HISTORICAL ROOTS OF THREE INTELLECTUAL MOVEMENTS

BY

Robert E. Abu Shanab, Assistant Professor

Department of Philosophy

Faculty of Arts

Benghazi University

Benghazi, Libyan Arab Republic

HISTORICAL ROOTS OF THREE INTELLECTUAL MOVEMENTS

I. Introductory Note :

The primary objective of this paper is to exhibit the historical interrelationships among Logical Positivism, Operationalism, and Behaviorism. Although these three movements occurred almost independently of each other, yet, to use S.S. Stevens' words, " a general community of spirit among them led directly to extensive cross-fertilization " (1) Specifically, I shall however concern myself as much with the salient points of encounter among these three movements as it is also with (1) a clarification of the historical influence of these movements, and (2) asking some philosophical questions about the result of this influence. But before a discussion of the historical perspective of each movement is delineated, it would behoove us to indicate in a concise manner the general lines of thought concerning each movement.

II. General Statement About Logical Positivism, Operationalism, and Behaviorism :

The avowed intention of the logical positivists in the early 1920's was to declare their independence from traditional philosophy which they considered as being burdened with too much speculation. What the logical positivists wanted to fashion was a philosophy that was in conformity with the results of the current formal and factual sciences. They asked: What is the proper business of philosophy ? What should a contemporary philosopher do ? They decided that the task

of philosophy is the analysis of knowledge, especially of science, and that the chief method of philosophy is the logical analysis of the intersubjective language of science (2) Hence at the inception of the Vienna Circle in the early 1920's, the logical positivists wanted to formulate a meaning criterion whereby they could decide whether statements are cognitively meaningful-and thereby discern meaningful science and its logical analysis from meaningless metaphysics. In their various attempts to formulate such a criterion, the logical positivists were led to several difficulties. An early and important statement of the meaning criterion was Schlick's version in the form of the well-known slogan, " the meaning of a proposition is the method of its verification " (3). Schlick's formulation prompted other philosophers such as R. Carnap, C. Hempel, A. J. Ayer, and K. Popper to reformulate Schlick's version. Many objections, however, were directed toward these various reformulations. The basic difficulty focused on the obvious point that every proposed criterion by the logical positivists turned out to be either too exclusive or too inclusive : It was judged to inclusive since it failed to eliminate nonsensical sentences formed by alternation of nonsensical sentences with significant sentences. For exampel :

(1) My table is brown or Satan is crippled is logically entailed by

(2) My table is brown.

Thus (1) leads to the untenable consequence that any sentence can by alternation be added to (2), and, in this vein, we can logically say that in principle all sentences can become empirically significant. Thus, this criterion fails to accomplish its purpose, namely, to distinguish those sentences which are empirically significant from those which are not. In this

sense, the criterion is too inclusive. On the other hand, the criterion was judged too exclusive on account of its " completeness " claim. The point is simply this : how much observational data do we require for scientific laws in order for them to be completely verified ? Regardless of how much observational data be assumed, the data always fall short of guaranteeing the universal character of scientific laws. Consider the following general statement :

(3) All metals expand when heated

this universal statement ranges over an unlimited number of instances ; it is not logically equivalent to a conjunction of any finite number of observational statements. Consequently, the criterion in requiring conclusive, complete evidence is itself incomplete, because that requirement excludes genuine scientific statements, e.g., laws from the realm of empirically significant discourse.

Indeed, many philosophers have given up any hope for an adequate formulation of a criterion of significance along the lines of the logical positivists. For if it is put forth as stipulative definition, there is no reason to go along with the stipulation ; as a general criterion of significance, i.e., generalization about meaningful sentences, it is deficient in light of the many counter-examples that have been given. If it is offered as a proposal, then, again, there is no reason to accept it as covering all cases of significant discourse ([4]).

Operationalism, as propounded by Bridgman in 1927 in his *Logic of Modern Physics,* was a movement which focused its attention upon getting rid of the last vestiges of metaphysical obscurity still remaining in some parts of science, namely, physics. Just as some of Einstein's conclusions in the theory of relativity provided the groundwork for the meaning of logical

positivism, so, with Bridgman, it was the same Einsteinian views on relativity which brought him to consider operational analysis in physics.

Einstein had considered as meaningless such terms as " absolute length ", " absolute simultaneity ", " absolute duration " from Newtonian physics. The scientist's inability to state any observational or experimental procedures for the application of these terms led Einstein to the view that they were devoid of empirical meaning. Bridgman, having embraced this background as a stimulus, set forth in his book *The Logic of Modern Physics* a program for the legitimate admissibility of scientific concepts. Briefly his view was that for a concept to be scientifically acceptable, one must be able to perform a set of operations ([5]).

When one compares operationalism with logical positivism, one finds that they both share similar methodological views and that they differed only in emphasis ([6]). The logical positivists were extremely sensitive to the logical commitments underlying the introduction of scientific concepts. Bridgman, on the other hand, did not elaborate on a precise explication of the logical relationship between theoretical and observational terms. This task, for better or worse, was carried out to a great extent by the logical positivists. Undoubtedly they encountered many difficulties. But the work the logical positivists carried out, expecially in attempting to elaborate on a precise logical relationship between theoretical and observational terms, greatly stimulated inquiry into the methodological problems of the empirical and social sciences. One should emphasize through that whereas the logical positivists had painstakingly devoted a great deal of time to elaborating a precise formulation of a meaning criterion, Bridgman, on the other hand, did not seem to bother about

such an enterprise. His concern was primarily to " operationize " scientific concepts without actually presenting any elasborate theory of meaning. Indeed Bridgman was simply interested in presenting a certain technique for the formation of scientific concepts. According to Bridgman, this " operational " technique is best revealed by the practice of 20th century scientists themselves.

Behaviorism, as propounded by J. Watson early in this century, was a movement directed against the old mentalistic psychology. In Watson's writings one comes across one of the earliest attempts to rid psychology of its speculative vestiges. Watson's declaration of independence from the introspectionist-dominated schools of thought was originally introduced to scholars in his famous article of 1913 entitled " Psychology as the Behaviorist Views It ". A salient characteristic of Watson's article was his opposition to all psychology dealing with consciousness. He declared that psychology must break with the past, discard the concept of consciousness altogether, and begin at the beginning by constructing a new science built on objective findings. In other words, if psychology is to become a science, it must follow the example of the physical sciences. A psychology that is based upon consciousness has subject matter which cannot be treated scientifically. As Watson explains it :

> Psychology as the behaviorist views it is a purely objective, experimental branch of natural science which needs intropection as little as do the sciences of chemistry and physics ..... It can dispense with consciousness in a paychological sense. The separate observation of " states of consciousness " is on this assumption, no more

> a part of the task of the psychologist than of the physicist. We might call this the return to a non-reflective and naive use of consciousness. In this sense consciousness may be said to be the instrument or tool with which all scientists work ([7]).

As assumption underlying this quotation was not that Watson denied the existence of consciousness or mental events, but rather his affirmation that if psychology is to achieve the status of a science, it should not consider consciousness as its primary subject matter. Rather, its primary subject matter, to Watson, is exactly the same in kind as that of all other sciences. In this connection, he maintained that :

> You will find, then, the behaviorist working like any other scientist. His sole object is to gather facts about behaviorverify his date-subject them both to logic and to mathematics (the tools of every scientist) ([8]).

Thus classical psychology which depended so much upon the concept of consciousness is unfit to be included with the physical sciences, for propositions which draw their truths from the realm of consciousness lack the characteristic of being publicly observable or apprehended. Watson's behaviorism then insisted on objective techniques for securing data for the psychologist. He also emphasized that psychology should limit itself to the study of responses made by the organism to certain stimuli. That is to say, all meaningful psychological sentences are to be interpreted in terms of stimulus and response. Watson's stimulusresponse theory was met with approval by contemporary psychologists ; however, they attempted to go beyond Watson's behaviorism in their willingness to infer

between the stimulus and response all sorts of states or processes which they call " intervening variables ". Thus, when one takes a glance at the neo-behaviorists, such as E.C. Tolman, K. Spence, S. S. Stevens, etc. one cannot help but detect the inedible imprint that logical positivism, operationalism and Watson's behaviorism have left on them. It is in this sense that neo-behaviorism can also be viewed as an attempt to cleanse psychology of its past and to provide for it a more effective scientific methodology.

III. Clarification of Historical Influences :

In the preceding section we presented some of the salient features of logical positivism, operationalism and behaviorism. It was pointed out that although these three movements occured almost independently of each other, they still shared one common objective in their rejection of a discipline that is not patterned after the model of science. I would like now to address myself to the historical influences surrounding these three movements.

(a) *Watson.* It is clear that neither logical positivism nor Bridgman's operationalism had any direct influence on Watson inasmuch as he published his first behavioristic views in 1913, in an article entitled " Psychology as the Behaviorist Views it ". This is almost two decades before any officical publication by the logical positivists appeared. This is not to say that Watson could not have been influenced indirectly by the positivistic movement in central Europe, which was already taking shape as early as 1907 (9). It is not all unlikely that Watson was influenced by William James' pragmatism which flourished in his early years. On the other hand, certain writers have tried to establish a definite link between pragmatism and logical positivism. P. Frank (10), for instance,

writes that upon reading Carnap's exposition of the meaning of a statement in science, he was as surprised as Carnap was later to find the closeness of Carnap's views to William James' pragmatic requirement that the meaning of any statement is given by its " cash value ", or by what it means as a direction for human behavior. In the United States, we find C. W. Morris ([11]) using the name " logical empiricism " in an effort to strengthen the tie between logical positivism and pragmatism.

(b) *Bridgman.* Bridgman was directly influenced by Einstein's views on relativity which brought him to consider operational analysis in physics. *The Logic of Modern Physics,* however, was not influenced by either logical positivism or Watson's behaviorism. Neither has Bridgman influenced Watson. Yet one can say that Bridgman has influenced logical positivism by his use of the term " operational definition ". As Frank puts it :

> Reichenbach had explicitly pointed out that what is needed is a bridge between the symbolic system of axioms and the protocols of the laboratory. But the nature of this bridge had been only vaguely described. Bridgman was the first who said precisely that these " relations of coordination " consist in the description of physical operations. He called them, therefore, " operational definitions ". This name has been generally accepted ([12]).

On the other hand, Schlich in "Meaning and Verification" gives us a different outlook about Bridgman. As he explains it :

> Professor Bridgman's book on *The Logic of Modern Physics* is an admirable attempt to carry out this

program i.e., Einstein's initial adoption of a meaning criterion for " non-local simultaneity " for all concepts of physics ([13]).

Thus it seems that Schlick does not think Bridgman deserves credit for influencing logical positivism. However, although Bridgman might have influenced the logical positivists though his use of the term operational definition ", still Bridgman has ignored striking differences in the manner by which various theoretical terms are introduced or anchored. As a technique for concept formation, operationalism stressed one of the relationships between theoretical terms and observation terms ..... the operational definition for concepts appearing in the empirical hierarchy of terms.

(c) *Logical Positivism.* Although logical positivism influenced neobehaviorism, it does not appear that they had any direct influence on Watson. Logical positivism, for the most part, occurred " independently " of Watson's behaviorism and Bridgman's operationalism. Yet it should be kept in mind that some logical positivists such as R. Carnap and C. Hempel were attracted to Watson's behaviorism. Unlike Watson, however, they were not at all concerned with developing a psychological theory. Rather they were primarily interested in the Logical analysis of psychological propositions in order to discover whether they display any relationship to the ones in the physical sciences. It is interesting to note in this connection that the logical positivist Otto Neurath ([14]) with his implicit approval of behaviorism suggested at one time the term " behavioristics " as a replacement for "psychology". Furthermore Hempel, at one time, called himself a *logical behaviorist* ([15]) in an attempt to distinguish his broader logical theory about psychological propositions from the restricted area of stimulus-response, whcih was Watson's main concern.

Thus we find that Watson was primarily interested in propounding methodological behaviorism. As a methodological thesis, behaviorism involves no commitment whatever concerning the *logical* analysis of mental words, nor does it imply the denial of mental states. What methodological behaviorism asserts could be simply stated as follows :

The subject matter of scientific psychology is nothing but behavior ; and as a science, psychology should study human and animal behavior without introducting " private " mental states over and beyond the publicly observable stimuli and responses. Thus, as a methodological thesis, behaviorism leaves open the question whether there are mental events ; they are of no relevance to science. On the other hand, logical behaviorism (or as some call it " analytical behaviorism ") claimed that all sentences containing psychological terms are transformable by analysis into other sentences containing no psychological terms. In this way, the behavioristic requirement of logical positivists such as Hempel and Carnap would amount to a logical analysis of psychological terms or sentences containing psychological terms ([16]).

Thus, though one can point to certain common inquiries and doctrines between Watson's brand of behaviorism and the logical positivists, it is highly unlikely that the logical positivists had any direct influence on Watson. It would however be fair to indicate that Watson's behaviorism borced the logical positivists to take into consideration the *meaningfulness* of psychological statements if analyzed within the purview of the school of behaviorism.

(d) *Neo-behaviorism.* With Watson one comes across one of the earliest attempts to rid psychology of its speculative vestiges. Neo-behaviorism could also be viewed as a second

attempt to cleanse psychology from its past and provide us with a more effective scientific methodology. The neo-behaviorists, especially E.C. Tolman, were greatly influenced by Watson. For like Watson they, too, emphasized that psychology should be treated as one among other scientific inquiries. Aside from Watson, logical prositivism and Bridgman's operationalism directly influenced neo-behaviorists. In this connection, K. Spence-aneo-behaviorist - and G. Bergmann-a logical positivist in his early days-wrote an article entitled " Operationism and Theory in Psychology " in which they claimed that

> A number of psychologists such as Tolman, Skinner, Stevens stimulated by the writings of Bridgman have centered their efforts largely on the empirical component of scientific method. Under the watch word of operationalism, they have carefully considered and laid down the requirements that scientific concepts must meet in order to insure testability and thus empirical meaning. The second aspect, the formal (theoretical) component of scientific endeavor has been brought to the forefront in psychology principally through the writings of Hull and Levin ([17]).

Thus it would seem from this quotation that the main source which psychology in the 1930's took as its model was the logical positivistoperationist model of science. Undoubtedly neo-behaviorism attempted to stabilize itself within the surroundings of the positivist-operationist model of science. And as a result of this extensive cross-fertilization, psychology as spearheaded by the neo-behaviorists-ironed out its methodological issues. Thus, what availed itself to the intellectual community was a vastly improved discipline. With all this

historical background behind us, I would like now to address myself to some philosophical questions.

IV. Some Philosophical Questions about the Result of the Influences :

(a) Is logical positivism bad philosophy ?

Before attempting to answer this question, we should inquire what we mean by " bad " ? By the term " bad " we mean " restricted " " limited ". Hence *bad philosophy* is restricted, *limited*, if (1) it does not attempt to resolve ontological and epistemological questions and (2) it is not an ontology which, in its genuine attempt to treat questions of first philosophy, cannot dialectically answer all the philosophic questions about the assay of what *there is* and of *knowing*. Now to the question whether logical positivism is bad philosophy. One quick reaction to the question is, yes. For it neglected inquiry into metaphysics, epistemology and ethics. Recall that the early positivists declared that these traditional inquiries are meaningless. Later, however, the logical positivists found it necessary to distinguish various components of meaning, whereby they claimed that these traditional inquiries were devoid of any cognitive content, although the concepts involved might still have strong psychological overtones. Thus it is my contention that logical positivism is bad philosophy since it rejected the study of traditional inquiries.

on the other hand, logical positivism, as a form of scientism, is not bad philosophy, since it equates philosophy with logic of science. Philosophy was replaced by the logic of science, and ' logic of science is the syntax of the language of science " (18).

(b) Can good psychology stem from bad philosophy ? The answer would simply be, no. Good psychology (neo-beha-

viorism) simply did not. It stemmed rather from rigorous examination of methodological formulations of science. Good psychology then stemmed from philosophy construed as the philosophy of science. And philosophy of science (the logic of science) is, according to positivism, neither an ontological nor an epistemological analysis of what *exists* or of the structure of knowledge situation ; it is an analytical description, within *the context justification*, of the status and the structure of scentific concepts, laws, theories and of broad factual theses which scientists take for granted.

(c) Can bad psychology stem from bad philosophy ? In order to answer this question, let us consider metaphysical materialism. Advocates of metaphysical materialism deny that there are any nonmaterial entities, events or processes. Put differently, metaphysical materialism simply denies the existence of minds (conscious states). Such a position is obviously absurd and would, if adopted by behaviorists, lead to disastrous consequences. For instance, if metaphysical materialism were adopted by behaviorists, it would certainly hamstring the whole behavioristic program in completely neglecting mind or mental states in any form. Also adoption of metaphysical materialism by behaviorists would throw out the psycho-physiological parallelism which behaviorism espouses as a factual thesis. Thus I think bad psychology would stem from bad philosophy ([19]).

(d) Are philosophers-especially philosophers of science-ignorant of the content of science ? ([20]) Philosophers of science are definitely not ignorant of, nor I should add reveal a general lack of interest in, the content of science. For many philosophers come to the area of philosophy of science after having had some training in one of the scientific disciplines that appealed to them. Furthermore, many of them are interested

in the content of the scientific discipline that they are investigating. Indeed they use the scientific research insofar as it helps them shed light on some philosophic problems. J. J. C. Smart, for instance, contends that the results of scientific investigation might turn out to be helpful to philosophers to the " question about whether space and time (or perhaps space-time) should be thought of as absolute or relational, and again that scientific theories enable us to understand why time appears to run one way " (21). In addition, further research by neurophysiologists, so argues some philosophers, may enable us to understand better the relation of mind and matter. Thus to claim that philosophers of science are not interested in, let alone ignorant of, the content of scientific disciplines is not a correct description of the *status quo*. Neither is it true to assert, as some have (22), that philosophers of science are simply concerned with " the context of justification ", and not " the context of discovery ". Hempel, for one, emphasizes the significance of the context of discovery in addition, of course, to the context of justification (23).

(e) What import or bearing does scientific method (or do the results of theoretical physics) have upon philosophy proper-upon certain large questions of knowledge and reality ? Sir James Jeans (24), for example, concludes that we can no longer pretend to understand the " real nature of things " since theoretical physics only describes " our observations on nature " These processes in the " inaccesible substratum of nature " are thus best construed, according to Jeans, as "mental" rather than " material ". But his conclusion hinges on faculty common-sense analysis of, for example, " perceptions ", " measures of things ", and " microscopic precision ". Only by blurring the distinction between perceptual objects and perceptual apprehension, the distinction between *measure* as a

relational property of a thing and the process or record of estimating that property does Jeans find support for his " mentalistic " or idealistic interpretation of nature. Likewise Jeans' claim that we must abandon both causal determination in our everyday world and any hope of precise knowledge of it rests only upon inaccurate characterization of the relations between quantum mechanics and our macro-world.

What Jeans has done may best be described as a haphazard attempt as layman at rationalizing some popular version of " idealism " that he has acquired from his local heritage. He has not arrived at " idealism " by the methods and theories of physics nor by those disciplined habits of mind characteristic of philosophers of science. From what he has argued, we can conclude nothing as to the bearing of physics on philosophy proper. And this fact supports my general claim that, strictly speaking, when science and philosophy are said to interact or to influence each other, only three sorts of things occur :

1. Science itself asks questions which require philosophical analysis for their solutions and these resolutions are circoumscribed task of the methodology of science.

2. Philosophers may simply discard some of their analyses, because science has shown that the world is in some respect different from what philosophers had taken it to be-but not because science has proved philosophers' analyses wrong. (Consider, for example, the philosophical analyses of absolute and relational space, and the recent physical hypothesis of relational space-time).

3. Ontologists can be of distinct service to the philosophy of physics by clarifying, for example, the status of theoretic entities like *particle*. By showing that science unproblemati-

cally *replaces* the ordinary or perceptual object by a physical abject (a set of microparticles), ontologists take the wrong kind of dialectical pressure off both theoretical physicists and philosophers of science. Thus the theoretician need not (indeed, he cannot) argue that science problematically *constructs* the physical particles or object out of perceptual objects which, since they are themselves *constructions* out of sense data, are not real-or, like Mach, argue that therefore the particles are not real. Relieved of such pressure, our theoretician can deal properly with those features of the particle which are peculiar to it and are in need of dialectical clarification ([25]).

NOTES

1. S. S. Stevens : « Psychology and the Science of Science », **Psychological Bulletin,** Vol. 36, (1939) p. 221.

2. R. Carnap : « Scientific Empiricism », in **Dictionary of Philosophy,** D. Runes (ed.), (New York : Philosophical Library, 1942), p. 285.

3. M. Schlick : « Positivism and Realism », **Erkenntnis,** Vol. 3 (1932-33). Reprinted in **Logical Positivism,** A. J. Ayer (ed.), (Illinois : The Free Press, 1960), pp. 86-87.

4. For a detailed account of the various formulations, as well as the difficulties, of the criterion of significance, see C. G. Hempel, « Empiricist Criteria of Cognitive Significance, Problems and Changes », in **Aspects of Scientific Explanation and other Essays in the Philosophy of Science,** (New York : The Free Press, 1964), pp. 101-122. Also see P. Marhenke, « The Criterion of Significance », in L Linsky (ed.), **Semantics and the Philosophy of Language** (Urbana : University of Illinois Press, 1952), p. 150.

5. For a comprehensive view of Bridgman's methodological views, Cf the following articles (a) « Operational Analysis », **Philosophy of Science,** Vol. 5, (1938), pp. 114-131 ; (b) « Some General Principles of Operational Analysis », **Psychological Review,** Vol. 52, (1945) pp. 246-249 ; (c) « Some Implications of Recent Points of View in Physics », **Revue Internationale de Philosophie,** Vol. 3, (1949), pp. 479-501 ; (d) « The Nature of Some of Our Physical Concepts », **British Journal of the Philosophy of Science,** Vol. 1, (1951), pp. 257-272 ; (e) « Remarks on the Present State of Operationalism », **Scientific Monthly,** Vol. 79, (1954), pp. 224-226 ; (f) « The Logic of Modern Physics after 30 Years », **Daedalus,** Vol. 3, (1959), pp. 518-526.

6. Cf. C. Hempel : « A Logical Appraisal of Operationism », **Scientific Monthly,** Vol. 70, (1954), pp. 215-220. Also Cf. the author's article « Logical Positivism and Operationalism », **The Pakistan Journal of Philosophy,** Vol. X, (July - December, 1972), pp. 1-15.

7. J. Watson, « Psychology as the Behaviorist Views it », **Psychological Review,** Vol. 20, (1913), pp. 158-177.

8. J. Watson : **Behaviorism** (Chicago : University of Chicago Press, 1920), p. 6.

9. Cf. P. Frank : **Modern Science and its Philosophy,** (Cambridge : Harvard University Press, 1941), Ch. 1, **(passim).**

10. **Ibid.,** p. 33.

11. C. W. Morris : « Pragmatism and Logical Empiricism », in **The Philosophy of Rudolf Carnap,** Paul Schilpp (ed.), (Illinois : Open Court, 1963), pp. 87-98.

12. Frank : **Modern Science and its Philosophy,** p. 44.

13. M. Schlick : « Meaning and Verification », **Philosophical Review,** Vol. 45, (1935). Reprinted in H. Feigland W. Sellars (eds.), **Readings in Philosophical Analysis,** pp. 373-384.

14. O. Neurath : « Protocol Sentences », **Erkenntnis,** Vol. 3, (1932-33). Reprinted in **Logical Positivism,** pp. 199-208.

15. C. Hempel : « The Logical Analysis of Psychology », **Revue de Synthese,** (1935). Reprinted in **Readings in Philosophical Analysis,** pp. 373 - 384.

16. Also, **physicalism** is the philosophical thesis imputed to advocates of such a view.

17. G. Bergmann and K. Spence : « Operationism and Theory in Psychology », **Psychological Review,** Vol. 48, (1941), p. 1.

18. R. Carnap : **Logical Syntax of Language,** (London : Kegan ; New York : Harcourt Brace, 1937), sections 72-73.

19. By happenstance, perhaps Hobbes' metaphysical materialism would lead to better psychology or science of man than Hegel's objective idealism.

20. Cf. Westland's article « Psychology and the Philosophy of Science », **Mind,** Vol. 81 (1972), pp. 533-542.

21. J. J. C. Smart : **Between Science and the Philosophy of Science** (New York : Random House, 1968), p. 5.

22. Westland : « Psychology and the Philosophy of Science », p. 541.

23. C. Hempel : **Philosophy of Natural Science** (New Jersey : Apprentice Hall, Inc., 1966), p. 15.

24. James Jeans : **Physics and Philosaophy** (Cambridge : Harvard Press, 1948), **passim.**

25. Cf. G. Bergman's article « Ontology versus Physics », **Philosophy of Science,** Vol. 25 (1961), pp. 1-14.