concepts by postulation" respectively.

A concept by intuition is one which denotes, and the complete meaning of which is given by, something which is immediately apprehended. A concept by postulation is one the complete meaning of which is designated by the postulates of the deductive theory in which it occurs. A deductive theory is a set of propositions which fall into two groups called postulates and theorems, such that the postulates formally imply the theorems by means of the logical relation of formal implication. Given the postulates, the theorems can be proved.

In considering any theory, proof must not be confused with truth. Proof is a relation between propositions, i.e., between those which are postulates and those which are theorems, whereas truth is a relation between propositions and immediately apprehended fact. The former is a purely formal relation which it is the business of pure mathematics and formal logic to define; the latter is an empirical relation which is the task of empirical science and empirical logic to designate.

The relation of proof, defined by the formal logical relation of formal implication, is quite independent of the truth or falsity of the propositions it relates. The proofs of the theorems in

Euclid's Elements hold irrespective of the empirical question of truth-value, concerning whether Euclidean geometry is that of the space of our actual universe. Newton's proof that the propositions in this Principia follow necessarily on logical grounds from the fundamental axioms of his mechanics is just as valid today as it was before the truth of this mechanics was brought into question by the Michelson-Morley experiment and Einstein's. Hence, when the postulates of a deductive theory are defined as those propositions of the theory which are taken as unproved and used to prove the theorems, this must not be confused with the quite independent question of the truth or falsity of the postulates.

If what is meant by a postulate and a deductive theory is clear, one is prepared to understand a concept by postulation.

CONCEPTS BY POSTULATION

Our definition tells us that such a concept is one the complete meaning of which is designated by the postulates of the deductive theory in which it occurs. In other words the only meaning which such a concept has is that which it gains by virtue of the properties or relations assigned to it by the postulate or set of postulates within which it is a member term. It means what the postulates prescribe it to mean, nothing more, nothing less; apart from these postulates it is a meaningless mark.

The proof of the theorems in a deductive theory, of whether or not there is anything immediately perceived, is identical with what the propositions propose. For this reason it becomes evident that concepts which gain their meaning from such postulates may have meanings neither derived from, nor directly referable to, anything which is immediately apprehended.

The importance of the concepts by postulation shows itself in science, philosophy, and common sense beliefs. In modern science the first use of concepts by postulation and the first

clear distinction between them and concepts by intuition was made by Newton, who formulated modern physics deductively.

In the precise language of this terminology, Newton is saying in his distinction between "mathematical" and "sensed" space, that there are two different types of concepts for which the one term "space" is used. There is "space" in the sense of "mathematical space," which is a concept by postulation, and there is "space" in the sense of "sensed" or immediately apprehended space, which is a concept by intuition.

In the deductive theory of physics it is always space, time or motion in the sense of the proposed concept by postulation that is used. This entails that if one wants to know what Newtonian physics means by a "physical object," one does not immediately apprehend the colored shapes of the table or chair of common sense; instead, one examines the postulates of Newton's Principia. Newton means by a physical object the kind of entity having the properties and behavior which his three laws of motion prescribe.

Between "physical object" in this meaning and "physical object" in the sense of a concept by intuition there is all the difference. From "physical object" in the latter sense nothing can be deduced.

The relation between one immediately apprehended factor and another is external and contingent. Newton's Principia **(4)** demonstrates that from "physical object" in the sense of his concept by postulation, the meaning of which is given by the "Axioms" of his mechanics, all propositions making up the major portion of his treatles can be deduced as necessary consequences. Among these deduced or proved propositions can be found Kepler's three laws of planetary motion and all the important empirically verified laws of the entire science of dynamics.

Einstein replaced Newton's postulates for mechanics with a different set, but in Einstein's theory the same distinction exists between postulated time which flows "equably" and sensed time which flows nonuniformly **(5)**. Thus, contemporary as well as traditional modern physics distinguishes between concepts by intuition and concepts by postulation and formulates its theory in terms of the latter.

It is by means of the concepts by postulation that science is able to introduce unobservable entities and relations into its theory, and to predict the existence of scientific objects theoretically which are confirmed experimentally only later, and even then only indirectly.

Metaphysics is the thesis that there are concepts by postulation as well as concepts by intuition. Positivism is the thesis that there are only concepts by intuition.

Concepts by postulation were first introduced into Western philosophy by Democritus because of the need for them in Greek physics and mathematics. Plato merely continued what Democritus had initiated, analyzing the unobservable atoms of the Democritean theory into the intuitively given continuum which provided their "matter" and the ideal mathematical ratio which determined their geometrical form. Democritus and Plato's distinction between the "sense world" and the "real world" is an example of our distinction between what is given to immediate apprehension as denoted by concepts by intuition and what is proposed by deductive scientific and philosophical theory as designated by concepts by postulation.

Aristotle, on the other hand, because of the breakdown of the postulates of the Democritean and Platonic theories in Greek mathematics, due to their incapacity to validate the Eudoxian method of exhaustion, and because of his concern with biology, was forced to reject all postulated scientific objects such as the physical atoms of Democritus or the stereometrical atoms of Plato, and to admit into science and philosophy only concepts by intuition.

The distinction in Plato's philosophy between "sensibles," "mathematicals," and "ideas," to which Aristotle refers in the first book of the Metaphysics and which has been shown to possess specific scientific content in the mathematical and astronomical theories of Plato's day, also turns around our distinction between concepts by intuition and concepts by postulation. A "sensible" is a concept by intuition, the meaning of which is given by immediate apprehension through sense awareness. "Mathematicals" and "ideas" (i.e. ratios), on the other hand, are concepts by postulation.

The change is not to reject denotatively given concepts by intuition from one's scientific theory, replacing them by purely theoretically designated concepts by postulation as do Democritus, Plato and the modern physicists, but retaining and using only concepts by intuition to postulate their intuitively given meanings as logical status and resultant immortal persistence beyond the brief spans during which they are actually sensed. In other words, treat them as "eternal objects." What is meant is something given only by immediate apprehension. To this immediately apprehended content, which is transitory as sensed, there is added by postulation merely an immortal logical status and persistence. It is precisely this slight element of postulation added to pure concepts by intuition which distinguishes metaphysical theories like Aristotle's and Whitehead's from positivism.

Whitehead's "eternal objects" and Aristotle's "forms" are quite different from Plato's "ideas." An Aristotelian "idea," like a Whiteheadian "eternal object," is a Platonic "sensible" given an immortal persistance by postulation. A Platonic "idea," on the other hand, is not even in part a "sensible." Both are totally different things. "Sensibles" are nominalistic and purely transitory. This is precisely why that the sense world is a world of becoming and not a world of being. It is only by giving up concepts by intuition (i.e. Platonic "sensibles") and formulating one's scientific and philosophical theory completely in terms of concepts by postulation (i.e., Platonic "ideas") that

one can find the invariants obeying the principle of being which give "genuine knowledge" according to Plato.

Aristotle's and Whitehead's formation of "ideas" by giving "sensibles" an eternal status is a necessary consequence of their rejection of "bifurcation." Having repudiated all scientific objects or factors whose conservation is guaranteed by postulation, no meaning can be provided for the laws of science which hold, even when the scientist is not observing, except by smuggling into the transitory data of sense awareness an immortal persistence which they do not possess.

Plato forms "ideas" by rejecting concepts by intuition entirely in the formulation of the deductive theory of his science and philosophy and by using only concepts by postulation. These concepts are given such meanings by the postulates of the deductive theory in which they occur that they designate nothing either sensible or imaginable. In the Sixth Book of the Republic, when describing the passage of dialectic from the "mathematicals" in the hypotheses of the sciences to the "ideas," Plato asserts that one "makes no use of images" **(6)**. It is not that one gives "sensibles" or "images" a logical immortal status; one does not use them at all. A Platonic "idea," with respect to its content as well as its immortality, is a quite different kind of concept. Not only do Democritean, Platonic and Stoic Greek philosophy and modern science use concepts by postulation, but this is true of Western beliefs of common sense as well.

Berkeley and Hume have shown that even the supposition that there are public physical objects, or minds other than one's own, involves much more than mere observation or immediate apprehension can give. These beliefs, like the verified theories of modern science, are proposed by postulation and confirmed only indirectly by observation; they are not given completely, or guaranteed, by direct inspection alone. The errors in our perceptual judgments demonstrate this. This presence of concepts by postulation in even the layman's ordinary beliefs is obscured

by the fact that the postulates in question have been verified through their deductive consequences so many times in daily experience that we have come to regard their trusthworthiness as almost as secure as our belief in immediately apprehended factors such as colors and sounds.

The belief in the existence of colors is guaranteed solely by observation or mere immediate apprehension, and consequently involves only concepts by intuition. The belief in tables and chairs and other persons depends on the postulation of more than is immediately apprehended and upon the checking of one's hypothesis by deducing logical consequences and confirming the deductions.

Since what is postulated involves more than mere immediate observation provides, concepts by postulation are present.

When one passes from common-sense objects to the mere deductively fertile and adequate postulated objects of science, the amount of meaning introduced into Western theory by postulation increases, and what is meant diverges more and more from the meanings provided by concepts by intuition which restrict themselves completely to the immediately apprehended.

The belief in the external world is at best only an indirectly confirmed, highly probable hypothesis stated in terms of concepts by postulation. It is not an immediately apprehended certainty denoted by concepts by intuition, and needs not be the only possible one for common sense. There are other theories for common sense to be found in the East.

CLASSIFICATION OF CONCEPTS BY POSTULATION.

I. Concepts by Intellection. Concepts by postulation designating factors which can be neither imagined nor sensed.

(a) Monistic, e.g., The space-time continuum of Einstein's field physics.

(b) Pluralistic, e.g., Plato's atomic ratios.

II. Concepts by Imagination. Concepts by postulation designating factors which can be imagined but cannot be sensed.

(a) Monistic, e.g., the ether concept of classical pre-relativistic field physics.

(b) Pluralistic, e.g., the atoms and molecules of classical particle physics.

III. Concepts by Perception. Concepts by postulation designating factors which are in part sensed and in part imagined.

(a) Monistic, e.g., the public space of daily life.

(b) Pluralistic, e.g., Other persons, tables, chairs, and the spherical moon with its back side which we do not see as well as its presented side with designating factors.

IV. Logical Concepts by Intuition. Concepts designating factors the content of which is given through the senses or by mere abstraction from the totality of sense awareness, and whose logical universality and immortality are given by postulation.

(a) Monistic, e.g., The "Unmoved Mover" in Aristotle's metaphysics.

(b) Pluralistic, e.g., Whitehead's "eternal objects," Santayana's "essences," or Aristotle's "ideas."

CONCEPTS BY INTUITION

The concepts by intuition gain their entire meaning from the immediately apprehended. The all-embracing immediacy from which any theory, Eastern or Western, takes its inception, exhibits itself as a continuum or field which is differentiated. To have a name for this all-embracing, initial, immediately apprehended fact with which any attempt to arrive at a description of experience must begin, is Northrop's differentiated aesthetic continuum. Within this field there occur factors in one part different from those in another. We immediately apprehend a field which is white here and blue there. The adjective "aesthetic" is added to ensure that it is the qualitatively ineffable,

emotionally moving continuum of colors, sounds and feelings which the artist presents in its immediacy, not the logically defined continuum of mathematical physics which is a concept by postulation. This initial, complex given fact considered in its totality with nothing neglected is what is meant by Northrop's concept of the differentiated aesthetic continuum.

Since the differentiated aesthetic continuum with all its aesthetic and emotive immediacy includes everything that is immediately apprehended, all other concepts by intuition derive from it by abstraction. The consideration of certain immediately apprehended factors apart from their immediately apprehended context; "abstract" is not meant in the sense of the postulated. It has been noted already that the differentiated aesthetic continuum contains two factors. There is (a) the field or continuum apart from the differentiations with it or the definite properties which characterize it, and there are (b) the differentiations or definite properties apart from the continuum which runs through them and embraces them. The former, (a), is called the indefinite of undifferentiated aesthetic, continuum, the latter, (b), the differentiations.

We arrive at three major possible concepts by intuition. They are:

I.The Concept of the Differentiated Aesthethic Continuum.

II.The Concept of the Indefinite or Undifferentiated Aesthetic Continuum.

III. The Concepts of the Differentiations: Concepts by Inspection.

If follows from the designations given above that the following relations hold:

I = II with III;

II = I without III;

III = I without II.

The concept of the Indefinite or Undifferentiated Aesthetic Continuum is difficult to appreciate. The indefinite, indeterminate, aesthetic continuum is as immediately apprehended as are the specific differentiations within it. Hence, the concept of the indefinite or undifferentiated continuum, gained by abstraction from the differentiated aesthetic continuum, is a concept by intuition, not a concept by postulation.

Major possible concepts by intuition:

A The Concept of the Differentiated Asthetic Continuum. The totality of the immediately apprehended with nothing abstracted away.

B. The Concept of the Indefinite or Undifferentiated Continuum. The intuited continuum apart from all differentiations.

C. The Concepts of the Differentiations Concepts by Inspection Atomic concepts by Inspection. The specific inspected qualities or differentiations considered apart from the continuum.

(a) Concepts by Sensation. III given through the senses.

(b) Concepts by Instrospection. III given introspectively.

D. Field Concepts by Inspection. Any instance of III considered as inseparable from II.

COGNITIVE VALUE FOR SOCIAL SCIENTIFIC THEORIES

The remarks, made in the Symposium on Mind and Body of the Association for Research in Nervous and Mental Disease in December 1938 (7), refer to the application of epistemological distinctions to a scientific field for neuropsychological and psychiatric phenomena.

The analysis proves to be useful to show the logical requirements to gain cognitive knowledge by the postulation of a deductively postulated theory to account for the observed inductive

empirical facts of individual psychological behavior. This shows the pattern that Northrop was to follow as the method to analyze the cognitive value of the social sciences and the humanities.

Let us follow this work in detail. The method used here to apply the notions of concepts by intuition, concepts by postulation and epistemic correlation, the substantive finding of the logic of the psyche and the solution of the body-mind paradox implies scientific and metaphysical ground problems.

We must mention that in the paper "The Significance of Epistemic Correlations in Scientific Method" for the Fifth International Congress for the Unity of Science in 1939, **(8)** Northrop faces the problem of clarifying the relation between those concepts which a given science uses in the early natural history stage of its development and those which enter into its final and more theoretical formulation.

The crucial question is: If the concepts of scientific deductive theory get their meaning through the imagination of the theoretical scientist by postulation, and do not refer to the immediately sensed factors denoted by concepts by inspection, then how can such a theory be put to an empirical test?

The answer is that one can verify scientific theory referring to scientific objects given by postulation which are not directly observable by deducing from the postulates of the deductive theory theorems which refer to what is directly observable. The fallacy involved in this answer is that it asks deductive logic to take from postulates stated in terms of concepts of one type to theorems stated in terms of concepts of an entirely different type.

What science requires, as shown by an analysis of existent scientific theory and typical crucial experiments, is an account of scientific concepts as they enter into scientific method, which will

1) preserve the irreducible difference between concepts by postulation and concepts by inspection, 2) permit both theorems and postulates to be expressed in terms of concepts by postulation, thereby not requiring formal logic to do more than it is capable of doing, and 3) at the same time, make possible the verification of deductively formulated theory by appealing to directly apprehendable empirical factors.

Since scientific theory is formulated completely in terms of concepts by postulation and tested by an empirical appeal to what is immediately perceived, some additional factor between concepts by postulation in the deduced theorems and concepts by inspection referring to what is empirically perceived must be present in scientific method. An examination of a specific crucial experiment in physics in conjunction with the deductive theory which it confirms shows this missing factor to be what Northrop terms epistemic correlations.

Epistemic correlations are not to be confused with the more familiar correlations of science such as appear in statistical studies or in the relation established between the temperature and volume of gases at constant pressure. The latter correlations are "homogeneous" correlations, to distinguish them from epistemic correlation which are "heterogeneous." The distinguishing mark of a homogeneous correlation is that it relates a concept of one type to a concept of the same type, i.e., it correlates a concept by postulation to another concept by postulation, or a concept by inspection to another concept by inspection, whereas an epistemic correlation always relates concepts of different types, i.e., it joins a concept by postulation in the deduced theorems of deductive theory to a natural history concept by inspection denoting something immediately observable, thereby making empirical verification possible.

Verification consists in three steps: 1) The deduction of theorems stated in terms of concepts by postulation from postulates using concepts of the same type, 2) the designation of unam-

biguous epistemic correlation in the deduced theorems to natural history concepts by inspection, and 3) the empirical observation of the immediately apprehended natural history factors denoted by these concepts by inspection.

It appears, therefore, that the scientific method for constructing and verifying deductively-formulated scientific theory is somewhat more complicated that has usually been supposed. There are not merely the natural history concepts by inspection denoting the immediately observable factors to which empirical observations refer, and the quite different concepts by postulation in both the postulates and the theorems, which define the meaning of the deductive theory, but there are also the epistemic correlations joining one type of scientific concept to the other to permit empirical verification.

The scientist can define unobserved scientific objects in the postulates of a theory so that rigorously logical deductions can be made there from. He does not regard his theory as true until these deductions, stated in terms of concepts by postulation are checked experimentally or empirically by appeal to observable fact.

At this point, the need of a scientific psychiatry facing epistemological questions arises. Mere observation and experimentation do not provide a trustworthy criterion of the verification of a scientific theory, since observation and experiment alone give only concepts by intuition whereas what is present in a scientific theory are concepts by postulation. What is required in addition is some unambiguous relation joining the two.

The success of physical theory is due to the fact that it possesses deductive theory expressed in terms of concepts by postulation insists upon observation and experiment which give immediately apprehended data denoted by concepts by intuition, and it has specified epistemic correlations joining the one to the other.

The case in psychiatry is that there are theories and a wide range of data, without the two getting together effectively to command assent from all experts concerned. Perhaps the neglect to distinguish clearly between concepts by intuition and concepts by postulation and the resultant failure to designate unambiguous epistemic correlations joining the one to the other may have something to do with the matter.

The presence and essential importance of epistemic correlations in the method of natural science have been obscured by symbolism. The symbol "blue" is used both for the concept by inspection, which refers to the immediately sensed color, and the concept by postulation, which refers the unobserved wavelength of a certain type of electromagnetic propagation, with the result that two quite different things joined by an epistemic correlation are often taken for an identity.

If psychiatry formulates its theory wholly in terms of neurological and physiological concepts, defined in terms of chemical and physical concepts, those are concepts by postulation, not concepts by intuition. If one means by body what psychiatry means by body, it is with a postulated, indirectly verified thing, not with something immediately observed, that one is concerned.

In speaking of the parallelistic theory of the relation between mind and body, it is frequently asked why the parallelism does not show in respect to non-cortical factors. The distinction between concepts by intuition and by postulation and the epistemic correlations that parallel nature as denoted by the one type of concept with nature as connoted by the other type of concept, then we may say that a parallelism does show for non-cortical and cortical factors alike. But the parallelism, more exactly termed epistemic correlation, is not between body and mind but between the person as immediately apprehended as an association and continuous se-

quence of sensory aesthetic qualities denoted by concepts by intuition, and the person as theoretically conceived as a neurological physio-chemical system designated by concepts by postulation.

The same considerations apply to "mind." One may mean by "mind" what is given directly to consciousness. This is a concept by intuition. If one restricts oneself to concepts by intuition when using the words "body" and "mind," then there are not two different realms or two different entities given; instead there is one continuum of diverse factors presented with immediacy. In reality, no line can be drawn between the immediately apprehended pain, which we speak of as psychical, and the yellow patch in the sky denoted by the symbol "sun," which we sometimes refer to as physical. Both factors are denoted by concepts by intuition, and are for that very reason abstraction from a single continuum of directly apprehended fact. One feels a pain as one apprehends the yellow patch in the sky. The real given by concepts by intuition denotes one continuous world, not two diverse worlds, even when one concept by intuition bears the tag "mental" and the other concept by intuition bears the tag "physical."

It is to be noted also that sensed time, sensed space, and sensed objects are just as ineffable as self-consciousness or a pain or any other psychical disturbance. In the real of the immediately given, denoted by concepts by intuition, there is no inner and outer, no subjective and objective, no distinction between the mental and the bodily; there is merely the all-embracing aesthetic continuum with its aesthetic qualitative differentiations.

There has been a second meaning of the symbol "mind." It goes back to Descartes and Locke. This is "mind" in the sense of a mental substance. "Mind" in this second sense is a concept by postulation. As Hume showed, "mind" in this sense is just as different from "mind" in the sense of that which is immediately apprehended as sensed space and sensed time and sensed objects

are different from the "true and mathematical" postulated space, time and masses of Newton's physical theory.

When discussing the problem of the relation between "body" and "mind," we must be clear about the possible meanings by the two words, since each has two quite different meanings, one of which is given by immediate apprehension, the other by postulation indirectly verified.

"Mind" in the sense of a mental substance designated by a concept by postulation is so empty and ambiguous that nothing of any definiteness can be deduced from it. No one has been able to formulate within a single deductive theory how the postulated mental substance is related to the postulated material substance of physiology and physics. These are the main reasons why the concept of a mental substance has tended to be discarded by physiologists, psychologists and philosophers. When this occurs, one is left with "mind" only as a concept by intuition. The symbol merely denotes what is immediately apprehended when one introspects.

That "mind" in this sense is important for medicine and psychiatry is shown by the fact that it is the pain or uneasiness or depression that one introspects which sends one to the physician, and it is the concepts by intuition which one uses to denote one's feelings which provide the physician with the first clues to his diagnosis of the patient's ailment. Consequently, although "mind" in the sense of a mental substance given by a concept by postulation must be thrown away, "mind" in the sense of a concept by intuition, or some other word meaning the same thing denotatively, must be retained.

A large part of contemporary diagnosis refers to neurological, chemical and physical factors involving postulated molecules and atoms, i.e., concepts by postulation. Certain classifications of psychiatrical types are at the same time based, in part at least, on mere description and upon

introspectively given data, i.e., appeal is made to concepts by intuition. A scientific psychiatry must bring these diverse bits of knowledge into some working relation with each other.

But to combine them in their present form is to put concepts by postulation in the same world of discourse with concepts by intuition.

This consideration suggests that "mind" in the sense of a concept by intuition must find epistemic correlates in the physico-chemical concept by postulation world of discourse for all and not merely some of its immediately apprehended manifestations. Concepts by postulation designating physico-chemical entities and relations are unavoidable to complete the entire postulation theory in terms of such entities and relations. Consciousness and its immediate data are accounted for in terms of concepts by intuition and the mental substance-material substance difficulties in the traditional postulational theory are avoided. Concepts by intuition referring to immediately introspected data will still remain as ultimate and irreducible, as is the aesthetic component of the self which they denote, but they will be used in deductively formulated theory only to denote the data for which the deductively formulated theory must account; they will not be used to define the entities or relations of the latter theory itself.

The advantage of a postulated physiological and physical theory of all factors denoted by concepts by intuition, whether they be given through the senses or introspectively, is that one keeps all postulated entities within a logically connected theory. The postulation of "material substances" to account for certain immediately apprehended factors and "mental substances" to account for other directly inspected factors, being so completely different from each other and having nothing in common, there is no way of getting them into working relationship with each other in a single deductive scientific theory.

To work with deductive theory in psychology and psychiatry, introducing the postulated entities and processes of chemical and physical theory, then it is necessary to bring the different entities and relations into connection with one another.

Along these lines of thinking, Northrop arrives at the conclusion in these terms:

> ...[A] sound set of postulates for any scientific theory must possess not merely consistency, independence and completeness, but also connexity. But if connexity is to be present, then the basic relations of the scientific must apply to all the entities and not merely to some of them. This will not be the case if some of the entities which we postulate as having spatial relations are physical and others are mental, not having spatial relations.
>
> It appears, therefore, when one passes to postulated theory in psychology and psychiatry, that one must introduce the same kind of entity as the epistemic correlate of introspected emotions and feelings as one introduces for the equally immediately given and equally ineffable redness of sensed bodily blood which it is usual to think of as in some sense designating the physical. In other words, the ultimate dualism is not between "body" and "mind," but between the immediately apprehended component of the person denoted by concepts by intuition and the theoretic component of the person designated by verified scientific theory which is stated completely in terms of concepts by postulation. The two components are related by epistemic correlations to make empirical verification possible. Hence, the one component is as ultimate and real as the other component. The complete person in his unity is these two aesthetic and theoretic components joined by the two-termed relation of epistemic correlation(9).

FACTUAL AND NORMATIVE THEORIES IN THE SOCIAL SCIENCES

On December 2, 1939, Northrop presented his notions of normative and factual theories to the Round Table on Generalizations in the Social Sciences, under the chairmanship of Morris Cohen, in connection with the elebration of the 10th anniversary of the founding of the Social Sciences Research Building at the University of Chicago. The discussion of this contribution can be found in the volume published by Louis Wirth in 1940, Eleven twenty-six: a decade of social research (10)

It is perhaps the earliest time when Northrop introduces the notions of "normative theory" and "factual theory" in the analysis of the social sciences.

The conception of the scientific method is at the heart of the matter. The conceptual distinctions discovered by Northrop in his own analysis of natural science and certain methods of economic science have an important bearing on this problem.

He finds that the conception of the scientific method as one which starts with preconceived ideas rather than pure facts, is correct. Another way to put it is that we begin with problems. An inquiry never starts unless there is some difficulty which arises. The logical argument, as stated by Northrop can be represented as follows: social science begins with a specific problem. But social science, unlike natural science, faces two fundamentally different kinds of problems. In natural science there are only problems of fact. But social institutions, being in part at least man-made, confront the scientist with two quite different questions: 1) What is the character of social institutions in fact? and 2) How ought social institution to be?

The first question is factual; the second is normative. Thus, whereas natural science faces only problems of fact, social science is confronted with problems of fact and with problems of value.

A factual social theory is one which is false if it is not in complete accord with what it is the case. A theory of any present social order describes existing conditions as they are. If there is even one fact out of accord with it, the factual social theory to that extent will not be scientifically verified.

A normative social theory designates what ought to be rather than what is. None corresponds perfectly to any de facto state of affairs anywhere. A normative social theory differs always from what is in fact the case.

The scientific method for determining normative social theory cannot be that of natural science applied to social facts. The latter method is appropriate for factual social theory. It is inappropriate for normative social theory.

The different kinds of factual social theories are best approached by way of the distinction between concepts by intuition and concepts by postulation. The concepts by intuition can only be appropriately used by inductive methods. The scientific method for handling them must be observation, description and classification. Factual science of this type is science in the natural history stage of development. Natural history science restricts itself to concepts by intuition and the inductive methods of Bacon appropriate thereto. The achievement of deductively formulated theory in social science involves more than the accumulation and extrapolation of natural history data or the argument from analogy between cultures. It entails the discovery of the key concepts in terms which any and all natural history data are to be analyzed. Besides the economy of thought and fertility which it introduces, a deductive theory must be verified.

Normative social theory, both in character and method of verification, differs from factual social theory. Among factual social theories, those of the natural history type using concepts by intuition are quite different from those of the deductively formulated type using concepts by postulation. Among existent deductively formulated economic theories, both the method of verification and the attendant limited predictive power marks them off from deductively formulated theory in natural science.

Northrop makes his points from the perspective of the methodology of the social sciences in his critique upon the indiscriminate use of problems in the sociological inquiry:

> ...Unless it is realized that science begins with the problems which initiate inquiry, not with facts or with some preconceived method, this basic difference between the two types of problem in social science is

not noted, and the need for different scientific methods to resolve the different types of problems is not recognized.

When such ovesights occur, confusion results. Normative theories presenting reforms are put forward as if they were factuals of what is or will be inevitably the case. Or factual information or factual theories are put forward as if they were relevant for confirming or denying normative proposals. Or, what is most usually the case, the end-product is a theory which is neither a verified factual theory of what is case but a worthless hodge- podge of the two.

...A factual social theory of contemporary Russia would have to refer to its communist ideology. This, however, does not make the factual social theory normative. A social theory becomes normative when it restricts itself to the normative and passes judgment on its norm as compared with other normative theories. Hence, by the method for determining normative social theory is not meant a method enabling one to include norms among its factual data as a factual sociological theory can and probably must do, but the method by which, out of all possible normative theories which the imaginations of men have constructed or can construct, scientifically correct one is to be determined **(11).**

The critique is not against the legitimate use of norms and values as observable factual items, like it is case in a factual theoretical formulation of the phenomena of power where ideologies and ethical or legal norms are described as elements into the dynamic system of relationships of power. There, the values, norms and ideological statements are just describable items. The critique is against the confusion of these described data and the cognitive character of those norms as verified true statements.

These new ways of discourse bring the old problem of "objectivity" in the social science into a new different light, providing with an epistemological criterion, instead of the simple involvement of the personal values and subjective bias of the observer.

On these grounds, Northrop analyzes the principles and logical consistency of modern social theories, especially the controversial case of the Marxist social theory:

Much of the contemporary social science is in the natural history stage. Witness most institutional economics, and the purely empirical

statistical studies of Wesley Mitchell and his colleagues. The movement in German social science, including economics as well as sociology, called Historismus, falls within this stage. Like the evolutionary theory of Darwin in biology, it is description extrapolated over time, and, hence, due to the persisting use of concepts by intuition, it is of the natural history type.

Marxist economic, political and sociological theory, like Hegelian dialectical Historismus before Marx, is a peculiar mixture, and one must say hodge podge and confusion (a) of natural history description with deductively formulated factual social theory, and (b) of the factual with the normative. This confusion and unscientific mixing of concepts belonging to different worlds of discourse and the identification of the factual and normative in one theory could never have occurred with Marx had he started with the character of social problems rather than with a natural history description of cultural evolution combined with certain questionable assumptions which he took over uncritically from Hegel. Marxist materialism, as he and Lenin, following Feuerbach, emphasize, calls for a realistic epistemology. The notion of an external material object is a concept by postulation, not a concept by intuition. But description of evolving social institutions, following the Historismus natural history tradition, calls for concepts by intuition. To combine the two types of concept as Marx has done is to talk nonsense. It is like saying that electrons are pink. The error slipped uncritically into Marx from Hegel's theory of all concepts as concrete universals. Hegel saw the particularity of the concept by intuition and the universality of the concept by postulation, but, overlooking the epistemic correlation, he saw only one concept, which he termed the concrete universal, when in fact there are two epistemologically correlated. Thereby, he made a hodgepodge of two distinct worlds of discourse.

Marx inherited a second error from Hegel -- the Hegelian identification of the ideal or normative in society with the de facto actual.

This identifies normative social theory with factual social theory and thus fudges the distinction between factual social problems and normative social problems. The absurdity of overlooking this distinction showed itself in the case of Hegel in the identification of the ideal society with the de facto society of early 19th Century Germany. It shows itself in the case of Marx in the identification of the ideal society not with any de facto society in the present, but with the de facto society that is inevitable, supposedly, tomorrow. Unfortunately, this supposed inevitability in the case of Germany did not occur for Marx any more than it did for Hegel. The bourgeois democratic society of Germany did not move indubitably into communism. It went instead, to Hitler and then, in the West, under an Anglo American ideology in part socialistic but in no part communistic.

Both Hegel's and Marx's identifications of normative social theory with historical factual social theory have failed to be confirmed by

> history. Thus fact as well as the anlysis of the problems of social science support the distinction between factual social theory and normative social theory noted earlier in this chapter. Furthermore, the distinction between the natural history type of factual social theory of Historismus with its historical method, and deductively formulated factual social theory using concepts by postulation must be retained also, to avoid mixing worlds of discourse and confusing historical sequence which is contingent and a concept by intuition with causal necessity which is a concept by postulation having meaning only in a deductively formulated theory of history.
>
> Causal necessity or determinism in history is only possible in a deductively formulated social science which has a theoretical dynamics. Hume made it clear that necessary connection or determinism is not given inductively in natural history data. **(12)**

Northrop formulates his ideas about the cognitive and predictive value of factual and normative social theories around the basic concept of determinism as a form of necessary causality, which is the key to understanding the important specific role assigned to him for both factual social theory and normative social theory, as elements underlying his understanding of the connection between ideology and behavior, and the sociological jurisprudence in the legal science.

Determinism is possible at all only in a deductively formulated science. Social science has obtained deductively formulated factual social theory only in the case of economics, and in both its method and its assumptions it is impossible to deduce the future from the present.

Since social institutions are in considerable part at least man-made, and normative social theories define the ends of human action, they might throw more light on the future state of a social system than factual social theory would show.

Hegel and Marx threw more light on what happened than did the Austrian or classical Anglo-American economic science and paid considerable attention to ideological factors such as bourgeois democracy vs. socialism and communism. The observation that social evolution proceeds through revolutions in which the normative social theory defining the traditional social

institutions is negated, rather than by the gradualistic changes governing Darwinian evolution in biology, is one contribution of Hegel and Marx to social science.

Northrop discussed these matters along the Round Table. He considered that a large amount of work in social science which is of the natural-history type is describing actually observable characteristics. There are no generalizations at all in the sense of the generalizations of Newton's physics. It is a science still dealing with a natural-history type of concept.

Social scientists, thinks Northrop, starting with natural-history materials and using concepts by induction to describe them, use factorial analysis to guide one from a large number of descriptive traits to crucial ones. As that factorial method is pursued, it ought to guide one to key concepts which would then be used in a deductively formulated theory to give a generalization in the social field comparable to the generalization in physics. It is very dangerous to attempt deductive formulations of scientific theory before the science has gone through its natural-history stage of development.

LOGICAL REQUIREMENTS FOR A THEORETICAL SOCIAL SCIENCE: THE CASE OF ECONOMICS

> "Were a benign and omnipotent being to appear before the vast body of creative contemporary economists, in religious fervor assembled, promising the answer to one request, the prayer offered up would probably be as follows: Most Needed and Welcome Being, give us a scientific theory of economic dynamics" **(13).**

With these rather humorous words, Northrop opens the essay: "The Impossibility of a Theoretical Science of Economic Dynamics," published in November 1941 in the Quarterly Journal of Economics. **(14)**

It is important that the rigorous definition of theory must be kept in mind anytime Northrop's logic is applied to the analysis of a scientific body of knowledge. Theory is a deductive system

designating the primitive concepts in terms of which all other concepts in the science can be defined, and the primitive propositions or postulates from which, by formal logic or mathematics, all other propositions in the science can be deducted as theorems. Such a theory would be scientific if, in some manner, its adequacy were tested by appeal to the empirical subject matter of the science. From this fundamental definition of theory, Northrop specifies the precise notion of a theory of dynamics, as a theory which concepts are sufficient to designate the specific state of a system at a given time and its postulates permit the deduction of a specific state for any future time. A most spectacular and typical example is Newton's mechanics.

When the notion is applied to the particular case of economic dynamics, such a scientific theory is meant to be an empirically verified deductive system, providing primitive concepts and postulates defining the present state of an economic system in such a way that once its quantitative values were determined empirically, the theory, through its postulates and theorems, would enable one to deduce a future state of the system without appeal to empirical factors.

The problem subject matter of this analysis is that regardless of the fact that economists study and possess important empirical knowledge concerning economic changes in time, these studies constitute only the first of the two stages in the normal development of any empirical science. It is the deductively formulated theory of the natural history data -- not the natural history case of economic changes with time. In economic statics, economics possesses, in its classical theory, not merely the natural history data but also the deductively formulated theory. The question is whether it is possible to generalize the present deductive theory for economic statics so that one can get from the present empirical state of an economic system to a future state, not by the speculative extrapolation of the empirical curves of past economic events, but by logical implication as a deductive consequence of the concepts and postulates of one's theory.

A valuation, or an economic value, reflects the want of some individual for some object or service. This means that the subject matter of economics is not the physical object or behavior itself but the desire of the individual for that object. Consequently, an economic good is not an externally observable object or behavioristic activity, but is, instead, a relation, moreover, which exhibits itself introspectively in the person's interest in and desire for that object.

The fundamental entities of economic theory are economic goods, or wants, or valuations. Its fundamental relation is that of "preference."

In any properly formulated deductive theory the postulates are expressed in terms of the basic, or primitive, concepts. Contemporary economic theory measures up to this logical criterion of excellence. For its first and fundamental postulate is that economic wants arrange themselves in an order by virtue of the relation of preference. The foundation of the theory of value is the assumption that the different things that the individual wants to do have a different order. Given this fundamental postulate of the theory of value, distribution of goods between different uses, an equilibrium of exchange and the formation of prices can be deduced as theorems.

To gain the theorems which are the economic laws of the theory of production, it is necessary to add a second postulate to the effect that there is more than one factor of production. To get whatever theory of dynamics contemporary economics possesses, a third postulate is required. It is that we are not certain concerning future scarcities. This basic concept identifies the subject matter of economics, not the physical object or the behavior of the physical individual. There is no quality in services taken out of relation to the end served which makes them economic. Whether a particular thing or a particular service is an economic good depends entirely on its relation to valuations.

The question then arises how a deductive theory referring to such a subject matter can be empirically verified. How, by appeal to introspection rather than to the senses, can one get any criterion for public validity? Valuations are the very subject matter of the science, and these, as they enter into economics, are relativistic, personal things. How, then, can publicly valid meaning for the postulates of an economic theory using such valuations as its basic concept be obtained? Clearly this is the fundamental difficulty which the economist had to face in attempting to attain a publicly valid science.

Northrop explains that this "publicly valid" type of knowledge gained the public validity by ignoring the specificity of the private valuations which vary from person to person and by basing this science upon the generic property of the concrete, immediately inspected wants apart from their content and concrete specific character.

Any individual has wants of some kind and these wants take on an order because of the individual's preferences. Although the particular valuations are relative, varying from person to person, and thus do not have public validity, the fact that any individual does make valuations of some kind, which in every instance do order themselves, is not a private, relativistic fact but a fact which is true for everybody. In this manner a science which found its subject matter to be constituted of private, introspected, relativistic, personal valuations nevertheless attained a theory which is publicly valid.

As far as the total volume of wants does not remain constant through time, they are in constant flux. So, the basic subject matter of economic science, as conceived by contemporary economic theory, does not have the property of obeying a law of conservation.

Even if contemporary economic theory had concepts which define the specificity of the state of an economic system at a given time, it would still be unable to achieve an economic

dynamics, because the second requirement for such a theory is not satisfied; its subject matter does not obey a conservation law and hence it cannot deduce a future state from a present state of the system.

> We conclude, therefore, that a theoretical economic dynamics is impossible within the framework of contemporary economic theory. As long as valuations are taken as the fundamental concept of the science, an economic dynamic will be impossible for two reasons: 1) the subjective relative character of valuations necessitates the grounding of the public validity of economic theory on their generic properties merely, thereby leaving the state of a system at a given time unprecisely designated theoretically. Thus the first requirement for a theoretical dynamics cannot be satisfied. 2) The failure of the total quantity of valuations to obey a conservation law prevents the prediction of a future state, even if the present state were given specifically. Thus the second requirement for a theoretical dynamics is ruled out **(15).**

The scientific method used by economics is quite different than the one of natural science. By restricting itself to the generic properties of the introspected valuations, economics has accomplished something unique in the method of empirical science; it has attained deductively its postulates without the need of appeal to their deductive consequences.

Physics tests its deductive theory indirectly by empirically checking its theorems; economics, directly by empirically confirming its postulates. In physics one believes in the validity of its postulates because their deductive consequences, the theorems, are experimentally confirmed; in economics one believes in the validity of its theorems because they are the logical consequences of the immediately confirmed postulates. The failure to achieve theoretical dynamics is due not to the scientific method by which the theory is obtained, but to the character of the subject matter to which its basic concepts refer.

This does not imply that a theoretical economic dynamics is impossible upon any basis or by any method whatever. It means that the problem is not that of gaining more and more empirical information about more and more variables within the framework of contemporary theory, or

of generalizing the concepts of contemporary theory, but of (a) basing economic theory upon radically different primitive concepts and (b) introducing a quite different scientific method.

We see how contemporary economic theory cannot deduce the future of an economic system, but it does lay bare the factors which define what it can do. What one immediately apprehends are colors and sounds. The natural scientist also, in his immediately apprehended data, is confronted with factors which are personal and private and relative. Had he attained publicly valid theory by dropping attention upon the specificity of sense data and by rearing his theory upon the thesis that any individual has sensations of some kind which can be ordered, the publicly valid theory of natural science would be identical with that of economic science.

Sense objects do point beyond themselves to postulated factors such as tables, chairs, persons, electrons, electromagnetic propagations, and a space-time manifold which is public, whereas the private wants, interests, valuations, etc., of individuals, insofar as they enter into economics, do not. This is the conclusion of the economists as a result of their study of these introspectively given evaluations. Otherwise they would have attained publicly valid theory by proceeding to specific postulated objective valuations the same for everybody, instead of by the method which they have actually pursued, of ignoring the specificity of the private valuations and concentrating attention merely upon the generic fact that individual people have valuations, which become ordered by virtue of the relation of preference.

Introspective data of economic science do not point beyond themselves by hypothesis to publicly existent valuations or factors. Consequently, there being no public, objective, specific economic valuations to provide the ground for publicly valid theory, the economist had no alternative but to ground the public validity of his theory upon the generic fact that each individual has wants and that these order themselves. Insofar as the economist has empirical information

concerning the specific character of his subject matter, this information provides concepts which hold only for the individual, and insofar as economics has publicly valid propositions, these propositions assert merely what is true because the subject matter is an economic subject matter and not because it is one of specific instance.

The initial requirement for a dynamic is a theory providing concepts which define the state of a system at a given time, not merely with respect to its generic but also its specific properties. The method by which contemporary economics attained publicly valid theory forced it to take as basic a postulate referring only to the generic properties of its subject matter. Consequently it is unable to meet the first requirement for a theoretical dynamics.

There are other requirements for such a theoretical science: the relation of necessary connection joining the specific state of a system at one time to a unique specific state at any later time. This relation was present in Newtonian mechanics only because the law of the conservation of momentum was empirically valid in the science. Even though its concepts of momentum and position define the specificity of the present state of the system, Newtonian mechanics would be quite unable to deduce a future state and thereby obtain a theoretical dynamics, if the total momentum of a physical system changed with time.

After this analysis, Northrop concludes:

> ...It is impossible to attain a theoretical economic dynamics within the assumptions or by the method of comtemporary economic theory. Nevertheless, providing these assumptions and this method are sufficiently analyzed logically, so that one knows precisely what it can and cannot do, this theory is an invaluable aid, and because of the nature of the empirical subject matter with respect to conservation principles, perhaps the only possible theoretical aid, for the following of economic changes in time. The importance and necessity of any empirical science possessing an explicit logical analysis of its concepts and method, if its principles are not to be misunderstood and misused, seems also to be demonstrated **(16)**.

THE LOGICAL PROPERTIES AND CHARACTERISTICS OF FACTUAL AND NORMATIVE SOCIAL THEORIES

In volume VII of Ethics, 1940, Northrop published the article "The Criterion of the Good State" **(17)**, providing a formal logic analysis of the factual and normative scientific theories.

According to him, there are two possible questions about society: 1) merely concerning what the facts are, or 2) how we can alter them to produce a more ideal state of affairs. These two types of questions give rise to two types of problems: the factual social problems and the normative social problems. The solutions to these problems are a) factual social theories and b) normative social theories.

According to the method of natural science, no theory will be designated by it as correct unless the theory is completely in accord with the factual situation to which it refers. A normative social theory is one which differs in whole or in part from the factual situation. The scientific method for determining normative social theory cannot be that of natural science applied to social materials.

When this methodological requirement is neglected, knowledge is guilty of "culturalistic fallacy," due not to a moral but to a methodological error. It consists in applying to normative social theory a scientific procedure which is appropriate only for factual social theory.

A very important property of normative social theory is that its propositions are synthetic and not necessary.

They are not necessary because there are several rival normative social theories. The truth of any one cannot be determined by the presuppositional method on Kantian a priori grounds, which prescribes that to verify any theory, it must possess necessity and universality. No normative social theory possesses these two properties. All propositions in a normative social theory are

synthetic. This rules out any guarantee of their truth within the propositions themselves, apart from their relation to facts outside them.

When we make the data of one's introspectively given personal awareness or the facts of society the field of application of the empirical method, we gain factual rather than normative social theory and thereby commit the culturalistic fallacy. The paradox involves that the essential properties of normative social theory:

1.Permit verification only by an empirical method;

2.Necessitate the avoidance of culturalistic fallacy.

In order to satisfy both requirements, Northrop formulates his demonstration:

> The two properties of normative social theory which entail the use of the empirical method and the avoidance of the culturalistic fallacy are themselves compatible. Certainly there is no contradiction in propositions being synthetic and at the same time designating a possible form for society which differs in whole or in part from what is the case in any actual society. But compatible properties of a set of propositions cannot entail incompatible methodological requirements for the verification of those propositions. One cannot deduce an incompatibility from a compatibility. Consequently, the use of the empirical method and the avoidance of the culturalistic fallacy can be combined without contradiction. **(18)**

The problem of designating a scientific method for solving problems of value in personal ethics and social science has a solution.

The normative character of normative social theory does not preclude the use of the empirical method and make verification impossible. The attempt to avoid the culturalistic fallacy and at the same time attain verification by an empirical method is not self-contradictory. The logical steps in this difficult problem are described by Northrop precisely:

> The first property of normative social theory is that its propositions are synthetic propositions. This necessitates that normative social theory can be tested only by an empirical method. Two significant points must be noted: first, nothing is indicated concerning the kind of facts to which the empirical method is to be applied; second, it follows that the traditional statement of 'the naturalistic fallacy' is erroneous. This statement as given by Kant, G.E. Moore, and W.M. Urban, prohibits taking <u>any</u> empirically given 'is' as the criterion of the 'good' or the ought." Were this the case, normative propositions could not be synthetic propositions; also the paradox would be insoluble. If the culturalistic fallacy in the form in which it designates a demonstrable error were to prohibit the validation of normative theory by the empirical appeal to <u>any</u> is' whatever, then indeed, the requirements of 1) avoiding the culturalistic fallacy and 2) using the empirical method would be incompatible. **(19)**

The demonstration reveals the key for the solution of the problem to be on the <u>kind</u> of facts appealed to in the testing of the theory and not on the fact as such as criterion for verification. A fundamental distinction must be drawn between the factual in society or the introspective self.

> At last the subreptitious assumption producing our paradox reveals itself. It is the faulty traditional statement of the so-called naturalistic fallacy which, upon the basis of the demonstrable error of verifying normative social theory by appeal to introspectively given personal or publicly given social facts, asserts the <u>non sequitur</u> that it is a fallacy to test normative theory by an appeal to <u>any empirical data whatever</u>.
>
> Our demonstration and previous statement of the culturalistic fallacy confirms this conclusion. The fact upon which the demonstration rests is that normative social theory, by definition, because of its very purpose designates a possible from society which differs in whole or in part from what an empirically verified factual social theory for any actual society would indicate. Consequently, the procedure for determining the correct normative social theory cannot be the empirical method applied to social facts, or, as we also showed, to introspectively given psychological or supposedly primitive ethical data. Thus the precise statement of the culturalistic fallacy in not that it is an error to test the normative by an appeal to the factual but that it is an error to test the normative for society by an appeal to the factual in society or the normative for one's 'pleasures,' 'interests' or 'sense of goodness' by one's actual 'pleasures,' 'interests,' and 'ethical intuitions.' In short, the avoidance of the culturalistic fallacy does not prohibit an empirical appeal to any facts; it merely prohibits an empirical appeal to certain facts. Consequently, our paradox becomes resolved, providing that we, in our verification of normative social theory, apply the empirical method to facts other than those explicitly repudiated by the

avoidance of the culturalistic fallacy in its precisely stated, demonstrably correct formulation.

> Put positively, the steps of our analysis may now be summarized as follows: The synthetic character of the propositions of normative social theory necessitates that its correctness be determined only by an appeal to empirical evidence outside the theory. Yet, when we make the empirical data either of introspective awareness or of social phenomena the source of this empirical appeal, we gain factual rather than normative personal or social theory and thereby commit the culturalistic fallacy. In short, we must test normative theory by an empirical method applied to empirical facts, yet these facts cannot be either the subjective items of introspection or the public facts of actual society. Since no other facts exist except those of nature as verified by the data of immediate intuition and sense awareness, no alternative remains but to conclude that the scientific procedure for determining the correct normative social theory is that of applying the empirical method to the facts of nature. Only thus can the empirical method of verification required by the synthetic propositions of normative social theory be obtained and the culturalistic fallacy in the precise form in which it designates a demonstrable error be avoided. **(20)**

The next step is to demonstrate how the theories of natural science provide a philosophical conception of the world and man that brings a scientifically grounded criterion to bear upon the designation of the correct normative social theory. We mean by nature not merely the immediately apprehended data but also the postulated system of objects and processes which the experimentally verified, deductively formulated theories of natural science designate. The theories are held to be scientifically verified if deductions from them correlate correctly with the immediately inspected data. The theories designate a character of our universe and ourselves as a part thereof which goes far beyond the immediately sensed data by means of which the theories are verified. As a consequence our experimentally verified theories of nature provide us, when we analyze them with respect to their basic postulates and primitive concepts, with a philosophical conception of our universe and of ourselves. This philosophical conception in its epistemic correlation with the immediately appehended data which provide its verification is to be identified with our scientific criterion of the correct normative social theory for culture. Only thus can an empirical criterion for normative social theory be found which does not commit the culturalistic fallacy.

Northrop is now in the capacity to specify the role of the philosophy of science to link the natural scientific factual theories to the "ought to be" of values:

> ... being a normative social theory, there can be no trustworthy, publicly valid criterion of its validity or invalidity apart from an analysis of the verified theories of natural science, which makes articulate on both their ontological-theoretical and their epistemological-operational side the philosophical conception of nature and of man in his relation to nature which these theories entail. This analysis it is the business of the philosophers of science to pursue, not adding new facts or interpretations, but merely making articulate the philosophical conception of nature and man which the verified scientific theory necessitates. Consequently, there can be no trustworthy determination of social ideals without such a philosophy of natural science. **(21)**

Natural science exhibits the character of nature to us in two ways: one, through the immediately apprehended continuum and its differentiated data exhibited by the senses to which natural science appeals for the verification of its theory; the other, through the systematically related, unobserved entities and processes designated by the postulates of that verified theory.

Nature, therefore, as given by natural science, is partly known theoretically by the intellect and the imagination checked indirectly by experimental verification.

All these reflections culminate when we arrive at this general concept of the idea of the good for culture:

> That form of society is the good one which embodies in the emotions of men a sensitivity to nature in its aesthetic aspect and orders its education, its intellectual outlook, and its social institutions in the light of the latest verified, philosophically articulate scientific theory of nature in its theoretic aspect. **(22)**

In 1947, Northrop published the monumental work The Meeting of East and West. In Chapter I the author makes clear that the work is addressed to "the contemporary world." The relation between interacting cultural elements grounded in different economic and political doctrines and

diverse moral and religious ideals that generate paralyzing schisms within the state, and wars between nations, is in the heart of the subject matter.

In the basis of the whole intellectual program carried on in this book, the notion of "ideology" is a central one, as far as the entire inquiry of the work is concerned with the ideological issues of our time.

The concept of ideology in Northrop is not a simple one. A precise appreciation of it requires a thorough study of his philosophical ideas. Nevertheless, if we restrict ourselves to the sense in which ideology is used in The Meeting of East and West, there are some basic elements that are worthy of note.

Theoretical and intuitive economic, political, aesthetic and religious doctrines are components of culture; they turn around basic issues and problems beneath the concrete material, facts, and historical events observable in a society. The "ideological factors are many." Northrop concerns himself with "those most influential as measured by majority opinion and the more pressing ideological issues of our time." Besides these there are more "ideological factors" in society and history. Also he recognizes the existence of nonideological factors, such as climate, geography, famine, disease, etc.

> It is not maintained, therefore, that everything in culture and history is determined by the beliefs of men their specific economic, political, aesthetic, philosophical and religious doctrines. It is maintained, however, with the sociologist Pitirim Sorokin, and with an increasing number of students of society such as Clyde Kluckhohn, B.L. Whorf, D.D. Lee, L.K. Frank and David Bidney, that these ideological factors are very important elements in the total situation -- much more important than most people suppose, and that any approach to the issues of war and peace which neglects them does not face the full complexity of the difficulties confronting our world, and to that extent is doomed to failure. **(23)**

Northrop avoids the mistake of a monistic purely ideological determinism making very clear that an approach which overlooks the non-ideological factors in history and society and the de facto state of affairs is incomplete and inadequate. The adequate social ideal for our world must be supplemented with the empirical social scientists information concerning the actual state of affairs. Only with an adequate ideal for society and a realistic knowledge of the actual state of society can wise practical action be determined.

It is necessary to investigate the rival ideological issues of the world, initiating this undertaking without any clearly accepted conception of what the method is for determining the correctness of one ideology as compared with another. As one culture is taken up after another, not only do we have to seek out the theoretical assumptions determining its ideological component, but also the method for determining the correctness of one ideology as compared with another in the case of conflicts between them.

As far as new philosophical ideas define an entirely new set of personal and social values for a given people, they lead to radical transformations or the actual destruction of traditional institutions, and to the creation of new social forms and facts in direct opposition to the old. If in natural science it is the task of theory to follow the facts, in social science there is a real and empirically verifiable sense in which the facts follow the theory. In investigating social phenomena one must observe what happens and also examine the historical background to discover the ideas which have made the facts what they are.

Points made in The Meeting of East and West are worthy of note. The Lockean overemphasis on the nature of interpersonal relation as "interaction" can be traced down to the sociological theories that overstress this "interactional" character of the social phenomena. Any theory of the state specifies the relation which joins persons to each other and to nature. This relation for any

given scientific and philosophical theory depends upon how the theory conceives of a person and of nature. In the modern Newtonian and Lockean theory, nature is a set of material substances located in infinitely extended Euclidean space. A person is a single atomic mental substance. The reason for the latter conclusion is that the material substances of the person's body define only the order of nature, not the order of human society which is a relation between persons. The material substances cannot account for human personality. The relation between a person and nature or that portion of nature which is the person's body, is interaction. The material substances act upon the mental substance. Free will would call also for an action of the mental substance upon the material substance. This has tended to be assumed, but it has always presented difficulties for the modern mind, due to the conflict with the laws of the conservation of mass, an energy which governs the behavior of the material substances.

The other point refers to the modern pragmatic emphasis upon scientific method and its unfortunate misinterpretation. The initial pragmatic emphasis upon scientific method for all of human knowledge, the humanities as well as the natural sciences, was correct. But the interpretation of this scientific method in terms of its end-products gave rise to an overemphasis on the work of the experimental scientist and the engineer, and to a failure to appreciate the contribution of the mathematician, the theoretical scientist, and the scientifically grounded philosopher. Scientific method itself tended to be pictured as something which made quite unnecessary an attention upon basic assumptions, theory, and the systematic, logical formulation of empirically given, experimentally determined facts.

In Chapter VII, of the same work, **(24)** Northrop analyzes a perspective to look at the methodological problems of the social science, through the school of thought in legal sciences called "legal realism." According to this philosophy, the norms which legislation defines are to be found by applying the empirical methods of natural science to the facts of existing social

practices. This is a different edition of the culturalistic fallacy of identifyng the "ought" for society with the "is" of that society. The empirical and formal method of natural science, of the legal realists, applied to social facts, is the appropriate and correct method for determining factual social theory. For this reason, it is only in part the correct method for determining the quite different normative social theory with which lawyers, judges, and statesmen are primarily concerned. By use of a method which tells merely that certain social facts exist as thus conceived, one cannot arrive at a theory which, instead of adjusting itself to these facts, outlaws them and attempts to remove them.

Nevertheless, this is precisely what law passed by a legislature and applied by a judge does. **(25)**

DEDUCTIVE THINKING AND THE SCIENCES

In The Journal of Higher Education, April 1947, Northrop published his article "Education for Intercultural Understanding" with the revealing subtitle: "Ability to think deductively essential to the Sympathetic Understanding of Another Race's Fundamental Beliefs." **(26)**

In this work, Northrop says that an education which would fit human persons to meet the problems of the contemporary world must acquaint them not merely with Western civilization but with all the major civilizations of our world. Within this concrete frame of interest, Northrop makes specific his basic concept of culture:

> ... A culture is not merely the facts which an anthropologist observes by a careful use of the objective methods of science. It is also the concepts and theories by which these facts are understood by the people indigenous to this culture. **(27)**

It is with respect to the concepts and theories in terms of which the people of a given culture themselves understand their own present cultural practices and institutions that contemporary

anthropology and sociology are weak. The normative theories indigenous to the respective cultures are at the heart of the difficulty, and an anthropological and sociological science which neglects these normative theories misses a fundamental tool to understand social behavior.

The crisis of the social sciences seems to be at the base of the "problems of the contemporary world." Northrop points out the fact that these sciences in the modern culture of the Western world have brought to the formation of their own methodology and their own conceptual apparatus the philosophical assumptions of this modern culture. No one for a minute can suppose that Spencerian sociology is independent of the philosophy of Spencer; nor can anyone suppose that the Comtian sociology has an independence of the Comtian philosophy. The same is true of all the major anthropological and sociological sciences of our modern Western world. Each has developed a set of technical concepts in terms of which the institutions of different cultures are classified and investigated. All the facts of these other cultures are translated into the modern Western sociological science and its modern Western culture, and what one obtains often is not the ideology of the native culture that is being investigated but the empirical facts of this culture brought under the ideology of modern Western sociologists and their particular cultural and philosophical assumptions.

The solution for this fundamental problem at the foundations of modern social science is suggested by Northrop by introducing the methods of the modern logic of systems to anthropology and sociology. This method permits one to approach a given culture and allows one to understand the institutions of that culture and the conceptual interpretation and evaluation put upon those institutions by the people in question. This permits an anthropology and a sociology in which the different cultures of the world will be understood in terms of the conceptual framework of the ideological theories of the people who created that culture.

The introduction of the modern logic of systems requires a radical change in the type of curricular education. Scholars and students must be trained to think deductively, as well as inductively. Only by learning how to think deductively is it possible to acquire that tolerant attitude and open-mindedness necessary to comprehend the empirical cultural practices and institutions of a given people from the standpoint of that people themselves. To understand a culture is to know its premises and to approach it from the standpoint of those premises.

This method, because of its excessively inductive character, paying attention to texts and source materials and the words in texts, is continuously misleading the scholar and those who read his conclusions. The inductive character of the traditional historical method brings the historian and the social scientist to the subject matter of history and of a given culture without the technical, theoretical concepts and assumptions of the people in question which are necessary to understand it. The use of inductive method according to the sound prescriptions of this method results in neutral, colorless facts. This is the reason why most of the current anthropological and sociological sciences and historical scholarship dealing with the different cultures of the world throw little light on the problems of our time, which are ideological in their character.

It is impossible even to record and classify the facts of history or of the diverse practices and institutions of different peoples without bringing these facts under concepts and theories. To get pure facts, independent of all concepts and theory, is merely to look at them and to remain dumb, never uttering a word or describing what one sees. The moment one reports what one observes, at a meeting of historians or in a book written for sociologists, one has not pure facts but facts brought under concepts, and hence theory.

The social scientist's or the historian's aim at pure fact is a delusion. What one gets are not facts, but facts brought under some theoretical assumptions of the sociologist or historian in question. These theories are speculative, since neither the social scientist nor the historian has the training or the method necessary to understand the technical, economic, political, theological and philosophical theories which are being exemplified in the facts. Even if his theories are more critically examined, they are, none the less, his theories. Rarely are they the theories used by a people to conceive and evaluate the empirical facts exhibited in their social practices and cultural institutions.

To understand any culture means not merely to know the basic philosophical premises defining its standpoint but also to be convinced that these philosophical premises are, for the people in question, a reasonable scientific generalization from the empirical data of their limited experience. Never is any culture understood, even when its indigenous ideology is grasped, unless the facts which led to its particular ideology are also ascertained. This means that the philosophy of any specific culture is grounded in its science, even when the people in question may lack western science. People note the facts of experience and generalize from these facts to a philosophy. Consequently, no philosophy of culture is completely understood unless the empirical facts behind the generalization are also ascertained.

The present separation of the social sciences and humanities from the natural sciences must be unequivocally repudiated. No humanistic doctrine in any culture is understood unless the underlying philosophy of that culture is understood. No underlying philosophy is understood unless the empirical evidence and the process by which a people develops its basic philosophy its from experiences is grasped. One's philosophy of the good in the social sciences and humanities is one's philosophical generalization of the empirically true in the natural sciences.

NOTES

(1) Filmer Northrop, "Pareto's General Sociology," Virginia Quaterly Review, Vol. II, No. 4, 1935.

(2) Pareto, Traite de Sociologie Generale (1917). For English Translation From Later Italian Edition (1923) See Pareto, The Mind And Society (Livingston's ed. 1935).

(3) Filmer Northrop, "The Complementary Emphrases of Eastern Intuitive and Western Scientific Philosophy" in Charles A. Moore, ed., Philosophy East and West "Eastern and Western Philosophy." Princeton: Princ. V. Press, 1944.

(4) Sir Isaac Newton, Mathematical Principles of Natural Philosophy, translated by Andrew Motte, revised by Florian Cajori (Berkley University of California Press, 1934), p. 6.

(5) A. Einstein, The World As I see it (New York: Covici-Friede, 1934), p. 60.

(6) Platón. La República. México, UNAM, 1959, p. 268.

(7) See Symposium on Mind and Body of the Association for Research in Nervous and Mental Disease in December 1938, published in Vol. XIX, pp. 99-104 of their Proceedings by the Williams and Wilkings Company in Baltimore, in 1939.

(8) Filmer Northrop. "The Significance of Epistemic Correlations in Scientific Method," The Journal of Unified Science (Erkemtnis) Volume IX.

(9) Filmer Northrop. The Logic of the Sciences and the Humanities. New York: World Publishing Company, 1971, p. 199.

(10) See Eleven Twenty Six: A Decade of Social Research. Edited by Louis Wirth, pp. 227-273. The University of Chicago Press, 1940.

(11) Filmer Northrop. The Logic of the Science and the Humanities. Op. cit., p. 256.

(12) Ibid., pp. 258-260.

(13) Filmer Northrop. The Logic and the Sciences and the Humanities. Op. cit., p. 235.

(14) Filmer Northrop. "The Imposibility of a Theoretical Science of Economic Dynamics," Quarterly Journal of Economic. November 1941.

(15) Filmer Nortrop. The Logic of the Sciences and the Humanities. Op. cit., pp. 245-246.

(16) Ibid., pp. 253-254.

(17) Filmer Northrop. "The Criterion of the Good State," Ethics, Vol. LII, 1940.

(18) Filmer Northrop. The Logic of the Sciences and the Humanities. Op. cit., p. 283.

(19) Ibid., pp. 284-285.

(20) Ibid., pp. 285-286.

(21) Ibid., p. 288.

(22) Ibid., p. 289.

(23) Filmer Northrop. The Meeting of East and West. New York: The Macmillan Co. 1947.

(24) Ibid., p. 13.

(25) Ibid., pp. 254-261.

(26) Filmer Northrop. "Education for Intercultural Understanding. Ability to think deductively essential to the sympathetic understanding of another race's fundamental believes," The Journal of Higner Education. April 1947.

(27) Ibid., p. 173.

CHAPTER IV
THE SCIENTIFIC LOGIC OF SOCIAL BEHAVIOR: MODERN SCIENTIFIC SOCIOLOGY

THE MODERN CONCEPTION OF SOCIOLOGY

On December 4, 1948, in an informal address opening a conference of scholars and educators (1), Northrop points out the new challenge brought forth by the historical event of the release of atomic energy upon the social sciences.

The social scientist can no longer operate with concepts having little to do with natural science, because the release of atomic energy means that if he is going to say anything significant for the guidance of statesmen, legislators and military men, he must take cognizance of the knowledge gained recently in natural science. The link between the natural and social sciences is a matter at the very foundation of the social scientific investigation.

The traditional sociology of the 19th century was excessively Baconian. The theory held was that by merely observing different cultures and peoples in various parts of the world their salient characteristics would emerge, together with a conception of social science as a whole. This theory, overlooked the fact that in observation we not only observe what we see but also describe what we observe. As soon as this second operation begins we are involved with concepts; we no longer have pure fact, but theory.

Nineteenth century sociology tended to describe the facts of different cultures in terms of the concepts of Spencer or Comte or Summer or Keller. Thus instead of trying to understand different societies in terms of their own conception of their experience, it tended to view them in terms of the concepts of 19th century western sociology. The longer social scientists studied cultures, the more they realized that no observed society can be understood or evaluated until its concepts are found in the terms in which the people themselves conceptualize their experience, and from the standpoint of which they constructed their social and cultural institutions.

Professor Sorokin made the point that there is a sociological society and a biological society. Biologically, society is the product of the genetic constitution of the individuals in it, plus the responses of those individuals to outward stimuli from other individuals and from nature. In sociological organization, however, causality is not mechanical but rather logico-meaningful. If we take a given society, such as the Chinese, and introduce a certain stimulus, such as western law, the effect will not be at all the same as in a western type of society. In a cultural society, causality is determined by the concepts which the people in that society use to provide the common denominator terms for relating their literature, their religion, their conception of nature, their economic organization, their political science, and their law. Such terms determine the interrelation of factors within the culture, and until an observer has stayed with that society long enough to find those key common denominator concepts, expressed in conceptual terms which embody the experience of its people, it is impossible for him to understand what he has observed. (2)

The theory that there is a fundamental difference between primitive people and the people of sophisticated societies of our own time, in that primitive people do not think logically, has been criticized by social anthropologists and cultural sociologists because it is impossible to judge them according to our own concepts. Whenever primitives are regarded as illogical, it was because we were looking at their behavior from our standpoint, rather than from theirs. When they are studied long enough to give one the key common denominator concepts which they themselves use to conceptualize their experience into a meaningful whole, then their behavior is seen to be just as logical as our own.

In his study of the Navajo Indians (3), Professor Kluckhohn came to the same point that Professor Sorokin emphasized with his notion of social causality as logico-meaningful, by showing that it is impossible to understand the Navajo Indian without first understanding his

philosophy. As Professor Kluckhohn has expressed it, every given culture has certain primitive ideas and postulates, and these are the intergrating factors in that culture. Similarly, the first step toward integration for education in our culture is concerned with the problem of arriving at our own primitive concepts and postulates.

Professor Sorokin and Professor Kluckhohn are social scientists. They did not begin their work with the notion that these studies would lead them to natural science. Yet after a given society has been studied, and its key concepts determined, the question of why these particular people conceptualized their experience in those particular terms inevitably arises.

At this point Northrop makes an illustration of that process of formation of the basic integrative concepts, because it is the first time that the legal systems are discovered to be a fundamental strategic way to approach the social relationships involving both the invisible ideological element trapped in the neurophysiological system and the overt institutionalized observable behavior.

This mention inaugurates a whole period of growth in the philosophical thought of Northrop, which will bring the legal sciences to contribute in a very important manner on to his sociological thought. This will be shown in the following sections:

> Where, then, do the basic integrative concepts originate? It now appears that the answer is to be found by going back to the sages of the culture under study, whose utterances articulate its philosophical basis. We have been making a study with respect to Chinese law and Roman law. These two systems of law are fundamentally different, even diametrically opposed, so much so that what is good in one tends to be evil in the other. Yet both are based on the fundamental philosophy of the culture. The traditional philosophy of the Chinese classic defines the good for Chinese law, which is based on Confucianism. Likewise, Roman law was formulated by Stoic philosophers and was based upon Stoic philosophy. Now, both the founders of Confucianism and of Stoicism assert their respective philosophy of culture to be true because the source of its verification is nature, not culture. This is expressed in Roman law in the dictum that jus gentium, the humanistic law that defines the good integration of man in culture, is grounded in jus natura, the law or philosophy which is scientifically verified for nature. In short,

the philosophy of the good, for humanity, is the philosophy of the true, for nature.

Cultures vary, and men vary. Aristotle in his time studied 158 different constitutions, and from this concluded, quite correctly, that there were 158 different justices, yet he believed, also quite correctly, in an absolute justice. In other words, men live in different cultures, which may be of infinite variety, but all people are members of the same nature and inhabit the same planet, the same astronomical universe. Thus, our contemporary anthropology, sociology and philosophy of culture are leading us through the necessary step of recognizing that one can never understand a given society (and this is just as true of our own as of any other) without first discovering the basic concepts and assumptions in terms of which that people conceptualize their experience, to a second important discovery -- the discovery, namely, that the verification of the basic integrative philosophical concepts of a culture is to be found in the facts of nature known at the time the sages of the culture first articulated its philosophy.

This shows us how to integrate the humanities and the natural sciences. The basic concepts which define the good for the former must also define the true for the latter. **(4)**

BIOLOGICAL AND IDEOLOGICAL FACTORS IN HUMAN BEHAVIOR AND CULTURAL - SOCIAL INSTITUTIONS

The address delivered by Northrop as vice-president and chairman of History and Philosophy of Science, at the joint Symposium on the Relation between Biological and Cultural Factors in Social Problems, December 28, 1947, in Chicago, culminated in the essay "Ideological Man In His Relation To Scientifically Known Natural Man," published as Chapter XIX of the book Ideological Differences and World Order (5), edited by Northrop and published in 1949.

In this essay, Northrop undertakes an examination of the relation between ideological factors and biological factors in human behavior and its attendant cultural institutions, in the light of intuitive, introspective, radical scientific empiricism and of contemporary neurological and behavioristic psychological science.

Cultural institutions are, in part at least, the result of human behavior. Human behavior is conditioned by neurological processes. Comparative neurology shows that the nervous systems

of men in so-called primitive cultures are practically identical with those of men in more sophisticated cultures. It follows, therefore, that any conclusions which we reach concerning the relation of ideas to nervous systems will hold for any people in any culture.

Northrop criticizes the idea that normative social theories are pseudo-rationalizations after the fact, merely giving later verbal expression to particular social events brought about in a causal manner by previous particular events of a nonideological character. Among these nonideological causes economic factors are frequently given a primary place. Even for directly observable contemporary social changes, none of the social sciences has laws of a causal type, like those of physics, enabling one to deduce the state of a social system tomorrow from its state today. Nevertheless, this is what one must have before there are scientific grounds for asserting that social events are caused by any previous specified events.

The science of economics in neither its Anglo-American-Austrian nor its Marxist formulation is able to infer causally a future state of even the economic factors in the social system from a present state of the economic factors. This means that there is as yet no scientific justification for saying that even the present economic factors in society are due solely to economic causes. How much more unscientific then, and unjustified, must be the claim of the economic determinists who assert that all the manifestations of culture and history are due to economic causes.

Were it true that normative social theories are more verbal pseudo-rationalizations after the social facts, then it would follow that there should never be cases of the normative social theory arising first and of the facts conforming to the theory coming afterward. Yet history abounds in such instances.

Philosophical ideologies have a much more significant connection with human nervous systems and human behavior than many modern scientists, historians, and philosophers as-

signed to them. Contemporary neurological and behavioristic psychological science supports this conclusion.

Human beings in society are reacting not merely to particular natural events occurring just once at a given time and place, but also to symbols, to socially conditioned symbols, which keep their meanings constant during the period of decades or centuries, as the case may be, in which a given normative social theory captures their faith and thereby serves as norm for their social behavior and cultural institutions. But to say that human beings in society are reacting to natural events is to say that their behavior is determined by what is called a particular. And to say that human beings are reacting to symbols which keep their meanings constant through many events is to say that they are reacting to particulars which are the embodiments of universals.

The problem to be solved is the relation between ideological and biological factors in social institutions because as far as institutions embody normative social theories and as far as these normative social theories are a significant cultural factor in the ordering of social phenomena, normative social theories, unlike specific events in nature, exemplify universals rather than mere particulars.

The problem of establishing the relation between cultural factors and biological factors in social science becomes that, in part at least, of determining the relation between the processes of biological systems and the responses of people to particulars which embody universals.

When a given people are captured in the realm of their normative beliefs by a specific normative social theory, this theory serves in their behavior as an end. In other words, it defines a purpose. This means that if we are to clarify the relation between cultural factors and biological factors in social phenomena, we must determine the relation of normatively defined purposes to biological systems.

Previous attempts to solve this problem have produced two conflicting conclusions. These conflicting conclusions rest upon a common assumption: 1. Since human behavior exhibits responses controlled by purposes defined in terms of remembered norms which are universals rather than merely responses determined by physical events which are particulars, therefore human behavior must have its basis in extra-empirically verifiable extra-biological factors, the assumption being that in the realm of the biological there are only mechanical causes and no purposes, and only particular events and no remembered events with their persistent meanings and hence no universals. 2. Since biological systems and all natural systems as known by the methods of natural and biological science are mechanical systems responding to stimuli which are particulars rather than universals, purpose is a mere appearance or epiphenomenon and all ideas are particulars. Hence, universals do not exist, being, like the normative theories defined in terms of them, mere semantically misunderstood symbols which, when correctly analyzed, turn out to be mere pseudo-rationalizations after the nonpurposefully caused particular social facts, or else expressions of purely hortatory and noncognitive significance.

KNOWLEDGE AND THE NERVOUS SYSTEM

Investigations by Warren S. McCulloch **(6)** and Walter Pitts **(7)** show that certain biological organisms, because of the character of the neuron nets in their nervous systems, must know universals, responding to symbols as their exemplars, rather than as mere particulars. Other investigations by Arturo Rosenblueth, Norbert Wiener, and Julian Bigelow show that not merely a human being but also robots with inverse or negative feedback mechanisms have purposes that define their behavior. When this purpose can be determined by information, such robots are called servomechanisms. In other words, tha basic premise of both the traditional philosophical dualists and idealists and the traditional, scientific naturalists and mechanists to the effect

that natural and biological systems can have neither knowledge of universals nor normatively defined and behavior-controlling purposes must be rejected.

The traditional theories rest upon an oversimplified notion of activity in the nervous system. They assume that neurons are always put together in the nervous systems to form a path in or through the nerves which is noncircular. Northrop brings the scientific neurophysiological and cybernetic evidence to bear on the general question.

The simplest possible case of a noncircular ordering of the nerve cells is one afferent neuron "a" joined by a synapse to one efferent or motor neuron "b." Assume also that the signal which is the firing of neuron "a" entails the behavioristic response which is the firing of motor neuron "b." Then, assuming no further action upon "a," the signal which is the firing of "a" perishes as soon as "a" has fired. Hence the response of neuron "b" is a response to a signal which is a mere particular. The number of noncircularly ordered neurons does not alter this conclusion. It follows therefore that if there were noncircular paths within or through the nervous system, a signal (i.e., the firing of a neuron) at any point within it could signify only what happened at a particular instant, and there could be neither purpose nor memory, and every action would be a response to a mere particular.

If there are five neurons "a," "b," "c," "d," and "e," ordered in a circle in such a way that the signal which is the firing of "a" fires "b," which signal in turn fires "c," which by way of the firing of "d" and "e" in turn fires "a." The time it takes the impulses to succeed one another around the circuit is sufficient to permit any neuron to restore its energy from the metabolic processes of the body, the signal, which is the firing of "a" or any one of the five neurons in the circular net, will not perish. It will thereby persist through time. It will signify a universal rather than a mere particular, and memory will be achieved.

More than a century ago Majendie and Bell had defined reflexive activity and indicated its circular path from a part of the body through the nervous system back to the same part of the body. Cannon and his collaborator Arturo Rosenblueth were the first to call attention to this homeostatic property and to attempt to extend the concept to relations between the body and the world about it. But it was R. Lorente de N; who postulated and demonstrated the action of what he called reverberating chains of neurons so arranged in closed paths that each excited the next one around the loop, so that the last excited the first. Thereby the activity continued to regenerate itself around the loop.

Let us assume that the epistemic correlate of the postulated momentary signal or impulse which is the firing of this efferent neuron is in the consciousness of the person in question, the sense datum or "idea" denoted by the word "blue." Assume also that an impulse from the eyes fires a neuron which is a member of a regenerative loop and that its impulse is the epistemic correlate of the introspected "idea" or datum "blue." It follows from the character of a regenerative loop that this impulse will be transmitted continuously without ceasing around the loop, so long as the energy necessary to restore the neurons to a capacity to fire is maintained by metabolic activity. This insures that one has the form of the fact remaining constant over time through different particular events. Hence, one has the epistemic correlate of introspected universals.

Very simply related neural nets made up of regenerative loops have all the formal properties of the primitive ideas and postulates of mathematics and deductive reasoning of Russell's and Whitehead's Principia Mathematica. Human nervous systems can reason deductively and, insofar as they possess and use nervous nets with this formal character, they must reason deductively in precisely the manner specified by an analysis of deductive reasoning and calculation in modern mathematics and symbolic logic. Deductively formulated theories, whether they be the normative theories of social science or the factual deductively formulated theories

of natural science, are not rationalizations after the facts. They are, instead, because of the formal properties of the neural nets with their impulses in the central nervous systems of human beings, scientifically verifiable factors and scientifically verifiable factors of causal significance.

Any robot or organism constructed with regenerative loops possessing formal properties can compute any computable number or can deduce any legitimate conclusion from a finite set of premises.

A neuron in a regenerative loop of neurons may be so related to a motor neuron that it not merely fires the neurons in the circle of its own loop but also fires a motor neuron, thereby producing a specific overt response of the system. When this happens, the constant universal becomes manifest in a particular again, as a specific event here and now, but conforming to its universal.

With many regenerative loops in a single nervous system there can be many universals, and by joining these loops universals can be related. The postulates of any deductively formulated theory in natural science or any normative theory in social science can be constructed. As long as this related system of impulses in reverberating circuits never fires a motor neuron, it remains a covert universal, a mode of possible action, rather than a particular, or an overt, act. But when it fires a neuron leading out of the circuit, it generates a particular objective event. An abstract normative social theory, a mere universal and a possible, can, if it gets into a nervous system so as to define the form of its activity, determine the pattern of firing of motor neurons; and so, literally, causally, and neurologically determine an overt, objective, social and institutional fact.

If such set of postulates is a theory in natural science, it can generate behavioristic responses upon the part of a physicist which put the theory to an empirical test with respect to particular events or facts in nature. The universals of the deductively formulated theory considered as a

possible become related to particulars in a manner which introduces the quantifiers "all" and "some" of logic of propositional functions into the formal properties of neurological human behavior.

But there is nothing to prevent man from constructing several different deductively formulated theories in natural science or in normative social science out of the universals which regenerative loops provide for him. It may and does happen that the firing of a motor neuron prescribed by one normative social theory is prescribed by another. Two theories in one brain make choice obligatory for action.

If each circuit had a path separate from any other path, each would go its own way to its own end. But many paths share nervous parts and others would result in contrary acts of some effectors. A few, like swallowing and drawing breath, working at once would destroy us. Conflicts and mental collisions are barred by inhibitory links from one circuit to another so that when both are excited only one works. Thus the net embodies the possibility of these decisions.

The nervous system, which receives impulses epistemically correlated with images varying from moment to moment and standpoint to standpoint, arrives at invariant entities and relations holding constant through the changing, immediately apprehended particulars. Such invariants can be achieved by complicated neural nets which scan and average over a group of transformations. Human nervous systems have the formal properties necessary to know universals and to construct deductive theories in natural science and in factual and normative social science which can causally determine particular human behavior and, through that human behavior, the character of cultural institutions.

In any behavioral system, be it man, beast, or machine, there are two different but complementary types of scientific inquiry. In a behavioristic inquiry one ignores the inner constituents of,

and their relations within, the system. One concentrates attention upon what happens with respect to the response of the system when, everything else being kept constant, some specific stimulus or input is brought to bear upon the system. In a functional study, the central subject is the intrinsic structure and internal properties of the system itself. The input and output are used merely to throw light on the character of the system which connects the one to the other. Behavior is defined as any change of an entity with respect to its surroundings.

In passive behavior, the object is not a source of energy; all the energy in the output can be traced to the immediate input. Active behavior is that in which the object is the source of the output energy involved in a given specific reaction.

Active behavior in turn falls into two classes, termed nonpurposeful, or random, active behavior and purposeful active behavior. The latter is active behavior directed to the attainment of a goal. The purpose of voluntary acts is not a matter of arbitrary interpretation but of physiological fact. When we perform a voluntary action what we select voluntarily is a specific purpose, not a specific movement. If we decide to take a glass containing water and carry it to our mouth we do not command a certain set of muscles to contract, we merely trip the purpose and the reaction follows automatically.

If the system has the property of being an active system and if this active system has reverberating circuits which permit the existence of universals and the construction of postulates or proposals out of these universals which can define ends, then the system itself has the capacity to project possible goals or purposes and the capacity to trip one of these purposes rather than another.

Purposeful behavior is divided into teleological and nonteleological. In the case of non-teleological purposeful activity no signals from the goal modify the activity of the object in the

course of the behavior. Teleological purposeful activity occurs in any mechanism in which signals from the goal alter the behavior after it has been initiated, so that it reaches its goal. The requirement of any mechanism to be not merely goal-directed but teleologically goal-directed is to possess a "negative feedback" over the goal. **(8)**

After this scientific evidence Northrop concludes that the traditional argument that purposeful teleological behavior cannot be accounted for by means of scientifically verified psychology and neurology because the latter sciences give no basis for memory, universals, and purposes. The argument that purposeful teleological activities and the theoretical ideas defining human goals are mere epiphenomena of no causal significance rests upon a common confusion and a false premise. This false premise is that teleology and mechanism are incompatible.

This incompatibility is justified neither by logic nor by fact. When purpose and teleology are carefully defined, each represents a particular kind of mechanism. The real dichotomies are (a) between purposeful mechanisms and mechanisms giving rise to random behavior, and (b) between teleological purposeful mechanisms which possess a negative feedback controlling their behavior and nonteleological purposeful mechanisms which do proceed toward a goal and hence have a purpose but which do not have a negative feedback redirecting the behavior of the system on the way to its goal.

IDEAS, NERVES AND BEHAVIOR

The inquiry about the relation between ideological factors and biological factors in any culture, leads to McCulloch's and Pitt's demonstration that scientifically verified neurological man can know universals and Rosenblueth's, Wiener's, and Bigelow's demonstration that scientifically investigated, behaving neurological man can have causally significant goals and teleologically controlled behavior toward those goals with the original inquiry. A teleological system can be,

and in human nervous systems it is, a mechanical system. It is a mechanical system in which the behavior of the system is controlled by a negative feedback over the goal. (9)

Feedback may be positive or negativ. Both kinds involve activity in a closed path and some of the output is returned as input. When this output which returns as input has the same direction and effect upon the system as the nonreturning input, the feedback is positive. Thus positive feedback reenforces the input. Negative feedback means that the behavior of an object is controlled by the margin of error at which the object stands at a given time with reference to a relatively specific goal. Thus the modern gun is automatically controlled to hit its target. Electromagnetic waves returning to the mechanism from both the target and the projectile during the flight of the projectile give the error or deviation of the projectile from its intended course. This alters the input of the mechanism in such a way that the gun puts its next shell nearer the target.

Goals can be of two kinds. They may be some immediately apprehended particular enjoyed esthetically or used empirically to check a scientific theory of nature. But goals may also be the attempt to make the world conform to the theory of natural science as in engineering or to the normative theory of social science as in education, religious conversion, new legislation, and other social reforms. The former orders the things of nature to serve man's ends. The latter attempts to alter the behavior and cultural institutions of men to fit man's normative theory.

In the case of the deductively formulated theory of natural science, data from outside the organism coming through the sense organs of the scientist either correspond to what his deductively formulated theory, stated in terms of universals, specifies or they do not. If they do, the natural scientist, for the particular investigation in question, has reached his goal. His theory is verified. If they do not, the information fed back through the sense organs to the scientist

forces him to reconstruct the postulates of his scientific theory. He may have to draw upon new reverberating circuits with their quite different universals or basic scientific concepts.

In the case of a normative social theory, it, rather than the empirical social facts given through the senses, defines the goal. The negative feedback comes from the normative theory itself to the motor neurons prescribing that the man's behavior conform to the prescriptions of the norm. In this manner the censorship of personal and social norms arises and the prescriptions of an ideology for a given society operate through familial, educational, religious, commercial, and legal institutions and processes to mold what is in social institutions and behavior toward what ought to be.

The many reverberating circuits through the human cortex provide men with many different universals out of which to construct both their factual theories of nature and their normative theories of culture. One would expect rival hypotheses in natural science and the rival normative theories in the social sciences. Scientifically verified neurological theory of human beings makes deductively formulated theory in the natural sciences as well as normative theory in the social sciences both possible and significant. Human societies in the west radically reconstruct their social organization with the rejection of an old normative social theory and the acceptance of a new one. This is possible quickly only when a society or its leaders have reached majority agreement upon a systematic normative social theory and possess an excellent system of communications to acquaint and habituate the leaders of that society and, if possible, a majority of the people with that normative social theory.

Cultural factors are related to biological factors in social institutions (a) by the biologically defined purposeful behavior of human neurological systems containing negative feedback machanisms and (b) by the normative social theory defined in terms of the universals, which are

the epistemic correlates of trains of impulses in neural nets that are reverberating circuits in such negative feedback mechanisms. Overt behavior can be and is causally determined by embodiments of ideas as well as by particular environmental facts. In any culture, embodied ideas, defining purposes or ideals really matter.

COGNITIVE LOGIC OF A UNIFIED THEORY OF SOCIAL ACTION

In Social Science, July 1947, Northrop published the article entitled "The Scientific Method for Determining the Correct Ends of Social Action" **(10)**. In this work we find a complete formulation of the logic for a cognitive unified theory of social action. The whole argument turns around the question: Can scientific method determine the ends for which the discoveries of science are used?

The ends of social action are defined by social doctrines, termed ideologies. Conversely, an ideology is a theory defining the end or aim of social action. It is a theory designating the kind of society at which we should aim. Discrepancy between the type of social organization, which a normative social theory designates, and the type of social organization of de facto society, which a scientifically verified factual social theory would designate, is the essence of a normative social theory. Normative social theories, as conceptions of society not yet realized fully at which human beings are aiming, differ at least in part from the factual organization of actual society. They cannot be completely in accord with what is in fact the case.

Also, they are often, if not always, in part incompatible with what is in fact the case. For the whole point in passing laws in any legislative body and in drawing up a constitution prescribing a certain normative social theory is that the people know certain facts in existent society which they want to remove. Normative social theories are constructed so that they will be incompatible with these facts. This very incompatibility is the argument of the proponents of a given normative

theory for its acceptance. The only difference between the theory of natural science and the factual theories of social science is that the former applies this traditional method of the natural sciences to the facts of nature, whereas the latter applies it to the facts of culture and society.

The methods of natural science prescribe that no theory can be regarded as confirmed by these methods unless the facts in the subject matter to which the theory purports to refer are completely in accord with what the theory calls for. It follows, therefore, that when the methods of natural science are applied to the facts of society, rather than to the facts of natural science, the only type of social theory which such methods can give is a social theory which is completely in accord with all the facts of society.

Even if the future situation achieves in fact the aim which the normative theory envisaged, this will merely demonstrate that the normative theory, if accepted, can in part at least achieve its norm in fact; it will demonstrate nothing concerning the crucial question as to whether this is the correct or good norm to achieve.

If a pragmatic test of a normative social theory by appeal to future consequences is going to define the confirmation of that normative theory with respect to the future state of affairs in terms of the criterion of confirmation as specified by the methods of natural science, then in the future state of society to which appeal is made the normative social theory must designate a form of social organization which conforms not merely in part but completely to that de facto social state. But no normative social theory ever achieves completely in de facto society, no matter how long it operates, a complete concordance with any de facto state of affairs. Yet such a complete concordance is precisely what a normative social theory must achieve if it is to be a theory verified by the methods of natural science.

The normative theories of a culture, which define its specific aims and values, are made clear and specific when the economic science, political and theological doctrine, aesthetic theory, etc., of the culture in question are determined. Each one of these doctrines of a given culture turns out to be a theory, or can be put in such a form.

Any set of assumptions and postulates of a given deductive theory has specific logical consequences designated by the theorems of that deductive theory. These theorems work out in detail the consequences of the postulates of the normative social theory. Thus, just as the theorems logically deduced from the postulates of the deductively formulated theory of natural science define the techonological instruments which provide society with its tools, so the theorems which are the deductive consequences of the postulates of the normative social theory of a given society define the specific economic, political, religious and aesthetic practices and institutions which embody and enforce the ends or ideal norms of that society.

The scientific method and procedure for arriving at the deductively formulated theory of natural science, the theorems of which designate the instruments and instrumental means of society, are the empirical and deductively formulated methods of natural science applied to the inductively given facts of nature. Since normative social theory, like the theory of natural science, is deductively formulated theory with its postulates and theorems, our basic problem is that of determining how the normative social theory is confirmed or verified. The problem is finding the principle of selection by means of which, out of all the possible normative social theories which exist in our world or which can be imaginatively conceived, the correct or good one can be determined.

Basic assumptions of a given philosophy of culture prescribe the ideology or ideal form for the institutions and cultural practices of that culture, but also make certain assertions about

the character of nature and human being quite apart from the institutions and practices of culture. Moreover, these assertions concerning nature and the natural man inevitably made by the philosophy defining the ideology of the culture, are always of a character such that they can be empirically verified by an appeal to the facts of nature and to those characteristics of human beings generally which are quite independent of any particular cultural ideology men may happen to hold.

As The Meeting of East and West has shown also, the philosophy which defines the normative social theory of any of the other major nations or cultures of the world always makes similar assertions concerning the existence of specific factors in nature or the natural man which are either directly observable empirically or connected with the directly observable by standard scientific methods. The basic primitive concepts and postulates of the philosophy underlying a given culture have a formal normative reference by way of deductive logic to the theorems and their attendant prescriptions for good social institutions; and an empirical cognitive reference not to human made society but to nature and the natural human being.

THE VERIFICATION OF NORMATIVE SOCIAL THEORY

As we have already made clear, according to Northrop the verification of normative social theory is to be obtained not by checking its basic philosophical postulates against the facts of society either in the present or the future, but by checking them against the facts of nature. Normative social theories do not conform to the facts of de facto society; instead, they attempt to and in part succeed in making the facts of de facto society conform to the normative theory.

In 1951, in the volume Structure, Method and Meaning: Essays in Honor of Henry Scheffer, Northrop published a fundamental essay that brings together the discoveries and results of

mathematical logic and the foundations and method of sociology. This essay is "The Importance of Deductively Formulated Theory in Ethics and Social and Legal Science." **(11)**

The essay starts with a critical analysis of the conception of philosophy derived from mathematical logic and leads to a formulation of a logical foundation of social science on the grounds of a systematic rather than an analytic philosophy. Mathematical logic is analytic and systematic. The analytic emphasis encourages the departmentalization of knowledge, the investigation of specific problems in logic and empirical science, and the conception of philosophy as analysis. This conception of philosophy tends to take the meaningfulness of a proposition as given and to conceive of philosophy as the analysis of the proposition to render its meaning in an expanded and literal form. The systematic emphasis notes that not merely individual propositions but bodies of propositions have formal properties. The meaning of an individual proposition cannot be fully understood apart from the formal properties of the systematic body of propositions of the deductively formulated theory of which it is a part.

The conception of philosophic thesis of an individual proposition as given is naive. If a proposition is in a deductively formulated theory, any concept in the proposition is either a logical constant, a primitive concept, or a defined concept, i.e., a concept that is defined in terms of primitive concepts and logical constants. Since any primitive concept in a deductively formulated theory depends for its essential, syntactically given meaning upon all the postulates within which it is a term, the attempt to find the complete meaning of any proposition by analyzing it in isolation is incompatible with the way in which the primitive and defined concepts of a deductively formulated theory get their meaning.

A primitive or undefined concept in a deductively formulated theory is not a meaningless concept, even when it has no meaning given to it apart from the deductive theory in the form of

concept-by-intuition knowledge by acquaintance; it is meaningless only when considered by itself, apart from the postulate set in which it is a term. But within the postulate set, it has meaning assigned to it by the way in which it is related to other concepts by all the postulates and deduced theorems, not merely by one of them.

The so-called undefined or primitive concepts in a deductively formulated theory, even when considered wholly apart from the question of empirical applications of the theory, are without meaning. All the postulates of the theory prescribe their meaning syntactically. When an undefined or primitive concept appears within the postulates or theorems of a deductively formulated theory, that "undefined" entity takes on all the meanings assigned to it by satisfying that particular postulate set and its deduced theorems.

This systematic character of the meaning of any single proposition changes the conception of science and philosophy. No proposition in a deductively formulated theory can be analyzed apart from a consideration of all the primitive propositions of the deductive theory as a whole. This conception of philosophy puts an equal emphasis upon science and philosophy. It entails that the analysis of any single proposition of a deductively formulated theory is never exact or complete unless the formal properties of any such theory as a whole are kept constantly in mind.

The source of all these notions in Northrop's philosophy are the works of Henry M. Sheffer, among mathematical logicians, and of Cassius J. Keyser **(12)** and R.D. Carmichael **(13)**, among mathematicians. They discovered this double character of mathematical logic and the deductively formulated type of knowledge.

This type of knowledge enables one to designate and formulate the part in its relation to the whole, thereby giving us the conception of science and philosophy as a system. An understanding of either empirical science or philosophy is an understanding of the basic theoretically

defined problems which the inductively given facts and the many deductively formulated theories together generate.

Deductively formulated theory is important for the social sciences. Since the social sciences are facing normative problems of value as well as problems of fact, two quite different types of theory are required. Factual social theory attempts, after the manner of natural science, to obtain an empirically verified deductively formulated theory of society as it is in fact. Normative social theory attempts to specify a deductively formulated theory of society as it ought to be. Only certain social sciences have to date achieved deductively formulated factual social theory.

Sociology to date has not achieved a deductively formulated factual social theory, even for statics. The first attempt at such a theory was made by Pareto. His key variables defining the state of a sociological system at a given time depend upon interpretation and are vaguely connected with positivistically immediate empirical data that the result must be recorded as a failure. The experience of cultural anthropologists and sociologists demonstrates the necessity of deductively formulated knowledge if objectivity in social science is to be obtained even for factual social theory. The empirical sociologists and anthropologists of the 19th and 20th centuries, influenced as they were by positivism and British empirical philosophy, supposed that they could obtain an objective understanding of a foreign culture observed in the field if they honestly described the facts which they saw. In normative social theory and philosophy, on the other hand, many deductively formulated theories have been generated. Roman legal science, with its doctrine of jus gentium grounded in jus naturae, was such a normative theory. The Marxist ideology is another such theory. Thomistic philosophy is a third instance. Hume's philosophy **(14)**, as worked out by Bentham for law and politics and by Jevons **(15)** for economic science, is a fourth.

The objective social scientist is the one who makes sure that the conceptualization of the facts of a foreign culture which is portrayed is the conceptualization of the people in that culture, rather than his own. To do this, he must, by conversation with them and by reading their written documents, discover their basic concepts or ideology, as well as observe their overt behavior and institutions; and he must supplement induction with deductively formulated theory presenting each culture as its particular observable data conceptualized by its particular set of primitive concepts and propositions.

If a given stimulus is introduced into two different cultures, the response will be a function of the differing sets of primitive concepts and postulates in terms of which the people of the respective cultures conceptualize the data of their experience, order their own behavior, and pass judgment upon their own institutions and those of other people. The basic concepts in terms of which a given people conceptualize the facts of their experience, determine in significant part their norms for ordering their objective behavior and social institutions, and thereby determine the effect of the introduction of a given stimulus into their community.

When different people in different cultures, or the same people in different stages of their own cultural history, conceptualize the observed facts of their experience in different stages of their own cultural history, and conceptualize the observed facts of their experience in different ways, the effects of the induction of the same stimulus in the two diversely conceptualized cultures will be different. A social science which is to give an objective account of the diverse peoples and cultures of the world must use the method of deductively formulated theory, as well as that of inductive, positivistic observation. The great virtue of deductively formulated theory is that it forces cultural social science, in its account of any culture, to bring out into the open the conceptual, primitive concepts and postulates of that culture.

No single postulate set with its particular values of any one contemporary culture can be taken as the basis for ethical and legal principles which purport to be universally valid for all cultures.

The supposition that a moral science consists in taking a given single sentence as common-sense experience, which expresses a moral judgment and then analyzing it to bring out its expanded literal meaning assumes that a single ethical proposition is an isolated system, when in fact it is the expression of the postulate set in the background of the analytical philosopher's cultural and philosophical consciousness.

In so far as there are differing concepts used by different cultures in conceptualizing the empirical data of experience, there are differening norms.

The problem of an objective, ethical norm for the world is that of specifying and resolving the basic theoretical problem determined by formulating the question to which the different postulate sets of the different cultures or ideologies of the world are different answers. Only by means of the method of deductively formulated theory, can one formulate the problem of an absolute or universal ethical norm.

To suppose that an absolute ethical or legal norm is given by intuition is to ignore the fact that the structure of objective behavior and objective religious, economic, political, and artistic institutions are in fact a function of the postulate set or philosophy used to conceptualize the empirical data of experience. This is true also of personality structure and hence of one's moral intuition. When a given people shift from one set of philosophical premises for conceptualizing the raw facts of experience to another, their personality structure and moral intuition, as well as their objective cultural institutions, undergo a change. Moreover, one's sensation of pleasure follows these changes. This is the basis of the fallacy in taking pleasure as the criterion of the good.

Different cultures and persons conceptualize the facts of experience in different ways, and consequently have different personal and legal ethical norms, but certain of these conceptualizations may have a deductive fertility to account for all the data given with positivistic empirical immediacy which the others do not enjoy. This permits the question of the correctness of one set of philosophical assumptions, as compared with another, to be put to an empirical test, and thus permit the problem of a universal world norm for personal ethics and legal science to be put, in part at least, upon an empirically verifiable, scientific basis.

To understand a given culture, one needs to understand the concepts and postulates and the facts of nature which initially led the sages of that culture to regard their particular philosophy as an empirically and hence scientifically verified one. To possess an objective scientific conception of a foreign people and their culture, it is necessary to go to the facts of nature known to the most empirically informed persons to find the facts of nature that would verify that particular postulate set.

The method both for determining and for transcending the relativity of ethical and legal norms of the world seems to be that of deductively formulated theory applied to each of the many cultures of the world and to nature, and then used to converge on a common set of assumptions. This was the major undertaking of Northrop's The Meeting of East and West.

The meaning of the word "good" or of the word "just" is not given, but is instead a function of the basic concepts used to conceptualize and systematize or integrate all the data given inductively. Culture (and ethics and law, as parts thereof) merely reflects the postulate sets that are used by different peoples. Nature provides the data that are conceptualized. Hence, ethics and law are empty apart from the postulate sets of the world's diverse cultures, and unverified apart from those of the natural sciences.

THE SOCIOLOGY OF LAW

In 1950, Northrop inaugurated his contribution to sociology in the specific area of sociology of law. He started with the analysis of Underhill Moore's attempt to provide legal realism and sociological jurisprudence with a rigorous scientific method. This analysis is the content of his article, "Underhill Moore's Legal Science: Its Nature and Significance," The Yale Law Journal **(16)**.

It is worth following in detail both the attempt by Underhill Moore **(17)** and Northrop's analysis and conclusions. Without a substantial understanding of this essay, it is impossible to grasp most of the recent developments of Northrop's ideas on the social science.

The legal science of Underhill Moore was the product of the two major movements of modern legal thought: legal realism and sociological jurisprudence. The aim and the method of Underhill Moore's legal science are inseparable, because his aim was to provide legal realism and sociological jurisprudence with a rigorous scientific method. He hoped to achieve at least the beginning of a dependable legal science adequate to the changing and novel legal and social problems of our time. The method which he chose was that of natural science applied to social and legal facts. A legal realism and sociological jurisprudence which is adequate to the social and legal needs of the contemporary world must be one which can adjudicate between conflicting present economic, political, social and legal norms and also specify a scientifically verifiable new theory. The basic social and legal problems of the contemporary world, domestic as well as international, are inescapably "ideological and normative" in character. Different nations have different social and legal codes. Within any nation the old codes are proving to be inadequate for resolving the problems of an increasingly technological society in an atomic age. A legal science must be able to specify new norms to replace the old. Such a legal realism and sociological jurisprudence must be one which has systematic or structural predictive power

from the present state of society to the future. The predictive power of inductive methods and of inductively gathered statistical curves extrapolated into the future will not do because legal codes and social norms when effective must reflect what Ehrlich called "the inner order" and what Underhill Moore termed "the group habits" or "the high frequency behavior" of human beings in society **(18)**.

Legal and social norms have their basis in the systematic relational or structural factor in society. Only a legal and social science which has systematic or structural predictive power from today's "inner order of society" to tomorrow's can give today the new norms necessary to replace the outmoded and crumbling legal codes and norms of the present status quo. Only an experimentally verified, deductively formulated social and legal science has the possibility of doing this.

Legal realists and sociological jurists require a more objective method for determining the inner order of society. The method introduced in Underhill Moore's field studies of commercial banking was designed to provide it. After applying this more objective method, notwithstanding its careful "elaboration of categories" and laborious gathering of data, he had merely broken up the one gross, essentially introspective, intuitive judgment into thirteen different similarly introspective intuitive judgments.

When he gave the objective data to experts in a bank on the one hand and to himself and his co-workers on the other hand and asked these two groups to make the thirteen intuitive judgments, there was in one case a difference of conclusion for four of the thirteen judgments. The method of intuitive judgments in legal realism and sociological jurisprudence was not a trustworthy means of determining the inner order of society. This conclusion becomes inescapable when it is noted that these intuitive judgments were made not by distant judges on the

bench but by bankers and social scientists intimately acquainted with the social institutions they were judging.

Underhill Moore was forced to conclude that the method of legal science must drop introspective, intuitive judgments and become completely objective.

Legal science must base itself upon behavioristic rather than introspective psychology.

It does not follow from this that Underhill Moore's legal science and behavioristic psychology are invalid because they deny the existence of introspected impressions and the scientific validity of the introspective method. Underhill Moore grants the scientific validity of introspective methods to give what they can give, namely the subjective.

He had found when he turned to sociology that no such deductively formulated sociology existed. Existing sociology was still for the most part in the inductive, descriptive, Gallup poll statistics, natural history stage. The last attempt at a deductively formulated, experimental sociology was made by Pareto. It ended in failure because too many of Pareto's key variables were located in the inner instincts and introspective interiors of the ancient Greeks and Romans, where no one could determine whether they existed or not. Hence, Underhill Moore had no alternative but to attempt the foundation of a new experimentally verified, deductively formulated sociology as well as a new sociology of law.

INNER ORDER OF SOCIETY AND THE LIVING LAW

According to sociological jurisprudence, the ethical and legal norms for solving the disputes of society have their basis in, and if effective must correspond to, the de facto" "inner order of society." This seems to provide a definite criterion for determining norms by the realistic sociological method. Actually, however, as Underhill Moore noted, it is as vacuous as the

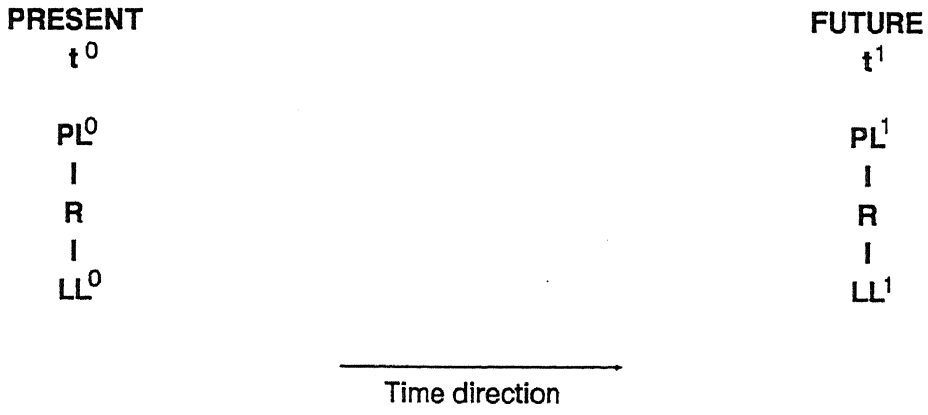
abstract nouns of the Austinian analytic jurisprudence, unless objectively valid specific operations or methods by which "the inner order of society" is to be determined are made explicit. That this had not been done becomes evident the moment one asks the question: How does the lawyer advising his client, or the judge making his decision, determine what "the living law" inner order of the de facto society is?

The contemporary world is characterized by the diversity of normative social and legal theories competing for the minds of men. The most vital disputes of our world are raising questions about whether one norm or another should be used to decide the dispute. Technological discoveries, such as the method for releasing atomic energy, are rendering many present social and legal norms inadequate if not obsolete. The crucial test for legal realism and sociological jurisprudence comes, therefore, when we ask the question: Does this conception of legal science provide a method of determining the new norms to replace the old? Underhill Moore's research demonstrated that this question must be answered in the negative.

The difficulty centers in predictive power. According to sociological jurisprudence, the correct normative propositions of positive law are those which correspond to the high frequency behavior, or what Ehrlich termed the living law, of de facto society. Underhill Moore's final method for legal science assures one can obtain an objective determination of the high frequency behavior, or living law, of de facto society. Sociological jurisprudence does provide a definite objective criterion of positive legal norms for the social status quo. Suppose not merely the positive law but also the underlying living law of the status quo is in question. Can sociological jurisprudence designate the new legal and social norms for judging and changing the behavior of today's status quo? The answer is in the affirmative, if sociological jurisprudence has a scientific method and a theory is such that given an objective determination of today's inner order of society it cannot ambiguously deduce tomorrow's. Given such a capacity today to deduce

or predict tomorrow's living law, the sociological jurist would have to write out the positive law norms corresponding to tomorrow's predicted living law to possess today the new legal norms for transforming not merely the positive law but also the living law of today's status quo.

The following graph represents the situation:



t^0 = the present state of the social system.

t^1 = a future state of the social system.

PL = the normative propositions of positive law.

LL = the living law or high frequency behavior of de facto society.

R = the relation of correspondence between the correct positive legal form and the de facto living law.

Given an objective determination of LL^0 at the present time t^0 legal science enables one to deduce LL^1 at the future time $t.^1$ Sociological jurisprudence would write out PL^1 in correspondence with the deduced LL^1 and possess a method for specifying the new legal and social norm to

replace the old. Because PL^1 as knowable at the present time t^0 corresponds to a living law not yet reached in the de facto society, it avoids the culturalistic fallacy of identifying the "ought" for today's society with its "is." Achieved at the present time t^0, PL^1 would provide a normative criterion for changing not merely the positive law but also the living law and social and legal institutions of the present status quo.

It was precisely this predictive power of PL' by way of the prediction of LL' that Underhill Moore was seeking. The basic problem of legal practice and legal science is the problem of prediction. Unless a present prediction of the future living law is obtained, legal realism and sociological jurisprudence must remain perpetually silent on normative issues. Without a legal science which predicts tomorrow's high frequency order of society from today's, legal realism, sociological jurisprudence and social science generally can say nothing about the new social and legal norm required to meet the new domestic and international social problems.

It can merely record and echo the positive law norms which correspond to the present social statuos quo.

A necessary condition for predictive power is that it must have a deductively formulated theory. This necessary condition, which Underhill Moore's final formulation of legal science met, is not a sufficient condition for predictive power. Modern economic science is deductively formulated yet it does not achieve this type of predictive power. The mere fact that Underhill Moore achieved an objectively verifiable, deductively formulated sociology of law is not a guarantee that such a sociological jurisprudence will obtain the time-equation connecting LL^0, the present inner order of society, to LL', the deducible future inner order of society, which is necessary if sociological jurisprudence is to provide any criterion of new logical codes and norms to replace the old.

The experiment can, however, be looked at in another way and used to answer a different type of question. In any single study, such as the distribution of vehicles, for example, the two curves representing the different distribution of parking before and after the posted regulation represent two different living laws. One, the living law LL° at the earlier time t°; the other, the living law LL' at the later time t'. If, therefore, by studying the relation between these two curves, one could find an equation holding for many different similar studies, relating the first curve to the second, then one would have the aforementioned time-equation which would make it possible, if given an objective determination of the LL° living law of the present, to deduce the LL' living law of the future.

Underhill Moore assumed that the propositions of the positive law function as stimuli permitted him to treat the positive law symbols as one instance of any stimulus in a society which might have the effect of changing its present structure into that of the the immediate future. His experiment became a study in the relation joining the living law at one time to the living law of the same social system at a later time.

In seeking the mathematical formula connecting today's living law to tomorrow's, Underhill Moore tells us that he and his co-workers examined every possible empirical factor in the behavioristically conceived situation upon which this equation might depend. Two equations were discovered.

The first defines the point at which the living law of the future state of the social system will begin to deviate from the living law of its present state. The second defines the difference between the deviational part of the future state and the part of the earlier state from which the future state was a deviation. One has but to examine these two equations in order to determine whether

it is possible in social science, in sociology, and in the sociology of law to deduce the future state of the system from a present state.

Such an examination shows that the future state can be deduced only if one knows initially not merely the living law distribution of the present state of the social system but also the positive law norm which is to be introduced. Neither of the two equations relating the future state of the system to the present state can be solved unless the positive law norm of the future state is known initially. Thus, instead of being able to deduce LL' from LL° and then being free to determine the new legal norm by merely writing out the propositions of PL' in such a way that they correspond to LL', Underhill Moore's research permitted only the deduction of LL' if one knew at the earlier time t°, not merely LL', but also PL'. Underhill Moore saw that his research did not give the predictive power necessary for a handling of normative social and legal questions on a realistic sociological basis; even for the simple type of social system which he studied.

He knew that he had used the most powerful methods for deriving law from sociology by the application of the methods of natural science to social facts. He applied these most powerful methods faithfully to the simplest possible socio-legal system, where if anywhere they should have succeeded. If these methods failed to give new normative legal and social theory in such a simple social situation, then the weaker inductive methods of many of his colleagues must fail even more.

Underhill Moore and his legal science will have to be reckoned with by all subsequent social scientists and legal thinkers. He has given the world its first experimentally verified, deductively formulated sociology of law. This is the reason why he has shown what legal realism and sociological jurisprudence can and cannot do.

Underhill Moore's legal science, therefore, has demonstrated the three following things concerning the capacity of a juristic science whose method is that prescribed by Ehrlich as "a science of observation" or whose method is that of natural science applied to social facts.

His method can give an objectively verified specification of the living law and the corresponding positive law norms of the present status quo. There is the possibility that, given an objective determination of the living law high frecuency behavior of the present status quo and assuming a specific new positive law norm, one can determine (a) the point at which the introduction of this new norm will result in a change of future high frequency social behavior from that of the present, and (b) predict the amount of the deviation beyond this point. Legal realism and sociological jurisprudence, even when implemented with the most powerful and objective scientific methods for determining changes of the inner order of society with time, are not capable of designating a new norm or of resolving normative legal and social disputes.

Northrop concludes after all these considerations concerning the works of Underhill Moore:

> ...Underhill Moore's conception of a proposition in law as merely the bare particular stimulus or particular cue to a response must be modified to include the meaningfulness and efficacy in overt behavior of ideological factors as required by the neurological and behavioristic, scientific findings of Professors McCulloch, Pitts, Rosenblueth, Wiener and Bigelow and as applied to the role of ideological factors in human behavior and the resultant inner order of society by this writer. This change will have the effect of grounding law in a social science which places its emphasis upon the "logical-meaningful" relations determining the inner order of society first indicated in the sociology of Professor Pitirim Sorokin and upon the key importance of the philosophical assumptions of any society as emphasized by many contemporary anthropologists such as Professor Clyde Kluckhohn. In short, the theory of the living law as well as the positive law will be grounded in a science and philosophy of the world's cultures **(19).**

SOCIOLOGY AND INTERNATIONAL LEGAL PROBLEMS (20)

In "Philosophical Anthropology and World Law," published in the transactions of the New York Academy of Sciences in 1951, Northrop throws light on the role and contribution of sociology, along with the legal sciences and philosophical anthropology, to the solution of a concrete historical problem, namely an effective international law.

The criterion of effective law has been laid down by the great Austro-Hungarian sociologist of law, Ehrlich, and is expressed in Ehrlich's formula that the positive law must be grounded in and correspond to the living law **(21)**. By "positive law" Ehrlich means the legal constitutions, statutes, institutions and officials which are introduced. By the "living law" he means the de facto behavior, mores and norms of the people, or at least a majority of the people, quite apart from the positive law. When the positive law is not rooted in the living law, it is Ehrlich's thesis that legal institutions and processes for handling disputes break down.

What this principle means, internationally, is that no positive legal rules or institutions for bringing the settlement of disputes between nations under the rule of law, rather than of force, can be successful unless these positive rules and institutions are rooted in, and are the expression of, the living law of all the major peoples and cultures of the world.

The first task in the attempt to obtain an effective world legal order is to determine the underlying living law of the world's major cultures.

This is an undertaking for which the lawyer and the statesman are quite incompetent. The living law of the diverse cultures of the world can be determined only by a direct scientific study of those cultures, and the science whose business it is to pursue this study is anthropology. Hence the importance of anthropology, and in particular cultural anthropology for world law.

Only certain factors supplied by the science of cultural anthropology are required. These relevant factors become evident when one notes that positive law is concerned always with norms. Positive law always prescribes certain normative rules, statutes or procedures which serve as a normative measuring rod to distinguish the behavior in society which is permissible from that which is not. Law is concerned with the normative factors in cultural and social organization. What the international lawyer needs, therefore, from the anthropologist is the normative factors in the living law of the different peoples of the world. What is wanted from the cultural anthropologist is the living, vital, indigenous ethos that will sustain the international lawyer's positive world law out of, and in accord with, this living ethos.

The positive law which defined these traditional attempts corresponded at most only to the living law ethos of but one culture in the world, the modern French and Anglo-American Western culture. It was little more than a positive law brought into correspondence with the living law of this solitary, relatively small Western culture and then generalized for the rest of the world. By the very nature of the case, such an international law fails to correspond to the plurality of living laws of the other European, Latin American, African, Islamic and Asian cultures of the world and hence, of necessity, must be ineffective.

Having noted that the first step toward an effective world law is the determination through anthropology, and it may be added through sociology, of the living ethos of each of the major cultures and nations of the world, the second task becomes evident. It becomes that of determining the key independent variable or variables in the science of cultural anthropology which, when its values are determined empirically for any specific culture, give us the ethos of that culture. What is this independent variable? The sciences of sociology, anthropology and psychology converge upon the answer to this question. The work of many sociologists,

anthropologists and psychologists could be brought to support the conclusion upon which these sciences converge.

An additional key variable unique to a cultural system is found in the meanings that the people of a culture hold in common and use to conceptualize, order and integrate the raw data of their experience. Because meanings are the key factors, that Sorokin calls this unique causality of cultural science "logico-meaningful causality" **(22).**

The meanings used by a given people to describe, organize and interpret the data of their experience determine the ethos of their culture.

The word "good" is the name for the basic meanings of the hierarchy of all meanings used by a people to conceptualize themselves and their universe. If the basic meanings define the ordering relations of a culture, they automatically define its living law, and the living law of a culture is its ethos. To these basic conceptual meanings the word "good" adds but one thing in addition to its designation of them, i.e., their application to, and use as a measure of, conduct. Ethics is the conceptualization of the data of experience applied.

Even primitive people devoid of a written literature order their relations in terms of their conceptual meanings. Philosophy has this basic significance. Is not the response to stimuli of sex and hungger basic, a mere afterthought. Ideas would be irrelevant in behavior were the neuron of the human nervous system ordered linearly. Then the firing of the sensory neuron by the stimulus would fire the cortical neurons and in turn the motor neuron. Thus the stimulus alone would determine behavior.

Cortical neurons are ordered in a circle to which a sensory neuron comes and from which a motor neuron goes. The impulse produced initially by the stimulus firing the sensory neuron will

be passed continuously around the circle, representing the stimulus that is gone. Philosophy not only can, but must, serve as the normative judge and censor of any stimulus striking a sensory neuron, determining what passes over into overt behavior and what does not. Law and ethics, as grounded in the trapped universals placed at the top of the cortical hierarchy because of their capacity to prepare the human organism for any stimuli hitting it, become intelligible. Neurological and introspective psychology combine to affirm that behavior is a response to ideas found to be basic in remembering, describing and integrating the stimuli, and in enabling one to anticipate tomorrow's stimuli. When many people agree on these basic meanings, there exists a single culture.

Cultural sociology and anthropology and neurological psychology converge upon the conclusion that the way to an effective world law is through philosophical anthropology.

The basic meanings which define the ordering relation or living law ethos of each major people and culture of the world must be determined. This entails a study of their basic philosophical and religious classics. The corresponding positive law for each philosophically defined living law must be made explicit. Only thus will the operational consequences in practice of a given living law cultural ethos become evident; and this necessitates a study of the legal classics and practices.

With this knowledge from philosophical anthropology of the living law and the corresponding positive law of each culture of the world, the international lawyer is able to construct an effective world law. The lawyer does this following Ehrlich's criterion of effectiveness by formulating it so that as far as possible it draws upon, is rooted in, and corresponds to the vital living law norms, or the philosophy, of all peoples and cultures of the world.

SCIENTIFIC METHOD IN SOCIOLOGY OF LAW

In 1960, in his book Philosophical Anthropology and Practical Politics **(23)**, Nothrop synthesizes and systematizes the different ideas so far developed in different contexts to bring them into a coherent formulated method. Sociologists of law have investigated the factor upon which the practical effectiveness of legal and political institutions depends. The sociological jurists' finding is that positive law and politics will be ineffective if the substantive normative prescriptions of the positive legal decisions and political policies are not supported by the living personal morality and customs of a large percentage of the people.

Ehrlich distinguishes between the "positive law" and the "living law." By the former and its "norms for decision," he meant the substantive normative content of the written constitution and the successive statutes of the political government as applied by the legal and political community in question, and as implemented further by policemen. By the living law Ehrlich meant the substantive normative content of the spontaneously held beliefs and social habits and behavior of the people, or what most of them would do normatively even if there were little or no positive law.

The sociological jurists' criterion of effective positive law and practical politics is that the substantive normative content of the positive law and the practical politician's policies must for a considerable short run conform to the living law habits of the majority of people in the community in question.

This sociological criterion of effective positive law and practical politics does not mean that positive law can never succeed in reforming the living law. The anthropologist E.A. Hoebel **(24)** pointed out in his recent study of the comparative living and positive laws of seven different societies, never in any effective legal and political system do the living beliefs and normative

habits of all the people conform to the norms of the positive law. For judicial decisions and political policies to be effective, it is necessary merely that their normative content be that of the living law of a statistically large proportion of the people. Then the morale of the community will sustain the policeman in his legally authorized execution of the courts' judgments. Professor Hoebel emphasizes that when a cultural anthropologist affirms that the legal norms of the people of a particular tribal nation or culture are such and such, he is making a statement which is part qualitative and in part quantitatively statistical. The statement is qualitative in the sense that it describes the substantive content of the positive legal rules that are applied universally to everyone in the legal and political community in question. The statement is quantitatively statistical in the sense that only a statistically large proportion of the people embody these norms in their living beliefs and behavior.

This sociological and anthropological criterion of effective positive law and practical politics does not mean that for a considerable short run newly introduced positive legal and political normative rules and policies cannot succeed, even though the living beliefs and normative social habits of the majority of people in the community in question do not conform to them. To reach such an erroneous conclusion is to overlook the significance of the words "for a considerable short run" in the italicized definition above of the criterion of effective law and politics. What the sociological jurists' criterion does entail in such circumstances is that failure will ensue unless the practical politicians who are persuaded of, and are introducing, the new positive legal and political institutions, use their temporary position in office to educate their people in the basic beliefs and the objective reasons for those beliefs of the new positive legal system, thereby transforming the living law so that in the not too long run it will support the new positive law.

Sociological jurisprudence removes the theoretical misconception which led to take it for granted that (a) international law is meaningless and therefore (b) the attempt to achieve it is

failure. Today's political problems call for the determination of the specific normative content of the living law in any particular nation; the effective implanting of a new positive law in an old living law; the evaluation of what in the old living law is to be retained and what discarded in such reform of an old society. The scientific method for determining the living law in any particular case must be different from the scientific method for evaluating it after it is once determined. The former is called the descriptive method; the latter the evaluative method of philosophical anthropology.

Many social scientists have confused the living law as it is with what they personally think it ought to be. This is why the objective method for describing and the objective method for evaluating the living law of any nation are so important.

Each particular person's normative judgment is important and of the essence in any free society. It counts only as one in the living law and the positive politics of the nation to which he is officially assigned. Law and politics are concerned with the summations and interplay of private norms. Lawyers and politicians must have an objective method for determining the politically significant qualitative sets of norms in their quantitative summations.

Only if an objective description of the living law and positive political norms of each nation is made first, one can not evaluate before one has objective knowledge of what one is evaluating. What is the method for determining the living law of any culture or nation? Ehrlich left the answer to this question in an unsatisfactory state. Law and politics have to do with the intrinsic norms or goal values used by people to order their relations to one another and to nature. Every political constitution or legislative statute specifies certain normative rules or procedures which distinguish the de facto behavior of the people in the nation that is permissible or to be encouraged from that which is prohibited and to be penalized. What the lawyer and politician

need to learn from the social scientist is the independent variable in any society which specifies this normative factor.

This independent variable is never a particular fact in the society in question, such as the physical terrain, the economic instruments, sex, pleasure, climate, hunger, etc. It is the normative "inner order of the associations of human beings." The normative factor in any nation is not any particular fact or class of facts, but the normative relatedness of all its particular people. It is the normative relatedness of these people, as embodied in their living law customs and articulated in their positive, legally defined political ideals and and procedures that is a nation. Hence nations differ from one another as the normative contents of the relatedness of their associations differ from one another.

Since a nation is usually a complex of different homogeneous cultures, this independent variable or set of independent variables will take on different values, each defining a qualitative set of norms for each homogeneous component of the complex culture of any nation.

Causality is the name of the relation between the states of any system of entities as the system changes the inner order of these entities over time. In the systems of inorganic nature this relation is mechanical. Mechanical causality exists only for deductively formulated, indirectly confirmed theories of natural science. From the standpoint of inorganic natural science, the concrete entity of any legal and political system is a particular human being, each with his or her proper name. As a merely bodily human being, each political person is an instance of a concrete mass of Newton's physics. When, in Newton's mechanics, the positions and moment of the concrete masses of any inorganic system are empirically determined at any given moment in time, the inner order or state of that system of concrete entities is specified. Because the causality is mechanical, their future inner order can be predicted if external forces on the system are

negligible. A theory of domestic legal obligation and a foreign policy based on normatively neutral, merely physical power considerations would be appropriate and valid were such the case for political persons and political systems.

It is not the case that the mere specification of the positions of the living human bodies of any nation, considered merely as masses, is either a necessary or a sufficient condition for making determinate the normative political inner order of the associations of the people in that nation. The determination of the common introspected meanings that a statistically large proportion of any nation's people share is essential. Hence, as Sorokin realized, the causality of political and other sociocultural systems is logico-meaningful rather than non-teleologically mechanical.

The inner order of the concrete entities of any sociocultural system is always normative in content; it prescribes an ought-to-be, it is never a merely factual "is." The two independent variables, "position" and "momentum," which suffice to determine the inner order of the concrete entities of any inorganic system are non-normative, hence they are quite incapable of describing an inner order which is normative. For the latter type of concrete entities, ideas, ideals and hence meanings are essential.

THE LOGICO-MEANINGFUL CAUSALITY OF SOCIAL HUMAN SYSTEMS

The point of Sorokin's discovery that the causality of human systems is logico-meaningful amounts to the thesis that the key variable, unique to social systems, is to be found in the set of meanings that the concrete human beings making up any society or culture hold in common and use to describe, order and coordinate the raw data of their experience and to direct their motor behavior normatively. It is because shared meanings are the independent variables defining the inner order or state of any human social or political system that the relation governing

the temporal changes of state in such systems is appropriately called "logico-meaningful causality."

Wherever there are two different homogeneous simple cultures or two different components of a complex culture or nation, the people in these two cultural components or nations are using different sets of basic meanings or concepts to describe, order and anticipate the facts of their experience.

To be objective in political descriptive judgments of any nation or its political leaders, the set of meanings that give the legal and political norms of that particular nation their specific content must be determined.

Any practical politicians who would possess objective knowledge of the positive or living law of any nation must use the descriptive method not merely of anthropology but of philosophical anthropology. People order their relations to one another in terms of a specific set of shared meanings, i.e., their particular philosophy. Kluckhon was able to articulate the positive legal norms of the Navaho and found them to be related essentially to their cognitive natural philosophy. For most people, their own philosophy is not known, and they are unaware of the fundamental role that religious and political ideas play in their behavior. For most people, the norms of their nation or culture not are evident to them. Norms of any culture can be "covert" or "overt." In any person or nation, therefore, an implicit or explicit philosophy is present. Gregory Bateson affirmed that the human individual constantly imposes on his environment his own constructions and meanings and culture as opposed to another. The anthropologist Kluckhon found that every people has its set of postulates from which other propositions in their belief system are deduced or interpreted and evaluated. All cultures containing or influenced by Democritean, Platonic or modern science and philosophy, as well as Stoic Roman contractual

law, think in terms of concepts by postulation which are concepts by intellection; whereas the elaborate scientific, philosophical, legal and political theories of classically oriental peoples and nations contain only the concepts by intuition of either a radically empirical or a naively realistic set of shared meanings.

WHAT IS A NATION?

In Chapter 3 of "The Neurological Epistemic Correlates of Introspected Ideas," Northrop presents an account of McCulloch and Walter Pitt, and Arthur Rosenbleuth, Norber Wiener and Julian Bigelow **(25)** that have been mentioned and explained already. For a proper comprehension of these topics we remit ourselves to that chapter.

The crucial questions are: What is a nation? and What are the concrete entities and events in terms of which the abstract noun "nation" is to be analyzed?

There are no material wires, bones, muscles, or tendons physically connecting all the bodies of individual people in such a manner that if one of the bodies responds in a certain way, the bodies of all the others must do the same. Nevertheless, such a unified response is what occurs when any people form a nation.

Northrop answers the questions in these terms:

> ...a "nation" is a group of concrete, particular human beings who possess in the hierarchically ordered neural nets of their brains a similar set of elmentary trapped impulses (which are the physiological epistemic correlates of consciously or unconsciously memorized elementary ideas and postulates) for firing or inhibiting their motor neurons and thereby mechanically causing a similar cognitive behavioristic living law response to any given stimulus **(26).**

The concreteness of a particular nation finds its unity and the organic tie of its concrete persons in the shared meanings or ideas of its people.

Any idea is elementary if it is used to define other ideas but is not itself defined in terms of other ideas.

Since "philosophy" is the elementary concepts and postulates of any subject matter, a nation is a group of particular persons who have trapped in the reverberating circuits of their brains persisting impulses which are the epistemic correlates of the elementary concepts of a common philosophy to which they have committed themselves and of which they may or may not be conscious.

The criterion of a nation leaves open for the descriptive method to determine in any particular nation the substantive content of its predominant philosophy or its predominant sets of philosophies.

The trapped impulses in the brains of a group of people in a particular nation and the correlation of these impulses with the ideas of their shared national philosophy define the scientific method by means of which the cultural anthropologist or comparative cultural philosopher confirms or disconfirms whether he has found the correct set of postulates for describing the philosophy of that particular nation.

The method of descriptive philosophical anthropology as applied to politics must provide the specific qualitative set of postulates that define a particular nation's most elementary common philosophy; the quantitatively statistical support that each set of principles enjoys and the empirical criteria for confirming that the set has been specified correctly.

The reduction of the abstract noun "nation" to the negative feedback mechanisms of its people and the persisting impulses trapped in the cortical hierarchies of a statistically large proportion of those nervous systems, where the elementary impulses are the physiological correlates of

similar ideas and propositions, enables one to account for why people can respond politically as a national unit even though they are not physically connected to one another by bones, wires, tendons, muscles or other physical tissues.

How can a nation come into being where none existed before? All that is required is that individuals share a common set of ideas and propositions for ordering their relations to one another. Only when the leaders of a people are creating a new nation are they consciously aware of the common philosophy which they use to order themselves legally and politically with respect to one another, thereby giving that nation its special legal and political properties.

Northrop's analytical method explains why one nation can go out of existence to be replaced by a different nation or by two or more different nations when the geographical area, the people's bodies and the military physical power remain constant.

Any person's set of covertly or overtly persisting ideas functions as a censor or conscience determining for any given stimulus what motor, political or other responses are permitted or positively reinforced and what possible motor responses to that stimulus are inhibited. This is why any national people's preponderant common set of "trapped universals" is their normative criterion of the politically good, the legally just, the economically and militarily feasible and the aesthetically beautiful.

In building up methodologically our knowledge of a national society, Northrop advises that we shall take initially a nation as a simple homogeneous case, exactly as in physics when one assumes the ideal gas or the frictionless machine in the statement of empirically verifiable theory. This does not mean to leave out of account the diversity and heterogeneity of ideas and propositional beliefs in the minds of men on the earth's surface, any more than the physicist's theory and method leaves out of account complex gases or friction.

The heterogeneity of beliefs of particular people, groups of people and of nations can be demonstrated. One must begin with the homogeneous case and with the specification of many different homogeneous cases, leaving until later the description of the heterogeneous as the compounding of different, simpler legal, political and national philosophies.

Many social scientists corrupt their descriptive judgments because their descriptive method is so intuitive that they smuggle in evaluative judgments of their own political party or nation or school of "social science" when they are purporting merely to be describing another party or nation. Only if it is made clear and then distinguished from the evaluative method can any social scientist's judgments be based on objective evidence concerning what the other nations or his own nation is, rather than on what he feels or thinks it ought to be.

Any nation or its culture is known only when the complex postulate set which describes the norms of its living and positive law is determined. The descriptive method of philosophical anthropology and its practical politics must include deductive and theoretical as well as inductive procedures. In different nations and cultures the postulate sets are different. In some nations, its postulate set has been found to be composed only of concepts by intuition. In other nations and civilizations, their postulate sets will be found to contain concepts by postulation which are concepts by intellection in epistemic correlation with concepts by intuition. Operational definitions for testing whether one's descriptive method has designated the correct postulate set in describing any particular nation or culture are yet to be developed by cultural anthropologists. Northrop thinks that by interviewing its citizens or by reading the philosophical or other classics of any nation or political party and their positive legal constitutions and consciously expressed political policies, one can determine their respective philosophical assumptions to a first degree of approximation that is sufficient for most practical purposes.

Differences in the kinds and the content of the beliefs in the minds of people are not hereditary. Their physiological correlates may all be personally and culturally trapped or untrapped and changed with appropriate educational techniques. They can be brought out into the open and examined with respect to their cognitive truth or falsity. Many people who previously thought of the sensed and introspected data of their experience only in terms of concepts by intuition have mastered the imageless concepts by postulation of the symbolic logical and axiomatically constructed, deductively formulated mathematical physics. Many modern westerners who think and behave in terms of formal theoretical, scientific and legal constructs are now learning to feel, think and behave from the standpoint of concepts by intuition and the emotive and impressionistically aesthetic component of themselves and of nature.

THE EVALUATIVE METHOD FOR A NATION'S POLITICAL PHILOSOPHY

Any nation's normative political philosophy does not merely conform to what happens pragmatically in practice; it also evaluates it. Political norms measure what happens pragmatically in practice, they do not merely conform completely.

Northrop's evaluative method is two-fold: 1. Assuming the "is" of a particular non-normative theory of factual nature and natural person, considered either merely as introspectively entertained or as its epistemically correlated impulse trapped hierarchically in one's cortex, the theory of Northrop's evaluative method does not define away "ought" in terms of this bare "is;" instead, it defines "ought" as imposing something on this "is," namely, its teleologically mechanical causal efficacy as the inner target of one's public self in prescriptively inhibiting or reenforcing one's motor response to any stimulus of the moment. Since in any simple or complex moral and political goal-value choice, one's de facto behavior is the mechanical product of (a) the attention-absorbing stimuli of the moment and (b) one's covert factual philosophy, i.e., one's epistemically correlated inner target, there is usually a discrepancy between what the target calls

for and what one does. This discrepancy appears in introspective consciousness as conscience and as the existentialist philosopher's and theologian's sense of sin or Sorge. 2. Evaluating the "is" of a particular philosophy of first-order factual nature and natural person, our evaluative method for cognitively determining the truth or falsity of a national political philosophy defines away the "ought" or "ought not" for motor conduct in terms of the "true" or "false" for its epistemological and psychological assumptions as judged by appeal to first-order factual data.

The twofold theoretical distinctions 1 and 2 specify the operational procedures of evaluative method, given any personal ethics with content or any nation's specific, intrinsic, normatively worded political philosophy.

Theoretical principle 1 tells us that to talk about any normative words such as "ought," "ought not," "good," "bad," "politically good," or "politically bad" without specifying the non-normative philosophy of factual nature and natural person for which this specific normative content is the case, is meaningless. Given any national political philosophy of any particular nation, our first operational prescription is to bring out into the open the respective non-normative theory of factual nature and psychological man which each implicitly and frequently explicitly assumes. This is done when the epistemological theory of conceptual meaning and the psychological theory of the factual person are made determinate. Either the epistemological and psychological non-normative premises of the national philosophy in question will be logically inconsistent or consistent. If they are inconsistent, the normative natural philosophy will be demonstrably false in a sense which anyone anywhere can confirm on logical grounds. If they are consistent, theoretical principle 2 must be brought into play. By appeal to the factual data of any person's experience anywhere, it must be determined whether the consistent epistemological and psychological theory in question is confirmed empirically and, if so, whether its assumptions are

not merely necessary but also sufficient to account for all the first-order factual, introspected and sensed data.

To make Northrop's evaluative method clear, let's consider two different non-normative factual psychological theories of the person, T1 and T2. To say that T1 is false is equivalent to finding one fact with respect to conceptual meaning or to the first-order factual theory of any psychological person which is incompatible with some deductive consequence of theory T1. To say that theory T2 is confirmed with a greater degree of probability than is the case with theory T1 is equivalent to saying that T2 accounts for every fact for which T1 accounts and also for at least one such fact for which T1 does not account.

This evaluative method is not merely a standard for measuring traditional moral and political goal-value philosophies and norms of the de facto nations. It also prescribes what to do to determine the ideal nation. Its procedure consists in determining two things: 1. The present epistemological theory of conceptual meaning in factual natural and psychological science, and 2, the present factual psychological theory of the person.

The cognitively testable epistemological theory 1 tells us that any completely known thing is know in two ways which are irreducible the one to the other. And that the relation between two radically empirical and logically realistic components of anything is neither that of causality nor of a predicate to a substance but instead is that of epistemic rules of correspondence which are many-one when the logically realistic object is other than oneself and one-one when it is one's public self. The cognitively testable psychological theory 2 tells us that any human being whatever his or her private self with all its directly known ideas, ideals, frustrations, evaluations and emotions in epistemic correlation with one's public self, which is a nervous system, the inner target of which is a covert or overt philosophy.

This evaluative method takes this epistemological and psychological theory as the cognitive reference for evaluating and reforming the de facto political goal-value ideals of one's own nation or any other nation when those ideals have been correctly described. Because our non-normative epistemological and psychological theory of any factual person is empirically verifiable in a sense which can be confirmed by anyone anywhere who takes the trouble to test it by appeal to the first-order factual data of his immediate experience or who trusts other people called scientists or sages who have the time to do so for him.

THE EPISTEMOLOGICAL THEORY OF SOCIAL SCIENCE

The last systematic fundamental contribution made by Northrop to the social sciences, indirectly concerning sociology, is his Chapter 12 in Cross Cultural Understanding: Epistemology in Anthropology **(27)**, edited by Northrop himself in 1964. The title of this chapter is "Toward A Deductively Formulated and Operationally Verifiable Comparative Cultural Anthropology."

Here Northrop examines the cognitive character of one of the social sciences, in this case anthropology, in the light of his epistemological theory of science. This analysis throws light on the same issue about modern sociology.

> ... It is normal for any Western empirical science to pass through two stages. The first is appropriately called its natural history period; the second, that of deductively formulated theory with its correlated operational definitions. Is cultural anthropology at the transition point?
>
> Its past procedure has been largely inductive, concerned primarily with the observation and description of the data. Its language has been that of the culture of the anthropologists, most of whom have been Westerners. Hence, non-Western as well as Occidental cultures have been described with the two-termed subject-predicate syntax of the Aryan languages. Many languages of other cultures have a different syntax. The mathematical language of deductively formulated physics has a many termed relational structure.

> These considerations raise the question whether even the natural history data can be correctly described unless cultural anthropology passes to the more syntactically and semantically sophisticated stage of deductively formulated theory. **(28)**

In its second stage, the natural history descriptive work continues, but a much more critical and linguistically less naive language and scientific method are introduced for analyzing and describing the natural history data. The aim is to find the minimum number of elementary theoretical concepts and propositional assumptions necessary and sufficient to account for all the observable data. In the natural history stage the quest is for maximal implication, i.e., the largest number of described empirical facts; in the stage of deductively formulated theory, the search is for the minimal theoretical antecedents. In its natural history stage there tend to be as many independent assumptions and propositions in a science as there are naively observed facts. In the stage of deductively formulated theory, all the inductively described natural history facts are first analyzed and then described in terms of the smallest possible number of primitive or undefined concepts and elementary or unproved propositions. The customary name for these elementary assumptions is "postulates." From the primitive concepts all the other concepts of the subject matter are derived by definition; from the postulates all the other propositions, called theorems, are deduced by logical implication. Notwithstanding its minimum elementary assumptions, deductively formulated theory has unique predictive power; whereas natural history science is descriptively verbose and predictively negligible. It includes more and more natural history data in additional branches of science. The fewer and the logically simpler become its theoretical assumptions.

Ordinary language of natural history science is semantically ambiguous. Any of its words has several different epistemological kinds of meaning. This becomes evident when ordinary sentences such as the following appear: "Electrons are pink," "Sweetness is square," and "Consciousness is in the brain." The subject term in each case refers to one epistemological

world of discourse, the predicate term to a different one, and when two words referring to different worlds of discourse are put thus in the same sentence, the result is nonsense. Unfortunately, ordinary language does not have epistemological tags attached to its words. Neither does natural history science in its use of ordinary language. Mature common sense or science begins with the realization that every word of ordinary language is semantically ambiguous, having several species of epistemological meanings. It is necessary to distinguish the several species of semantic or epistemological meanings of any ordinary word from another.

They must use a language different from ordinary language. For ordinary language which, does not distort what the senses give, by leaving the relativity to the observer out of its statements, must be restricted to its radical empirical meaning. However, in this meaning there are no objects invariant for all knowers. Only the invariant language of the symbolic logic of relations and pure mathematics can give the latter kind of objectivity. But such a language describes merely a possible world. To have any relevance for the actual world, some relation must be established between the speculatively discovered, deductively formulated assumptions and unique language of the theoretical scientist and the ordinary language of direct sense awareness in its nominalistic radical empirical meaning. To escape these semantic ambiguities of ordinary language in the natural history stage of any empirical science, epistemology and the shift to speculatively discovered, deductively formulated scientific theory arise together and reenforce one another.

DEDUCTIVELY FORMULATED STATICS AND DYNAMICS

The differences between a deductively formulated statics and dynamics are important. Common to both is the set of undefined concepts and primitive propositions or postulates, together with the derived concepts and theorems of a deductive theory. Common to both also is the state function and its independent variables.

Given also are correlated operational definitions which specify how one experimentally, or observationally, determines the empirical values of the independent variables of the state function of the system in question at any present moment of time. When the deductively formulated theory has achieved merely a statics, the deduced theorems of the theory then enable one to determine, without further observation, what other empirical characteristics the system will have at that particular moment of time. When the postulates of the theory determine the empirical values of the independent variables of the system at a particular moment of time T1, the assumptions of the theory enable one to logically deduce, or mathematically calculate, the empirical values of the system at any past or future moments of time. This is a theoretical dynamics.

This assumes, of course, that the system is an isolated one. Operationally speaking, this means that external influences upon it are either eliminated or kept constant in the experiment in question so that they may be treated as negligible.

In the theoretical dynamics, the strongest possible mechanical causality holds. Stated in terms of chance and its probability, in such causality, the theoretical concept of probability enters neither into the temporal relation between the states of a system at different times nor into the state function itself. Probability is present only under the name of "the theory of errors," on the epistemically correlated operational side.

Theoretically, the concept of probability does not appear in either the postulates or deduced theorems of the deductively formulated theory.

In order to describe correctly even the natural history data of a particular people and culture, one cannot use the unconsciously assumed descriptive concepts and elementary assumptions of the anthropologist's own culture. To this it needs to be added that neither can one use the

concepts of some Western school of social science or psychiatry. Instead, one must think about and describe everything that one sees and hears in terms of the way the people in that culture think about it and describe it. In the case of most people, especially if their culture is an old one, their cultural philosophy is subconscious and covert to an extent that they may think they have no philosophy.

The use, therefore, of Western ordinary language to describe the philosophical mentality of people in a non-Western culture tells us little about the mentality of the latter unless the anthropologist goes on to specify theoretically the various possible epistemological meanings his ordinary language may have and then uses operational tests in the field, epistemically correlated with these different meanings of any ordinary word, to determine which epistemological way of thinking is that of the people in the culture in question.

The use of a postulate set is not to be confused with the achievement of a cultural anthropology that has arrived at the stage of logically realistic, deductively formulated theory. This becomes evident when one notes that anthropologists were merely attempting to observe and describe the natural history data of their science by means of ordinary language. The task of finding the minimum set of elemental theoretical concepts, within which the natural history postulate sets for all the different cultures fall as special cases, begins after the natural history descriptive task has been completed. It begins only when one realizes that the ordinary language used in the natural history postulate set for describing a particular culture is epistemologically ambiguous and often "objectively" misleading to the point of producing what Einstein calls "muddles" (29), and one then proceeds to introduce the epistemologically more precise language and scientific method necessary to prevent the natural history scientists from misrepresenting the observed facts in the very act of stating what they are.

The linguistic difference between the language of an empirical science in the mature stage of deductively formulated theory and ordinary linguistic postulate sets of the natural history stage are syntactical, semantic, and interconnective. Syntactically, the language of deductively formulated theory is imageless and many-termed relational, whereas that of the natural history stage, especially for all scientists of Aryan linguistic cultures, is sensuously imageful with a two-termed subject-predicate grammar. Semantically, ordinary language is ambiguous. The language of deductively formulated theory is an epistemic correlation of ordinary language in one of its three possible semantic meanings with the many-termed relational syntactic language of the symbolic logic of relations and pure mathematics as its linguistic instrument.

"Deductions" from the postulates in the case of the ordinary language of natural history science are usually more emotive and intuitive; whereas, in the mathematical or symbolic logical language, the deduction of theorems and predicted observable data is more mathematically and logically rigorous. Any mature theoretical statics or dynamics also describes a disjunctively related set of all formally possible worlds within which the empirical subject matter of the science in question falls as one species.

> The task of the empirical cultural anthropologist, therefore, who would take his subject matter, from the natural history stage of its description with ordinary language, to the mature stage of deductively formulated theory, consists in finding the minimal set of theoretical possibles (corresponding to the possible worlds of the pure mathematician) within which the ambiguous ordinary linguistically described postulate set for the philosophical mentality of the people of a particular culture falls as one, or a compound of several, of the possibles. Is there any clue as to what the elemental theoretical possibles of the cultural anthropologist might be?
>
> The aforementioned semantic ambiguities in ordinary language suggest the answer. Since what any person can mean the ideas in his mind or the symbols of communication in his culture is, of necessity, a function of where he thinks all ideas and symbols get their meaning, it follows that we will have the elemental

> theoretical possibles of cultural anthropology if we distinguish the major species of epistemologically meaningful ideas. This amounts to the thesis that whereas in the natural sciences it is the symbolic logic of many-termed relations and pure mathematics that defines the theoretical possibles, in the cultural sciences it is epistemology.
>
> To this end, four things must be specified: 1. The major possible sources and types of meaning which any symbol of ordinary language may have. 2. The source and type of meaning which the imageless, many-termed relational symbols of mature, deductively formulated knowledge in natural science possess. 3. Operational tests to be used in the field which will enable the cultural anthropologist to determine whether the people in question think with symbols of one species of epistemological meaning or another or with combinations of two or more kinds of epistemological meaning. 4. Analysis within any epistemological species of culture to determine which factors, given in that mode of knowing, are taken as elementary or primitive by the people in question, and which are derivative, either rigorously or emotively, as the case may be. This permits countless different cultural philosophies within cultures of the same epistemological species. **(30)**

The important thing to note about knowledge is that it is capable of being in error. This entails that science involves more than facts, since facts merely are neither true nor false, good nor bad. Facts cannot be in error. Only a proposition about facts, which is the causal effect of belief in a proposition which may be empirically confirmed to be true or false, can be meaningfully said to be in error.

Propositions are composed of terms, and the syntax by means of which the terms are related and given their meanings. The epistemological possibles become evident when the different possible ways in which ideas or symbols get their meaning are specified.

Epistemic correlations relate logically realistic directly unobservable concepts by intellection to radically empirical, immediately experienced data, which is described best by the more nonsyntactical, pointing, and pictographic languages of non-Aryan cultures, and by ordinary Aryan language in its nominalistic, semantic reference, with the distortions of its subject-predicate syntax eliminated.

To describe the world's traditional and present cultures, correctly diagnose the schizophrenic personal and social conflicts which arise when incompatible universals and their cultural values are in the same person's brain and make scientific contribution to the resolution of these conflicts, three things are necessary. Anthropologists must become clear on the differences between the radically empirical, the naive realistic, and the logically realistic meanings of any idea or symbol.

THE LOGIC OF THE SOCIOLOGY OF KNOWLEDGE

In the introduction to the book The Sociology of Knowledge by Jacques J. Maquet (31), published in 1951, Northrop refers to the fundamental questions at the base of the sociology of knowledge. For Northrop, the problem of sociology of knowledge is that of the relations between the facts of social existence and the ideas making up human knowledge. There are several positions frequently taken upon this issue. 1. The idea that the

solution of the problems of peace and the causes of war center in economic factors. 2. Ideas of men are but afterthoughts, merely rationalizing the group interests, the class aims or the focus of power politics which supposedly determine the beliefs and the behavior of men, both as individuals and as groups. 3. The ideas of men but reflect the facts or forces of a unique future which will succeed the present culture in an inevitable manner.

The inquiry that deals with these matters is the sociology of knowledge. It involves three factors: the conditioning of social facts, the ideas making up human knowledge, which are conditioned, and the relation joining the former factor to the latter.

The investigation of this problem involves asking of any given social theory: What are the conditioning social factors. Are they purely economic, physical circumstances such as climate or national resources, or are they the military establishments? What are the ideas conditioned?

Is every idea in human knowledge conditioned by sociocultural facts or are merely some? Which ones? What is the precise nature of the relation by means of which the facts of social existence determine the ideas of human knowledge? Completely deterministic relation, such as that of rigorous cause and effect between the states of physical systems at different times in mathematical physics or such as the formal relation of logical implication? Is it the weaker form of causal relation as designated by Mill's methods? Mere compatibility and harmony?

This inquiry requires the specification of a method: the purely inductive method of the historian by noting temporal sequences. The difficulty to be solved here is the finding of a ground principle to decide which among the infinitive historical facts are those relevant to the inquiry. Another fundamental question is if the asserted determination of human knowledge by social existence is a determination which operates only in one direction. Is this relation of determination nonsymmetrical? Is it the case that the facts of social existence determine ideas, and that ideas never determine the facts of social existence?

It is also very important to have a precise definition of the sociology of knowledge. One definition conceives it as the study of the relationship between society and mental productions. This definition leaves the question open as to whether the relation of determination between social facts and human ideas operates only in one direction. Another definition conceives it as the consideration of "mental productions in so far as they are influenced by social factors." This definition leaves the question restricted to the influence from society upon the ideas. If one takes the more restricted, traditional definition, then one can draw from it only very restricted and partial conclusions concerning the implications of the sociology of knowledge for the philosophical theory of knowledge. If one defines the sociology of knowledge as an inquiry into the determination of human ideas by social existence, all that one can possibly conclude is that sometimes social existence determines ideas. **(32)**

The inquiry of sociology of knowledge makes relevant the definition of culture. There is a fundamental difference between the biological organization of society and its cultural or social organization. Biological social organization and behavior are the organization and behavior which result solely from the genetical inheritance of the material bodies of the people in society and the effect upon these bodies of external stimuli. Cultural and social organization is built on top of this. The fundamental differentiating factors are symbols and learned behavior in response to social symbols. This appears in the definition of culture as socially learned behavior. These symbols, which are stimuli standing for factors other than themselves, have an intentional meaning. Since culture is learned behavior toward symbols, and since learned behavior conditioned to a symbol always involves a stimulus taken as an idea referring to something other than the stimulus itself, it follows that culture is learned ideas embodied in individual behavior. (33)

NOTES

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(26) Filmer Northrop. Philosophical Anthropology... Op. cit., p. 77.

(27) Filmer Northrop. Cross Cultural Understanding: Epistemology In Anthropology. N. Y. Harper and Row. 1964.

(28) Ibid., p. 194.

(29) Albert Einstein. The World As I See It. Covici Friede, N. Y. 1934, p. 60.

(30) Filmer Northrop. Op. cit., p. 205.

(31) Filmer Northrop. "Concerning The Sociology Of Knowledge" in The Sociology Of Knowledge by Jacques J. Maquet. Boston: The Beacon Press, 1951.

(32) See Northrop. "Ideological Man In His Relation To Scientifically Known Natural Man" In "Ideological Differences And World Order", Chap. XIX. Also Northrop, "The Neurological And Behavioristic Psychological Basis For The Ordering Of Society By Means Of Ideas" 107 Science, No. 2782, pp. 411-417.

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V. CONCLUSION

1.The fundamental requirement for a cognitively meaningful knowledge of the social phenomena is a clear understanding of the problem subject matter of the sociological inquiry.

2.Filmer S.C. Northrop has formalized a logic for the sociology of interpersonal social relations. This logic extends the epistemology and scientific methods of mathematical physical entities to individual persons, while also adding an intentional logic for human meaning and intentions.

3.The analysis by Northrop of the subject matter and method of natural science has made evident:ive notion of fact;

a. the different senses of the word "fact". The necessity of a precise cognitive notion of fact;

b. the precise definition of "objectivity" in terms of the notion of fact;

c.the stages of any scientific inquiry;

d.the necessity of a preliminary philosophical analysis of the subject matter in order to determine the kind of facts one must possess in order to understand them.

e. the epistemological and ontological character of the human person as knower; and

f. the interrelationship between the type of method and the nature of the problem subject matter of

4. The analysis of natural science led Northrop to this particular relationship between the stages of inquiry and types of concepts:

STAGE	NATURAL HISTORY	DEDUCTIVELY FORMULATED THEORY	
		ABSTRACTIV	HYPOTHETIC
Initial entities	"Pure fact" (the differenciated aesthetic continuum) directly sensed; yields with inferred knowledge "Description fact" and common-sensed objects and relations	Postulated common-sensed entities and relations; that can later be directly sensed	Postulated scientific entities and relations; that can never be directly sensed and cannot always be imaginated
Procedure	Observations of facts. Descriptions and classification. Baconian inductive generalization	Especification of postulated. Logical deduction of theorems. Verification of theorems	
Concepts	Generalization deal with "concepts by inspection"	Theorems deal with concepts by inspection	Theorems deal with "concepts by imagination,"or "concepts by intellection
Relations	Relations of identity	Relations of "epistemic correlation." Joins "concepts by inspection" To "concepts by imagination or by intellection" by means of operational definition	

5. Scientific inquiry starts with the a priori problematic situation to be solved or answered a posteriori. In social phenomena there are two types of problematic situations:

A. The factual problem involving knowledge about what is in fact the case.

B. The normative problem involving knowledge about what ought to be the case.

This implies two main fields for sociology:

I. Sociology of the social factual problematic situation.

II. Sociology of the social normative problematic situation.

The sociology of the factual social field requires factual social theories. These social theories follow two stages of development: Natural History stage and Deductively Formulated Theory stage.

The sociology corresponding to the natural history stage involves factual social theory whose fundamental primitive concepts and initial entities are concepts by intuition, whose meaning is given by the deliverance of the senses. Its subject matter is social man as part of the "Pure Fact," the differentiated aesthetic continuum, directly sensed. It yields inferred knowledge "described fact" and common sense objects and relations. Its procedures are the observation of facts, description and classification, and Baconian inductive generalizations.

The sociology corresponding to the deductively formulated theory stage involves factual social theory whose fundamental concepts and initial entities are concepts by postulation, such that the procedures of specification of postulates and the logical deduction of theorems are logical. Some of these theorems deal with two types of concepts:

a. Concepts by inspection that postulate entities and relations that can be directly sensed; and

b. Concepts by imagination or concepts by intellection that postulate scientific entities and relations that can never be directly sensed and cannot always be imagined.

Both types of social theories prescribe different logics of verification.

1. In the case of the social problematic situation which initiates the inquiry, its factual problem about the "Is" or actual social state of affairs can be solved by identifying the concepts by postulation with directly inspectable social data denoted by concepts by intuition. Then the primitive elementary postulates are directly verifiable.

The knowledge of the "is" or actual social state of affairs at different times, t_1, t_2, t_n, from the known state of affairs or social system properties to time to, requires the appeal to hypothetically designated unobservable entities and relations.

Since the social problem in question can be solved only by regarding unobservable entities and relations as the basic factors in one's subject matter, and the postulates are restricted to the designation of these basic unobservable factors, the only possible verification must be indirect by way of the theorems.

For theoretical social dynamics, it is necessary to use unobservable entities and relations, and it's required that the factors defining the state of the system at any time obey conservation laws: factors must be constant along time.

The verification of deductively theoretically formulated factual sociology entails the relating of the unobservable factors to the directly observable data. This relation is one of epistemic correlation. The task of the sociologist dealing with this portion of sociological knowledge is:

1. To specify the problematic situation.

2. To relate the natural history social data to the results of the analysis of the problem and to find those facts relevant to the inquiry.

3. To relate the relevant facts to the problematic situation in order to see if it is solved.

4. If it is not resolved, to postulate unobservable entities and relations and derive theorems and hypothetic judgments, specifying the epistemic correlations necessary for the empirical verification; to see if the problematic situation is solved.

The sociology of the social normative problematic situation requires normative social theories. These normative social theories:

a. Differ totally or partially from what is in fact actually the case of social phenomena, and

b. Postulate what ought to be the future factual case of social affairs

1. To the normative and legal social system of power, and

2. To the metaphysical question about the idea of the good that set the pattern and source of evaluation of value sociocultural system.

The sociology of the relationship between the socio cultural values shared by the social members of the group and their factual observable and spectable behavior involves factual social theory specifying the relationship between a) the basic symbolically given unobservable philosophic principles of a culture, b) the substantive normative prescription of the positive legal decisions and political policies, and c) the support of them by the living observable moral and customary behavior by the people.

Only by such a unitary theory of social action can sociology produce the kind of social knowledge and consciousness necessary to understand complex modern social problems with cognitive scope and value.

6. There is an epistemic correlation relationship between the person as immediately apprehended as an association and continuous sequence of sensory aesthetic qualities denoted by concepts by intuition and the person as theoretically conceived as a neurological physiochemical system designated by concepts by postulations.

The complete person in his or her unity comprises these two aesthetic and theoretic components joined by the two-termed relation of epistemic correlation.

7.Human behavior is conditioned by neurological processes. Cultural institutions are, in part at least, the result of human behavior.

The human nervous system is identical for any culture. Any conclusions which we reach concerning the relation of ideas to nervous systems will hold for any people in any culture.

Human beings in society react to:

a.Natural events that are particulars given just once;

b. Symbols socially conditioned which keep their meaning by persisting for long periods of time.

These symbols are particulars embodying univesals.

Social behavior implies a relationship between the processes of biological systems and the responses of people to particulars which embody universals.

Social institutions embody normative social theories. Normative social theories are a cultural factor in the ordering of social phenomena. Normative theories are universals.

A normative social theory serves as an end, goal or purpose in the behavior of people under the influence of these specific normative beliefs.

Social behavior implies a relation between normatively defined purposes and biological systems.

The human nervous system is a mechanical system in which the behavior of the system is controlled by a negative feedback over the goal.

Goals can be:

I.Some immediately apprehended particular enjoyed aesthetically or used empirically to check a scientific theory of nature

II . Some attempt to make the world conform to:

a. the theory of natural science (engineering); or

b. the normative theory of social science (education, religious conversion, new legislation, social reform).

In case I, data from outside the organism coming through the sense organs of the scientist either:

a. correspond to what the deductively formulated theory states in terms of universals

or

b.do not correspond

If a), then the natural scientist, for the particular investigation in question, has reached his goal.

If b), the information data feedback through the sense organs to the scientist forces him to reconstruct the postulates of his scientific theory, he may have to draw upon new reverberating circuits with their quite different universals or basic scientific concepts.

In Case II, the accepted normative social theory defines the goal, rather than the empirical social facts given through the senses.

The negative feedback comes from the normative theory itself to the motor neurons prescribing that the individual organism's behavior conforms to the prescription of the norm.

Censorship of personal and social norms arises. The prescriptions of an ideology for a given society operate through familial, educational, religious, commercial, legal, military, and political institutions and processes to mold what is the case in social institutions and behavior, toward what ought to be.

The sociological notion of "group" or "society" is meaningful as far as it specifies what are the concrete entities and events in terms of which any abstract noun as "society," "group," "nation," "empire," etc., is to be analyzed.

A social group is any set of concrete particular human beings who possess in the hierarchically ordered neural nets of their brains a similar set of elementary trapped impulses, which are the physiological epistemic correlates of consciously or unconsciously memorized elementary ideas and postulates for firing or inhibiting their motor neurons and thereby mechanically causing a similar cognitive behavioristic living law response to any given stimulus.

What is trapped is an impulse that is passed around a circular neural net or some neural physiological formal equivalent of such a persisting impulse.

The entire hierarchically ordered system of such neurophysiological surrogates of a person's immediately conscious or covertly retained ideas is not directly sensed.

The existence of these entities is known only by theoretically constructed imageless theory confirmed by way of epistemic correlations or epistemic rules of correspondence with the directly experienced meanings, ideas and other data of awareness and introspected consciousness that are denoted by concepts by intuition.

The relation of unity and organic ties of the persons of any particular nation is concretized in the high frequency state of shared meanings or ideas (covert or overt) of its people.

A legal and political nation is a group of particular persons located in the public space-time of nature, each with a minimalistic proper name, who have trapped in the hierarchically ordered reverberating circuits of their brains persisting impulses or their formal, analytic, physiological equivalents which are the concepts to which they have committed themselves and of which they may or not be introspectively conscious.

It is clear, after this thorough analysis of Northrop's epistemological approach to cognitively meaningful knowledge of social behavior, that the philosopher does not provide any theoretical methodological sociology. It is not the case that Northrop has postulated a "sociological model" comparable with Parson's "social system," or an alternative theoretical doctrine similar to his "social action." Northrop criticizes further development of Hegelian philosophy by Parsonian and Marxist sociological doctrines, which are two versions of a confusion between factual social theory and normative social theory.

Professor Sariola, the director of this dissertation, considered that I should reassess modern sociology in the light of Northrop's work. Professor Sariola gave his advice in a letter dated Feb. 22, 1978, in which he wrote the following: The issue is likely to become thorny on these points, because we are conditioned into thinking in terms of actors acting within a system frame, and this terminology is not exactly Northrop's.

But you can be assured that we will have an open mind and a good will to see that a philosopher's interest is rightfully reconciled with a sociologist's. I personally believe that in the history of philosophy and social science, Hegel marks the transition from the philosophical attempt to comprehend the universe within a single "mind" to the sociological attempt to break down the mind-universe into segments, and that consequently most of the misunderstandings between philosophers and sociologists may best be solved by finding a common ground in the Hegelian sythesis. This of course in no way distracts from Northrop's contribution, but it may help you in your attempt to make Northrop meaningful in sociology. Perhaps Northrop could best be understood through Hegel, who was the one "ancestor" whom both the philosophers and the sociologists have in common."

In response to that suggestion, this author contends that Northrop did not provide a criticism of current Parsonian or Marxist sociological models. He did not postulate an alternative sociological model either. His contribution is rather an epistemological analysis of the cognitive foundations, requirements and basic theoretical concepts at the basis of sociological inquiry.

His most important contribution was to make clear the cognitive consequences of building a deductive scientific theory of social human behavior from specific primitive concepts in order to derive deductively logically connected theorems involving concepts inductively observable through methodological operations. It is not just a criticism of Pareto's, Parsons' or Marx's sociological theories. It was an analysis of those specific practical sociological works, combined with an epistemological theory, which lead Northrop to bring into the open the cognitive problems and possible solutions of theory construction and empirical methodological verification faced by the modern scientifically minded sociologists.

Northrop performed a unique service to sociologists, calling their intellectual attention to important issues often neglected or ignored. Such is the case of the notion of concept in logical common sense and rigorous scientific discourse, the distinction between factual and normative social theory, and the contribution of modern neurocybernetic, neurophysiological and psychological cognitive sciences to a theory of knowledge. Northrop proves that all these apparently unconnected fields are components to take into account in a general theory of social behavior.

In the light of Northrop's analysis, the task is not to save a particular sociological theoretical model and its correspondent technical vocabulary. The goal is to consider any model in terms of the epistemological cognitive requirements in order to see if it stands by itself or requires a reformulation.

This dissertation is a valid contribution to sociology not because it provides new specific items to a particular theoretical model, a methodological research operation or to a set of substantive empirical data. Its relevance and usefulness for sociology is at a different level. It provides a rigorous synthetic presentation of Northrop's epistemological criteria to evaluate theories, methods and empirical preferences of followers and often too passionate objections from critics.

It is cognitively productive for the sociologist to have a clear idea of what he or she is doing from the wider point of view of knowledge. We sociologists are workers in a small portion of human knowledge. It is our duty to make sure we are making a legitimate contribution to scientific knowledge. In order to do that we need a body of philosophically grounded and scientifically oriented epistemology. This is what F.S.C. Northrop has provided in his prodigiously rich and profound work. If this author has not been able to put together the complex elements of his thought, it is my personal limitation coming forth, not his.

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