CHAPTER 1
EXPERIENCE AND KNOWLEDGE
The discussion in the present chapter is confined to the problem: as to what constitutes a paradigm instance of empirical knowledge along with the locus and criterion of validity of such an instance. This problem has been chosen due to two reasons. (1) Dewey's treatment of it suggests a highly tenable answer to this important issue in contemporary epistemological thinking. (2) It helps to work out a definite methodological import of his conception of experience as a source of empirical knowledge.

Any attempt to explain the knowledge about the world in the light of the world directly encountered is known as empiricism. Immediately experienced world, it is univocally admitted by all empiricists — Greek, modern and contemporary — is plural rather than one, discrete rather than continuous, precarious rather than regular, transitory rather than permanent. But the term knowledge in the sense of plural, precarious or transitory was unintelligible to Greeks as it is to modern empiricists. Within Platonic tradition, which prevailed in both the Greek and modern thought, all knowledge belonged to the domain of necessary truths. Heraclitean's admission about the transitory nature of experience, argued
Parmenides, was tantamount to complete denial of its relevance to knowledge. It is not the case that only Greek empiricists failed to maintain empiricist's thesis, i.e. experience is the sole source of all knowledge. Scepticism of Hume, too, resulted only from his failure to trace the necessity required by knowledge in the sense impressions.

According to contemporary positivists and empiricists, say, Mortiz Schlick, Neurath, Mach, Wittgenstein and Russell, it is not necessity but truth that qualifies empirical knowledge. True knowledge, they hold, is constituted of statements of facts i.e. statements about whatever is. They further find that both reality and experience are atomic in nature. Contemporary empiricism is deeply influenced, to begin with, by Mach's thesis that a physical thing forms a complex of simpler elements, each of which is directly given to us in immediate experience. Atomic conception of reality and experience leads contemporary empiricists to adhere to the possibility of knowledge about reality only of a contingent kind. Statements which constitute knowledge, they emphatically hold, are true not necessary. Quest for certainty is renewed with contemporary empiricists in the form of a quest for truth. Their quest for truth leaves them in search of some assertions carrying
a quality of absolute conviction about their truth to serve as solid foundation for the super-structure of knowledge. Equipped with the logical tool, contemporary empiricists feel confident of the possibility of erecting the more complicated super-structure of knowledge, if they could find some firm foundation. But as it is, their search for foundation itself seems to face a difficulty similar to that of Archimed^es, who was in search of a fulcrum to support his lever so that he could lift the whole world. Plight of contemporary empiricists is, in fact, worse than that, for Archimed^es faced only a practical difficulty, whereas with them it is multidimensional. Absolute conviction with which they wish to endow statements of empirical knowledge not only thoroughly disturbs the setting of concepts and percepts within man's cognitive experience, it results in a misinterpretation of symbolic representation in general and the role of refined symbolic systems like logic and mathematics in particular.

To demarcate clearly the nature of factual statements, contemporary empiricists differentiate them from the necessary truths of mathematics and logic. This distinction between mathematical and empirical truths goes back at least as far as Leibniz and Hume. But twentieth century insight into the growing systems
of logic and mathematics particularly emphasizes their incapacity to describe any facts. $7 + 5 = 12$ to a contemporary logical analyst is not a synthetic a-priori; it only gives a rule of transformation of two groups of units into a single group. Geometry, too, is not a description of real space, and logic only establishes rules within a symbolic system. A priori nature of mathematics, they find, is quite evident in independence of its validity from actual, empirical counting and measurement. Similarly, they feel contented with the autonomy of logic which results from its confinement to treatment of thought only through the intermediary of language and that, too, not through a natural language but a simplified and perfected version of it.

Humean thesis is presently maintained at a more elaborate scale; inductive inference is a guess work inaccessible to logical analysis for there are supposed to exist no logical relations leading from facts to theory. Formal logicians clearly hold that context of justification, and not the context of discovery, truly belongs to the domain of study of logic. Hans Reichenbach maintains that such a formal theory of induction is an oversimplification. He says, "Some logicians have believed that they have to construe confirmation as the reserve of a deductive inference; this is to say that
if we can derive deductively the facts from the theory, we can derive inductively the theory from the facts. This interpretation, however, is oversimplified. In order to make the inductive inference, much more has to be known than the deductive relation from the theory to facts."¹

Strangely enough, contemporary empiricists have not only oversimplified the problem of induction but have altogether done away with it. Totality of empirical knowledge, according to them, is constituted of molecular propositions i.e. truth functions of atomic propositions (as Wittgenstein has very clearly put it). Atomic propositions are, in turn, composed only of descriptive symbols, and descriptive symbols, it is further maintained, are definable in terms of other simpler symbols except that ultimately one comes to primitive words which are definable only ostensively i.e. by pointing at the objects designated by these primitive words.

Propositions containing these primitive words have been called variously by different contemporary empiricists as atomic propositions, elementary propositions, basic

propositions; and physicalist Neurath calls them protocol sentences. This variation with regard to names of these primitive propositions refers fundamentally to lack of clarity about their essential nature, which results from the incapacity of contemporary empiricists to provide minds, signs, thought and things a proper setting essential for any analysis of empirical knowledge.

Referring to the extreme indefiniteness on the sole problem of the basis of empirical knowledge by the contemporary empiricists, Hamlyn says, "Although some positivists the so called physicalists have maintained that the language of physics should be taken as providing the basis of truths, most philosophers have gone to direct record of experience on which knowledge is taken to rest. These truths are to be found in sense-datum propositions which are direct records of experience and which are for this reason incorrigible, consisting of extensively definable terms i.e. names of sense data)—It is not clear what constitutes an example of this (Russell, for example, suggested "Red here now" where every expression is what is called a "logically proper name", such that its reference is guaranteed."

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Physicalists have very correctly realized that statements of knowledge involve concepts not logically proper names. Neurath's protocol sentence giving, say, a reading of a barometer at a particular time on a particular day and a particular place shares the order of science. But this sentence is formulated in terms of highly systematized language which can by no means be termed as logically proper names, hence the reference of protocol sentences is not immediately granted. In fact terms belonging to ordinary language like red, here, now etc. too, cannot register atomic and discrete facts, for to belong to language at all, they have to lose their character of absolute discreteness. Russell happens to realize it himself, for he expresses this difficulty in accepting the impossibility of full purity of basic propositions. He says, "Owing to the fact that words are general, the correspondence of fact and sentence — leave the character of fact more or less indeterminate."  

Russell's insight into the problem of knowledge is deep enough to visualize that, "the theory of knowledge is rendered difficult by the fact that it involves psychology, logic and the physical sciences." Yet he refuses to deny

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4Ibid., p. 131.
the inapplicability of piecemeal analytical approach to this multidimensional 'problem of knowledge. It may be noted that it is not the technique of analysis which is questioned as a tool for the understanding of either a relationship between propositions and facts or the nature of logical necessity among expressions but its cutting them too wide to be joined again as logical empiricism.

Futility of the empiricist's argument, — whether Greek, modern or contemporary — it is Dewey's fundamental conviction, lies in their misconception of the term experience. Dewey is of the opinion that empiricist's thesis, i.e. experience as the sole source of all knowledge, can make a genuine claim. But it can be made only in the methodological import of a naturalistic conception of experience.

Naturally within a cognitive experience, human mind, sign and things are inseparably involved. Cognitive experience, therefore, happens to be a common object of study for psychology, logic and science. A theory of knowledge, which is interested in joint psychological, logical and scientific considerations can make its start only with an analysis of cognitive experience itself. Dewey's own theory of knowledge is an attempt at such an
analysis. But before coming to his integral answer to the multidimensional problem of knowledge, contemporary empiricists are to be credited for posing the problem of knowledge in the most crucial manner. The entire issue of empirical knowledge in its ultimate analysis does boil down to the relationship between propositions and facts on the one hand and the logical relationship among propositions on the other. But an inquiry into the problem so posed constitutes, according to Dewey, an inquiry into scientific methodology. He, in fact, is of the opinion that a theory of knowledge precisely is not faced with the problem as to why and how minds, signs and things co-operate but what essentially is the nature of this cooperation. Why and how part of the problem is answered by a metaphysical theory and a general theory of language respectively.

As regards the essential nature of the relationships concerned, a pertinent remark by the philosopher-physicist, Henry Margenau, seems enlightening. He holds that, "... discovery in science is a dual event involving both the selection of crucial variables and the establishment of relations between them."

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'Selection of crucial variable' is made, according to Dewey, by an activity which he prefers to name "how to think" and the 'establishment of relations' between variables done through another activity named "how to reason". These two activities form the inductive and deductive aspects of scientific methodology.

According to contemporary empiricists, passage from facts to propositions, although, does create some difficulty; yet, once equipped with basic propositions, the development of all the scientific theories then becomes a matter of logical necessity or logical consequence given by pure reason. Due to his conception of reason as a priori Henry Margenan too, in his conception of empirical knowledge, displays an inclination towards pure rationalism. In his opinion, the selection of variables is governed by the rules provided by the prevailing rational nexus among variables.

Dewey, of course, recommends an attitude of pure empiricism and recognizes no a-priori principles or reason which may determine cognitive experience. He considers scientific inquiry a spiral process initiated by the very relation and constitution of man and nature. Logical status of the outcome of inquiry itself becomes clear only gradually as it is continually submitted to public test for clarity, refinement and justification.
The standards and principles of logical justification, therefore, themselves are an outcome of a second order inquiry into the first order inquiry into facts. Since Dewey's theory of meaning does not admit of speaking in terms of orders of knowledge, he simply terms logic as a theory of inquiry.

Presently, of course, it has become very evident that human reason is not a rigid system of categories into which to pack all experience. Moreover, reason should lead to freedom of mind rather than to mental slavery. Hans Reichenbach agrees with Dewey and holds that, "The power of reason must be sought not in rules that reason dictates to our imagination, but in the ability to free ourselves from any kind of rules to which we have been conditioned through experience and tradition." Dewey is of the opinion that experimental methodology of sciences does possess genuine empirical integrity and has an inbuilt tendency for self-correction and self-improvement required by an ever growing endeavour like empirical knowledge.

An outcome of scientific experimental inquiry constitutes, for Dewey, a paradigm instance of empirical

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knowledge, and he names this outcome as warranted assertion because whatever status or meaning it has, is to be located within the operations of the process of inquiry. Now as there is no belief which cannot be exposed to further inquiry, his conception of warranted assertibility provides only an abstract conception of knowledge related to inquiry again in the abstract. Attainment of knowledge, in fact, according to Dewey is a progressive matter. Truth is for him an ideal value to be gradually approximated rather than a factual structure of empirical statements. He rejects any conception of empirical knowledge which claims it to be either immediate and noninferential or logically indubitable.

It is now widely recognized that when a person is observing anything he is really observing the effects of the thing upon himself. Dewey's theory of knowledge exhibits a high degree of sensitivity to this predicament of human observer. He clearly maintains that, even in the case of ordinary perception an object is made by the manner it is experienced — experienced in the sense of — heard it, saw it or touched it. Yet his position is clearly distinguishable from the subjectivists like Berkeley. According to Dewey, different manners of experiencing like seeing, hearing, recalling, dreaming or
thinking etc. are authentically distinct and this possibility of a variety of ways of experiencing objects provides them a surer existential status rather than ruling out their independent existence. P.W. Bridgman, in agreement with Dewey, says, "On the scale of ordinary sense perception, however, where we have the possibility of getting to the same terminus by the use of several senses — We can usually think of the object as something in itself, unaffected by the instrument, the only function of the instrument being to reveal the object to us."\(^7\)

Dewey has quite often been uncritically charged with having abandoned the notion of prior existence. He does, of course, avoid within his epistemological discussions, the much-debated question of whether the world exists independently of observations. What he rules out as doubtful is not the existence of the world but only the beliefs about it. Usually the questions about truth and reality do not appear as distinct problems in philosophic thinking. It is not argued that Dewey has been able to distinguish them; somehow he happens to solve them by two different methods.

The problem of reality, according to him, is concerned with the totality of existence, whereas the problem of truth is confined to a highly selective part of existence. Although the same empirical world is the subject matter for the sciences and for metaphysics, scientific data are highly selective and the way selection is done depends upon the procedures adopted. In case of complicated scientific theories it becomes an important decision as to how the theory will expose itself to empirical and experimental test. Since scientific data are not given but selected, theoretically, therefore, there are no rigid facts. Selective character of scientific data finds an ample evidence in the fact that different physical theories conceive physical world in different manner. Epistemological perspectivism of Dewey acquires a clear formulation in his own words: "A scientific inquiry may be regarded as a request 'for information'. But the needed information is not handed out readymade by nature. It requires judgment to decide what questions should be asked of nature, since it is an affair of formulating the best methods of observation, experimentation and conceptual interpretation."* Epistemological perspectivism

certainly does not mean subjectivism, because the very existence of the problematic situation presupposes a resisting object. Moreover, conclusions finally arrived at are not of mere wishful nature. Above all, it is never to be forgotten that Dewey is basically a naturalist.

Dewey's merit lies particularly in his attempt to get hold of the defining properties of knowledge in the context of the act of acquiring it. Earnest Nagel finds his analysis of scientific concepts based on sound foundations, for it makes theoretic concepts less puzzling and less mysterious. He considers Dewey's interpretation to be the only alternative to interpreting conceptions of theoretical science as mere convenient fictions. Earnest Nagel says, "... whatever else may be validly said about theories... their role in inquiry is that of directives for handling observation materials and of formulations which express systems of relationships between such materials." 9

Dewey's general behavioral theory of meaning and his operational theory of scientific concepts result, in fact, as he struggles to construe the nature of signs

and symbols in terms of their concrete uses in the resolution of problematic situations either in ordinary life or in theoretical experimental inquiry respectively. Within the problematic context, he finds that neither the words of a natural language nor scientific concepts describe facts in the strict sense of the term. Meanings of words through an identifiable and verifiable phenomenon yet these do not form inactive images; they represent a series of expectations or commands etc. which may serve as short hand to deal with world or instruments for thinking about it. Speaking more specifically, Dewey considers symbols of ordinary language as formulations of some general modes of behavior and scientific concepts as elaborations of correlations between various physical changes.

Operational thinking, in general, reflects an altogether different attitude towards the question "What is X?" It is not a search for whatever is, for an assumption of the a priori existence of world is avoided. In fact nothing is uncritically assumed. P.W. Bridgman, who is more technical and now a classical advocate of operational theory of scientific concepts, 10

holds that these are only prescriptions for the operations of measurement, e.g., what is meant by length is nothing else than a description of what is done while length is measured, and a number obtained by performing the operations of length measurement on the object, is taken as its length. Concept of true or absolute length in itself is meaningless, it refers — if at all — to an ever increasing possibility of improving the measuring instrument. Bridgman's operationalism resulted from a deep realization of difficulties and intricacies involved in quantifying different parameters of physical phenomena and construction of measuring instruments with increasing efficiency and accuracy. He found that the divorce of the object from the instrument that quantifies it is illegitimate, because efficiency and accuracy of measuring instrument is relative to the purpose which it fulfils and that certain instruments are valid only within certain range of phenomena e.g. clocks of different degree of accuracy are used by an ordinary man and a physicist.

Bridgman's operational thinking is highly informative for an experimentalist. But as sciences are growing theoretical at a fast rate, physical operations are found as insufficient medium for defining
scientific concepts. Dewey's operationalism offers a tangible explanation even of theoretical concepts; for he happens to tie the operational nature of scientific concepts with the determining conditions of the problematic situation with which an inquirer is faced. Commenting on the kind of operationalism Dewey advocates, Anatol Rapoport says, "... if a child asks "what is time?" it is probably best to talk of days and nights, summers and winters, to call his attention to the effects of age, to teach him how to cross days off on a calendar while waiting for chicks to hatch etc. If an experimental physicist asks "What is time?" a good answer is "that which is measured by a clock". But if a theoretical physicist asks "what is time?" the most meaningful answer is "the independent variable in the differential equations of motion."\(^{11}\)

In the above quotation it becomes perfectly clear that with reference to the context of problematic situation logical operations fall in continuity with the physical ones. Pragmatic claim that action is more primitive than thought has much deeper significance than is usually attached to it. Pragmatic maxim emphasizes the fact

that conscious awareness of external world by means of language in general succeeds organic awareness of it, and that rational operations emerge from organic functions. It is an empirical fact that complex animals have feelings like fulfilment or frustration connected with different activities. Feelings or sensations are, therefore, qualities of organic functions and are operative even if they are not known. So long as organic adjustment with its environment runs smooth there is no awareness even of organic kind. Need for discrimination of sensation possessing a recognized reference fundamentally coincides with the demand of developing a response suitably adapted to the requirement of some problematic situation. Conscious awareness by means of language is supreme but it is only an additional organizational factor within experience.

The functions which the use of language can accomplish, Dewey further holds, are not what man makes possible entirely through some arbitrary or conventional act. Connections which are developed and formulated to constitute knowledge are intrinsic to experience. Yet organic awareness or cognitive awareness by means of language forms the content only of organized or consciously organized and controlled experiences respectively. Functions of language, therefore, are naturally continuous with biological functions of organization. Operational thinking not only sees a
positive harm in breaking this natural link, but makes a conscious and deliberate use of it.

Dewey is of the opinion that experimental technique is already working according to the line of thinking operationalism would recommend. Outcome of an experiment contains as its significant part indications for a future conduct of such an experiment, e.g. combustibility of coal arrived at by means of an experiment would also state that if coal is brought in contact with flame it would burn. Impressed by the experimental technique, i.e. to produce, reproduce and bring about changes under the guidance of the scientific hypothesis determined in advance, Dewey maintains that as experience grows experimental, a sound basis for empirical knowledge is laid. Karl Raimud Popper has, in this respect, very insightfully maintained that science could be founded only on the basis of propositions which are characterized by observability and not by private observation. But since he confines experience only to subjective sensations (as it is usually conceived by other contemporary empiricists), he abandons empiricism and induction as valid grounds for scientific knowledge and replaces it

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Experimental method of science is certainly characterized by observability. Moreover it means a great change in earlier empirical method because experiment provides data, new now only in detail but in kind which leaves inductive inference with a sounder footing. But in spite of these merits of experimental science, fuller possibilities of operationalism remain unexploited. A contemporary logical empiricist is curious to know what it is that a demonstrative proof adds to the three, four, five rule to an experimentally established knowledge of it.

For a modern empiricist the application of mathematics to science remains a mystery. A contemporary analytical empiricist completely denies the applicability of mathematics for the purpose of getting knowledge about factual world. To an operationalist, however, no language symbols, whether that of ordinary language, experimental concepts or mathematical equations, are factual descriptions. Yet, all of them constitute efficient instrumentalities for the manipulation and understanding of and thinking about factual events. A demonstrative mathematical proof, therefore, comes to him as a refinement and reinforcement of his operationalism.

P.W. Bridgman finds that the basis of quantitative physics lies in the natural isomorphism of the physical
operation of measuring length (say, by placing of a stick end to end) with the arithmetic operation of adding numbers. To quantify any parameter, in fact, Bridgman maintains, "... the advantages of an isomorphism between the physical operations and the operations of arithmetic are so great that nearly all the schemes of measurement in scientific use are selected to have this property."\(^{13}\)

Operationalism of Dewey is, in fact, of a broader kind. The clarification of his position demands a precise formulation of the operationalism of scientific experimental technique vis-a-vis his behaviourism which in turn is supported by a very exhaustive kind of naturalism. Isomorphism necessary for the possibility of empirical meanings in general is much wider than the isomorphism which is utilized by the experimental method of science. Operationalism in its widest sense is one with Dewey's behavioral theory of meaning which is based upon a natural isomorphism of language, thought and human behavior in general (this idea is clearly elaborated in chapter on experience, language and meaning). Dewey writes, "The world is subject-matter for knowledge, ______________________

because mind has developed in that world; a body-mind, whose structures have developed according to the structures of the world in which it exists, will naturally find some of its structures to be concordant and congenial with nature, and some phases of nature with itself. The latter are beautiful and fit, and others ugly and unfit. According to Dewey experience, i.e. interaction of man with its environment non-human and human, is characterized by mechanical, ethical and esthetic traits.

Distinct with regard to the manner and range of interaction — displayed by the variations of traits themselves — the scientific, ethical and esthetic modes of experiencing the world have been recognized ever since Greek civilization and culture. But, during the last couple of centuries, science has grown into a highly organized discipline. Dewey grants the credit of this development to the scientific methodology, especially to its experimental technique. Involved with the development of ethics and esthetics, but under a very strong influence of scientific method, Dewey forgets the natural variations of different modes of experiencing

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and recommends an application of scientific methodology as it is to the domains of ethics and esthetics.

This recommendation, he finds it for himself, meets a challenge in its application to esthetics. It is argued in this work that operationalism is applicable to these domains of ethics and esthetics, only in its broader form i.e. behaviorism.