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## How Do You Know That You Know Anything?

*An advanced course in Modern Scientific Method is required of graduate Fellows in their second year at the Institute. The following article is part of the study assignment for the first seminar meeting of this course.*

By the time they have become graduate students, many individuals have some reason to believe that they know a great deal. Nevertheless, few even among those who are teaching such students are able to describe coherently and consistently how anyone knows that he knows anything. Therefore, we propose to begin with this question: How do you know that you know anything?

Your first reply may be that you have devoted many years to acquiring knowledge, that you have demonstrated to the satisfaction of many teachers that you have acquired knowledge, and that there is no doubt in your mind that you know what you know. In short, you are convinced that your own confidence in the knowledge you have acquired is a sufficient guarantee that you know what you know.

If such is your answer, your present inquisitor then suggests that it raises at least two more questions. The first is, What is knowledge?

Philosophers have been busy for at least 2,000 years in an attempt to answer this question. Those in one branch of philosophy, epistemology, have given this problem their primary attention for many centuries. Unfortunately, they have not yet been able to agree on an answer; and few even agree on the usage of words in which they endeavor to state the answer. Dewey and Bentley offer this comment† about "knowledge": "In current employment this word is too wide and vague to be a name of anything in particular. The butterfly 'knows' how

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† John Dewey and Arthur F. Bentley, *Knowing and the Known*, Boston, Beacon Press, 1949, p. 296.

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to mate, presumably without learning; the dog 'knows' its master through learning; man 'knows' through learning how to do an immense number of things in the way of arts or abilities; he also 'knows' physics, and 'knows' mathematics; he knows *that, what, and how*. It should require only a moderate acquaintance with philosophical literature to observe that the vagueness and ambiguity of the word 'knowledge' accounts for a large number of the traditional 'problems' called the *problem of knowledge*. The issues that must be faced before firm use is gained are: Does the word 'knowledge' indicate something the organism possesses or produces? Or does it indicate something the organism confronts or with which it comes into contact? Can either of these viewpoints be coherently maintained? If not, what change in preliminary description must be sought?"

For the purposes of the discussion at this stage we accept this quoted comment at face value and note that how one knows what he knows is a more complicated matter than it first appears. If firm, consistent, and coherent use of the name "knowledge" has not been achieved by the eminent philosophers who have devoted their lives to studying epistemology, or the science of knowledge, we are perhaps justified in not attempting to use the word further in this discussion.

We turn now to a second question raised by your supposed answer to our basic question. To what extent is your confidence that you know something a sufficient guarantee that you know anything?

Many people who demonstrably do not know what they are talking about are supremely confident that they know what they know. Every hospital for psychopathic disorders has such patients; and who does not have acquaintances, not as yet incarcerated, who are similarly confident that they know what others believe no one can know. Consider also the knowing behavior characteristic of primitive peoples and even of people in an advanced stage of civilization whose knowing reflects views, religious views perhaps, at variance with your own; you probably believe that they obviously do not know what they are so confident they do know. Our own forefathers knew that some people were witches, knew this well enough to hang or burn the supposed offenders; yet we today assert that, in spite of their great confidence, our forefathers didn't know what they thought they knew.

These considerations suggest that a mere superabundance of confidence in what one knows is not a sufficient justification for knowing that one knows it.

## SCIENTISTS' METHODS OF INQUIRY

Evidently, in order to answer the basic question, How do you know that you know anything?, we shall have to inquire into the matter more adequately than have innumerable philosophers in the past. Such an

inquiry would seem to require the best methods that we can discover if the results are to be useful. Presumably, the best methods of inquiry thus far developed are those used by inquirers who have demonstrated their ability to succeed most consistently in the past. Such successful inquirers are the scientists who have been responsible for the great advances in the physical, physiological, and behavioral sciences.

We turn our attention to successful scientific inquiries and ask these questions: (1) What do scientists accomplish? and (2) How do they conduct their inquiries?

Scientists, when they are successful in their inquiries into problematic situations, derive what are called warranted assertions. These are of the general form, "if this, then that." If you mix hydrogen and oxygen under certain conditions, then they will combine to form water. If childbirth occurs under unsanitary conditions and certain bacteria are present, then puerperal fever probably will result. If you drop from an airplane enough leaflets containing information of interest to a population below, then one can safely assume that most of the population will have received the information within a specified number of hours. In other words, successful scientists are able to describe what usually happens under certain conditions.

How do scientists reach such conclusions as those described above? At this point we may summarize the methods scientists use. Scientists search for similarities (or uniformities) and differences of relations among things and events. The details of the procedures used in conducting this search, or research, vary enormously, and the instrumental means of facilitating the research also vary greatly. Nevertheless, such a summary description of how scientists inquire into problematic situations will serve our present purpose.

The problematic situation with which we now are concerned has been indicated by the question, How do you know that you know anything? In attempting to inquire into this problem, if we wish to apply the methods used by successful scientists, we should seek similarities and differences among the things and events apparently concerned with knowing behavior. As is the situation with most research, we may not know initially what things and events are pertinent to the inquiry, but we make a beginning as best we can.

In view of the inability to achieve agreed-upon warranted assertions that has characterized the work of epistemologists for centuries, we obviously should be on guard against the most common pitfalls. Many of these, perhaps all, have been semantic boobytraps. Consequently, we shall attempt to achieve firm, coherent, and consistent naming of whatever we are talking about.

We begin with the vast universe of the world, sun, stars, and all that we can see, smell, taste, hear, and feel. We wish to talk about the sum total of such things without repeatedly having to describe them in

detail. For that purpose we need a short name, and we select "cosmos." This name is applied to the universe as a whole system including the speaking-naming thing who uses the name.

Next we differentiate (or note the differences) among the vast number of things in the cosmos and select for naming the living things; for these we choose the name "organism." Note that selecting for naming does not imply detaching the physical thing from the cosmos. Everything named remains a part of cosmos with innumerable relations to other parts.

Among the organisms, we further differentiate for the purpose of the present discussion and select for naming ourselves, our ancestors, and our progeny; these we name "man."

We then observe the transactions of man with the remainder of cosmos and note the transactions named "eating," "breathing," etc. Among the numerous transactions, we differentiate further and select for naming those transactions typical of man but not characteristic of other organisms. These transactions we name "behavior" with the understanding that we refer to human behavior unless otherwise indicated.

### SIGN PROCESS

This kind of behavior involves processes of a kind such that something stands for or refers to something else. This process we name "sign behavior," or simply "sign." Note that "sign" is not the name of the thing that stands for something else; "sign" is the name of the transaction as a whole, that is, "sign" is the short name for "sign process." Sign or sign process is the type of organism-environmental transaction that distinguishes a behavioral from a physiological process, a behavior transaction from a transaction such as eating, digesting, seeing, etc.

Sign process in evolutionary development has progressed through the following still-existing stages:

- a. The signaling or perceptive-manipulative stage of sign in transactions such as beckoning, whistling, etc.
- b. The naming stage used generally in speaking and writing.
- c. The symboling stage as used in mathematics.

Note: Border regions remain to be explored and characterized (i.e., tentatively named).

Focusing our attention now on the naming stage of sign process, we choose to name it "designation." Designation always is behavior, an organism-environmental transaction typical only of man in the cosmos. Designation includes:

1. The earliest stage of designation or naming in the evolutionary scale, which we shall name "cue." "Cue, as primitive naming, is so

close to the situation of its origin that at times it enters almost as if a signal itself. Face-to-face perceptive situations are characteristic of its type of locus. It may include cry, expletive, or other single-word sentences, or any onomatopoeic utterance; and in fully developed language it may appear as an interjection, exclamation, abbreviated utterance, or other casually practical communicative convenience."<sup>‡</sup>

2. A more advanced level of designation or naming in the evolutionary scale, which we shall name "characterization." This name applies to the everyday use of words, usage reasonably adequate for many practical purposes of life.

3. The, at present, farthest advanced level of designation, which we shall name "specification." This name applies to the highly developed naming behavior best exhibited in modern scientific inquiry. Specification requires freedom from the deceptive use of the form of syllogism commonly known as Aristotelian.

For the purpose of economizing words in discourse, we need a general name for the bits and pieces of cosmos differentiated and named. For this general name we choose "fact." Fact may be described as the cosmos in course of being known through naming by man (he himself being among its aspects) in a sufficiently developed statement to exhibit temporal and spatial localizations. Fact includes all namings-named durationally and extensionally spread; it is not limited to what is known to, and named by, any one man at any moment or even in his lifetime.

Frequently, we have need to discuss a limited range of fact where our attention is focused for the time being. For this we choose the name "situation." This is the blanket name for those facts localized in time and space for our immediate attention.

Within a situation we frequently have occasion to refer to durational changes among facts. For these we choose the name "events."

Finally, in discussing events we usually have occasion to refer to aspects of the fact involved that are least vague or more firmly determined and more accurately specified. For those we choose the name "object." Object is differentiated from event in being more accurately specified; it is subject matter of inquiry insofar as it has reached an orderly and settled form.

Further tentative comments on sign process may be helpful. The transition from sign process at the perceptive-manipulative stage (here designated signaling) to the initial naming stage (designated cueing) is a change from the simplest attention-getting procedures, by evolutionary stages, to a somewhat more complex sign process that begins to describe things and events. No clear line of demarcation is found.

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<sup>‡</sup> *Ibid.*, p. 157.

Some perceptive-manipulative signalings as well as primitive word cues are more descriptive than simple alerting behavior.

The transition from cueing to characterizing also reflects evolutionary development with increasing complexity of process including formal grammar, etc.

And the further transition from characterizing to specifying in the manner of modern science reflects the further evolutionary development of sign process, a still more complicated procedure.

At first thought the stage we have here designated *symboling* may seem to be a marked departure from, or to reflect a break in, the evolutionary development of sign process. However, mathematical symboling may be considered a shorthand means of specifying. Each symbol replaces one or more words. A single mathematical equation may replace a long and involved sentence, even a paragraph, or a longer description in words.

Thus sign process in its evolutionary progress to date may be described as the efforts of man to communicate: first by simple perceptive-manipulative processes; then by verbal processes of increasing complexity, until this increasing complexity of verbal procedure became so much of a barrier to further progress that a shorthand system was devised in order to facilitate further communication. This shorthand system has been most extensively developed in mathematical symboling.

#### A SUGGESTED HYPOTHESIS

Returning now to our basic inquiry, we suggest a notion or hypothesis about knowing as human behavior: knowing may be described as awareness of similarities and differences in relations among things and events. Like all scientific hypotheses, this notion is not a conclusion or warranted assertion but a summary description of where we have decided to focus our attention for further research. Thus a baby may be said to know its mother when, after experience in noting similarities and differences, the infant differentiates and notes similarities sufficiently to identify its mother. The stages of this process are more prolonged than most of us are able to remember. An infant requires days, apparently, to differentiate between light and darkness, more days slowly to differentiate among the innumerable things from which light rays impinge on his retina, and many more days in which gradually to increase awareness of similarities and differences among the objects (including perhaps sound waves) in its environment before mother is known more definitely than as a source of comforting warmth and necessary food.

The range from such simple knowing as that just described to the far more complex knowing evidenced by the graduate student who successfully passes the general examination for his Ph.D. is great

indeed. Nevertheless, we suggest that knowing behavior throughout this great range can be described by the hypothesis adopted.

In our study of modern scientific method, we shall investigate human knowing behaviors as we find them in the 20th century and as we find them recorded for earlier periods. The purpose of this research is to explore the usefulness of the hypothesis offered in order to ascertain whether or not and to what extent, if any, it may be useful in describing the knowing behaviors of men.

In the course of this research we propose to avoid, insofar as we can, all preconceptions about "knowledge," all the semantic swamps in which countless generations of philosophers have been lost, and all suppositions about man as a knower. We propose to investigate knowing behavior as a natural process in a natural world, as natural as the digestive processes in organisms or the chemical and other processes studied by the physical and physiological scientists.

In advance of inquiry we cannot pretend to know what the outcome will be. Our principal hypothesis may prove to be useless, or it may be modifiable so that it can serve the needs of further inquiry, or it may prove to be useful in the sense that, until something better is developed, it will serve as a recorded description of part of man's knowing behavior.

As is noted at the beginning of the foregoing article, "How Do You Know That You Know Anything" is discussed in the first seminar meeting of the Institute's graduate course in Modern Scientific Method. The seminars are being conducted at the beginning of this academic year by E. C. Harwood, Director of the Institute, and in later months will be conducted by Dr. George A. Lundberg, formerly head of the Department of Sociology at the University of Washington and by Dr. Stuart C. Dodd, who is presently on sabbatical leave from the University of Washington.

The principal reference works used in the course are: John Dewey and Arthur F. Bentley, *Knowing and the Known*, Boston, Beacon Press, 1949; George A. Lundberg, *Can Science Save Us?*, New York, Longmans, Green and Company, 1961; and John Dewey, *Logic, The Theory of Inquiry*, New York, Henry Holt and Company, 1938. These are supplemented by articles that have appeared in scientific journals and by reports (to be published later) on the progress of scientific inquiry in the several behavioral sciences. These reports present the results of research carried on at the Institute during the past 2 years by philosophers of scientific method working under the direction of Lundberg, Dodd, and Harwood.

An attempt will be made during the course to develop criteria for rating the relative usefulness of purportedly scientific work in the behavioral science fields.