PHILOSOPHY AS LOGICAL ANALYSIS OF
SCIENTIFIC STATEMENTS.

I

RUSSELL AND LOGICAL ANALYSIS IN PHILOSOPHY. Philosophy primarily is concerned with logical analysis of scientific statements. This new scientific method of philosophising is different from traditional philosophy in two respects; firstly, this type of philosophising goes hand in hand with empirical science - so it is not superior knowledge to that of empirical science; secondly, this description indicates the part that philosophy plays in empirical science; it consists in the clarification of the statements of empirical science, - this shows the value of logic for philosophical enquiries. Logic is no longer merely one philosophical discipline among others, it is the method of philosophising. Logic is understood here in the broadest sense. It comprehends pure, formal logic and applied logic or the theory of knowledge.

To construct philosophical system seems to be now out of fashion. Rational speculation is not ordinarily regarded as the rational method of philosophy. For it is argued that if rational speculation is not regulated by empirical findings then the result-
ing philosophical systems may be internally consistent but unfair to scientific truths.

The scientific philosophers, as his very designation suggests, is primarily subordinate to the conclusions of natural sciences. He is not prepared to defend any philosophic position which is directly or even by implication inconsistent with the scientific conclusions.

The implication of this attitude is clear, namely, science embodies the most respectable form of knowledge. This respectability is said to be due (a) to the scientist's adherence to rigorous method and (b) use of mathematical language. Two issues have figured prominently in scientific philosophy. Method and Language. The method of testing (verification, weak or strong) is closely associated with empiricist theory of knowledge. Knowledge, according to the empiricist, is based upon, and has to be justified by sense-experience. This belief in sense-experience accounts for the empiricist's distrust towards speculation. As the "results" of speculation are not justifiable by sense-experience and not formulable in precise logico-mathematical language, it has been alleged by the empiricist that speculative philosophy does not deserve serious consideration. Scientists do not easily accept any claim of knowledge without putting it to test. Because of this reason Man is gradually developing philosophy in which the accent is laid upon the investigation of Nature. Philosophy is regarded by many as inseparable from speculation. "Unless
the aims of speculative philosophy are recognised as unattainable, the achievements of scientific philosophy cannot be understood. The language of pictures is the natural mode of expression for the poet: but the philosopher must renounce the use of suggestive pictures for explanations if he wants to understand scientific philosophy.¹ They believe that the philosopher cannot use methods which establish knowledge, be it knowledge of facts or of logical relations; that he must speak a language which is not accessible to verification — in short, that philosophy is not a science. But in actuality, the philosophic speculation is a passing state, occurring when philosophic problems are raised at a time which does not possess the logical means to solve them. There is, and always has been, a scientific approach to philosophy, i.e., philosophy has proceeded from speculation to science.

Systematic and speculative philosophy is to be brushed aside. For on logical analysis "statements" of traditional philosophy turns out to be devoid of any content. "Speculative philosophy wanted absolute certainty. If it was impossible to foretell individual occurrences, at least the general laws controlling all occurrences were regarded as accessible to knowledge; these laws were to be derived by the power of reason. Reason, the lawgiver of the universe, revealed to the human mind the intrinsic nature of all things — a thesis of

of this kind was at the basis of all forms of speculative systems. Scientific philosophy, in contrast, refuses to accept any knowledge of the physical world as absolutely certain. Neither the individual occurrences, nor the laws controlling them, can be stated with certainty.²

The character of modern logic is truth-functional and extensional. Scientific philosophy aims at logical analysis of scientific statements. The fundamental axioms of the formal sciences like logic are logically true and the theorems which follow from those axioms are provable. If a science or a part thereof can be axiomatised, that proves ipso facto its strong logically defensible character. A system of science or a part thereof can be regarded logically defensible in the weak sense, provided its constituent statements are amenable to rigorous logical analysis.

Russell thinks that philosophy should not attempt to compete with science in working out a theory of the universe, or theories about particular parts of it. Philosophy, like all other studies, aims primarily at knowledge. The knowledge it aims at is the kind of knowledge which gives unity and system to the body of sciences and the kind which results from a critical examination of the grounds of our convictions, prejudices, and beliefs. But it cannot be maintained that philosophy has had any very great

² Ibid., p. 304.
measure of success in its attempts to provide definite answers to its questions. Past philosophers had mistakenly supposed that a priori reasoning could reveal otherwise undiscoverable secrets about the universe. But on the contrary, knowledge was only to be acquired empirically, partly through ordinary perceptions, partly by the refined techniques of natural science. The task of philosophy was, then, to subject the propositions established through ordinary perceptions by science to a logical "analysis". The object of this "logical analysis" was to reveal their exact meaning just exactly what they are about. The logical analysis showed whatever we might know, it was always something about sense-data and this material world is nothing but a logical construction out of sense-data.

While Russell was in favour of logical analysis to ascertain the scientific (core of) meaning of philosophy, the positivist largely under his influence developed a theory of scientific meaning to eliminate the last vestige of metaphysics, against which Russell himself had no particular allergy, from science.

It is again Russell who through his theory of description pointed out that the descriptive reference of the most of the full-blooded metaphysical statement are not metaphysical at all. This logical strategy of dissolving or at least reducing the metaphysical load of the so-called metaphysical statements drew the attention of modern empiricists.
In the wake of Positivism the idea became popular that the task of philosophy is the analysis of the language of science. Schlick insists that philosophy should not attempt a metaphysical "construction" of the world out of any kind of ultimate metaphysical components. Whatever is said must be capable of verification or falsification in or by experience, and metaphysical statements are statements of a kind which cannot be verified or falsified in experience. And so he formulates the principle that "the meaning of statement is its method of verification". The statements usually made by philosophers, therefore - statements which are neither statements of matter of fact nor empirical generalisations of natural science - are all meaningless.

The modern positivist does not say that all metaphysical works are to be destroyed, he maintains that such works have poetic quality. It can even be admitted that they express an interesting and stimulating attitude to life. His point is that even so it does not state truth or falsity regarding anything and thus it adds nothing to the increase of knowledge. Metaphysical utterances are condemned not because they are emotive but because they pretend to be cognitive. His charge against the metaphysician is that he breaks the rules which any utterance must satisfy if it is to be literally significant.

The philosopher who did most to eliminate metaphysics from the cognitive domain of science by adopting and employing the strategy of logical analysis is Rudolf Carnap. He maintains that a
philosophical, i.e., a logical investigation must be an analysis of language. Schlick and Wittgenstein are mistaken in saying that philosophical propositions are senseless, and that only empirical scientific propositions have sense. Philosophical propositions about the metaphysical nature of the world are senseless; but philosophy should not deal with the metaphysical nature of the world but with the logical nature of language. Carnap introduces a distinction between object statements (verifiable in experience) and logical statements (statements of the analysis of language). Philosophical statements are not object statements but logical statements. A logical or philosophical statement can make no reference to objects whatever but only to "symbols" — words. Hence logical analysis of language which is now identified with philosophy can make no reference to the relationship between symbols and the objects they symbolise; no reference, that is to say, to "meanings". It deals exclusively with the relations of symbols with symbols in the logical structure, or syntax, of language. The essence of logical syntax, according to him, is its "formal" character. No reference is made to the meaning of the symbols or to the sense of the expressions, but simply and solely to the kinds and order of the symbols with which expressions are constructed.

If philosophy is unintelligible to unbiased thought or is not in conformity with modern science, the fault is with the philosopher. From time to time his truth-seeking nature is subsided by his interest to give answers and his desire to speak in picturesque
language stops him from any attempt towards clarity. His language does not possess the precision which the scientist possesses. If philosophical writing is to be objective, it should be objective from the standpoint of its critic.

The history of scientific philosophy is the story of the development of problems and their proposed solutions. Problems are solved not through vague generalities, or picturesque descriptions of the relation between man and the world, but through technical work. The history of nineteenth-century science offers the philosopher a very useful and an enormous perspective. The abundance of technical discoveries is matched by a wealth of logical analysis, and on the ground of the new science there arises a new philosophy. This new philosophy began as a by-product of scientific research. It treats philosophy not as a collection of systems, but as a study of problems. It recognises in traditional philosophical systems the historical function of having asked questions rather than having given solutions.

Mathematical discoveries in the early nineteenth century cleared the way for modern scientific philosophy. Its advance was furthered by a new conception of the universe and of the atom. The work of the scientists thus altered philosophy completely and brought into being a philosopher with a new attitude and training.

Instead of dictating the so-called laws of reason to the scientist, we must proceed by analysing scientific methods and results. Then, we will find answers to the age-old questions of **
space, time, causality and life; of the human observer and the external world. The scientific philosopher tells us how to find our way through this world without resorting to unjustifiable beliefs, postulating extravagant metaphysical posits and assuming a supernatural origin for moral standards. Philosophy thus is no longer a battleground of contradictory opinions, but a science discovering truth step by step. Like the scientist, the scientific philosopher can do nothing but look for his best posits. But that is what he can do; and he is willing to do it with the perseverance, the self-criticism, and the readiness for new attempts, which are indispensable for scientific work. If error is corrected whenever it is recognised as such, the path of error is the path of truth.

For somewhat similar reasons the discipline of values, ethics, aesthetics etc. are also discounted by the empiricist. According to the empiricist, values are not objective, at any rate not as objective as the facts of science. While facts are cognizable, values are not. The so-called statements of value on analysis turn out to be non-cognitive. The alleged value-statements are nothing but expressive of human emotions and passions, which are psychological or physiological facts. To say "he is good" is often to be understood as "he is pleasing". Now who pleases me may pain somebody else. Somebody's capacity to please or pain has often been interpreted by the empiricist as something
subjective. This view makes values not only relative but arbitrary. For it leaves us with no criterion or standard to judge values. The idea of a 'scientific morality' - if it means anything more than the commendable recommendation to make use of discoveries in psychology when we are thinking about means - is an unreal conception. If moral rules are rules for achieving happiness, it ought to be fairly easy to discover which rules are good and which are bad, which to adopt and which to reject.

Moral decision cannot be made scientifically. We cannot discover a body of general moral truths that would help us to solve particular moral problems. It is not possible to compare ethics with mathematics or with any of the natural sciences, because the conditions which make the deductive method so fruitful in the sciences do not all obtain in the field of conduct. The success of the sciences to some extent is due to the possibility of discovering functional relations between measurable quantities and in another respect due to the possibility of giving precise meanings to the words employed. But in ethics we cannot be so precise and definite. The classical Utilitarian theory tried to produce a sort of mechanics of behaviour and it failed just because these necessary conditions do not obtain. Even if we neglect the fact that ethics raises questions about ends and take the duty to produce the maximum pleasure all around us as a datum, it is impossible to measure amounts of pleasure in the way that we can measure amounts of heat or energy. Both the practical difficulties of deciding what to do

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and the difficulties encountered in theoretical ethics are unlike those encountered in mathematics and science. In practice difficulties arise mainly from the conflict of moral rules and in the application of well-known rules to particular cases; in theoretical ethics they are mainly difficulties of understanding the logical behaviour of and relations between the concepts used in practical discourse. Problems of conduct arise on particular occasions, and difficult problems arise only when the circumstances are unfamiliar. A detailed moral code to which we might turn for the answer to every moral problem, cannot help us. For the difficulties will arise about the application of the rules to new cases and there are cases in which the need for practical thinking is necessary. Moreover, there are cases where there is some good reason for breaking the accepted code. "... it has occasionally been suggested that what is really distinctive of a moral view is, to put it somewhat crudely, the way in which those who take that view feel about it. There is, it is said, a special sense of being required to act in a certain way, not by any external pressure or sanction, but rather by one's own consciousness of the sense of wrongdoing of the guilt and self-reproach, that non-performance would incur. It is clear that there is nothing in this; but it is perhaps equally clear that this can hardly be, by itself, a sufficient criterion of morality." The need to think afresh

about moral problems is ever present and particularly great in a period of rapid economic and social change and rapid advance in knowledge of human nature. Most of our detailed rules were evolved in societies very different from our own and by people who knew far less about human nature than we now do. If we know, as we now do, that obedience to some of these rules does not promote the desired end, we must either abandon them or make them out to be absolute, categorical rules of morality, which in many cases is very unplausible. Difficulties also arise due to our inability to handle concepts or words that we use for solving practical problems. We have a specific vocabulary for dealing with moral questions. It contains such words as pleasure, pain, duty, obligation, good and evil. These words are not the property of specialists; in a way everyone understands what they mean; and people who do not know what they mean, who do not know, for example, what pleasure or remorse is, will never learn anything from ethics. But there is another way in which people do not understand these words. It is very difficult to know the connections between these words or between the ideas which they express. Under what precise conditions do we hold a man responsible? What is the connection between responsibility and deserving punishment? How are these different concepts related to each other? All these are typical questions of moral philosophy. These questions cannot be answered as accurately and as objectively as we do in science. "Moral theory
cannot emerge when there is positive belief as to what is right and what is wrong; for then there is no occasion for reflection. It emerges when men are confronted with situations in which different desires promise opposed goods and in which incompatible courses of action seem to be morally justified. In short, moral theory is but an extension of what is involved in all reflective morality.5

II

NEW LOGIC AND ITS LIMITS. Another important character of scientific philosophy is its adoption of new logic. By new logic is meant mathematical logic which has been developing since the second half of the last century and impressively systematized in the very influential work of Russell and Whitehead. The modern logician thinks that old logic because of its odd and unnecessary metaphysical commitment is very restrictive in its scope of application. By old logic is ordinarily meant the works of Aristotle and the ideas developed therefrom. This logic because of its metaphysical basis on the categories of substance and attribute could not formalise subtle and varied relations between terms which could not be shown to be designative of substance and attribute. This prevented it from analysing the complex relations necessary for

studying the subtle and more complex behaviour of scientific objects and theoretical entities.

Traditional logic was totally incapable of satisfying the requirement of richness of content, formal rigour and technical utility which its new role demanded of it. Formal logic rested on the Aristotelian-scholastic system which in the course of its further development had been only slightly improved and extended. In the field of applied logic (methodology) there were many individual studies and comprehensive work, but with regard to their precision of forming concept and profundity of analysis, it is rather at a primitive stage, perhaps, because of its inadequate formal foundations.

The progress of the new logic is marked by a minute study of the fundamental concepts of mathematics. This is really important because since the time of Leibnitz and Newton, they are opening new path of knowledge. Attempts have been made to clarify the basic ideas. "This enquiry into the logical foundations of arithmatic with a logical analysis of number as its goal, called peremptorily for a logical system which had the comprehensiveness and precision to do the work demanded of it. Thus, these enquiries gave an especially strong impetus to the development of the new logic. Peano, Frege, Whitehead, Russell and Hilbert were led to do their work on logic primarily for this reason." ⁶

The new logic made use of symbolic forms which is seen in mathematics. With the help of symbolic forms logical inferences become strict and rigorous in nature. From this it is clear that nothing vague and unimportant will be included in the deductive procedure which very easily may take place in a word-language. The methods of the new logic point out that many philosophical concepts which are accepted as such are to be explained in a different way or to be rejected altogether as they fail to satisfy the standards provided with by these methods.

It cannot be denied that the theory of knowledge or, in other words, applied logic takes the help of symbolic logic. Again, the new logic is different from the old logic not only by its formal structure but also by its wide scope. The theory of relational sentences and the theory of sentential functions deserve mention in this connection.

The old logic recognised only one form of statement which is of predicative form - i.e., "Socrates is mortal being". A subject term is attributed of a predicate term. The relational sentence also belongs to this predicative form. The new logic works out Leibnitz's notion of a theory of relations and thus makes possible many inferences involving relational sentences.

In the new mathematical theories certain strange paradoxes become evident. With serious study - it is clear that these contradictions are not mathematical but logical. They are known
as "logical antinomies". Russell eliminates the paradoxes by his "theory of types", and thereby the distinction between old and new logic becomes more clear. The old logic is no more important because in respect to its content it is poor and its contradictions remain.

The Russellian theory of type and its subsequent ramifications by other logicians are intended primarily to remove the said contradictions which are found both in respect of properties and relations.

The fundamental characteristic of logical sentences become clear with the help of new logic. A tautology is, whether its constituent sentences are true or false, necessarily true. It is true because of its form. It can be shown that all the sentences of logic and mathematics are tautologies. Tautologies are empty - they are devoid of content.

It is clear now that all sentences of logic are tautological and contentless. Thus with the help of them we cannot come to any conclusion regarding elements in reality. Thus there is no guarantee that the attempt to have metaphysical foundations on pure logic (like that of Hegel) will come out successful.

The new logic helps and guides logical analysis which amounts to a unified science. There is no question of different sciences with diverse methods but there is only one science. Whatever attains the status of knowledge has place in this science.
To put it differently, there is no fundamental distinction among them, basically they are same. The differences between the sciences are due to mistaken result which arises as we take the help of different sub-languages to put them clearly. Thus the differences are not in the sciences, we are responsible for them.

As the character of logic is tautological, it proves the impossibility of metaphysics. As the premises are tautological, the conclusion says the same as the premises, though the linguistic form is different. There is no scope of inferring one from another. This shows the impossibility of any metaphysics where attempt is made to deduce inferences from experience to something which lies beyond experience, e.g., the "thing in itself". The transcendent, i.e., which lies beyond experience is not an object of experience. Metaphysical concepts are such that are neither reducible to the given nor to the physical. They are illusory concepts or meaningless words to be properly called. They have no importance epistemologically or scientifically.

Any sentence pertaining to science must be subjected to logical analysis. If the sentence in question is proved to be either a tautology or a contradiction (negation of a tautology), then it has its place in the logico-mathematical domain. A sentence is empirical if it has factual content, it is then neither a tautology nor a contradiction. It has truth-value, i.e., it can be declared to be true or false at least in principle because we can consider this sentence from the standpoint of experience. All questions are at least in principle answerable. Philosophical pursuit con-
sists in the clarification of the concepts and sentences of science with the help of logical analysis. The new logic acts as an instrument for this purpose.

Traditional logic is concerned with truth but not in the sense as it is understood in the truth-functional logic. Traditional logic is almost directly concerned with the problem of what truth is (metaphysical) and how to determine it (epistemological) but these two questions do not figure, at least not directly, in mathematical logic. Since mathematical knowledge is not concerned with reality and knowledge thereof, so it is autonomous and independent. Modern logic is the science of valid reasoning, assuming that the propositions involved in the reasoning have their truth-values. But metaphysical logic is not prepared to share this assumption right from the beginning, and therefore it commits itself to some metaphysical and epistemological issues. Therefore old logic is not autonomous like modern logic.

Russell and Whitehead developed a system of Logic. The Principia Mathematica (PM), which, they thought, will be adequate for the purpose of analysis of scientific statements. In fact the language of PM was intended, among other things, for making philosophy scientific. Russell, it appears, considered that a logic from which the whole of mathematics with all its complexities can be derived must be an adequate skeleton (minus the extra-logical vocabulary which the variables replace) of a language capable of expressing all that can be accurately said at all. He came to
think that the world could have the structure of this logic, whose grammar was so perfect, unlike that of the misleading natural languages. As the logic had individual variables in its vocabulary, so the world would contain a variety of particulars, the names of which would be constants to replace, as extra-logical vocabulary, these variables; as the logic required only extensional, truth-functional, connectives between its elementary propositions, so the world would consist of independent, extensionally connected facts. The structure of the world would thus resemble the structure of Principia Mathematica.

Theory of types and its variations help the modern empiricists to eliminate various sorts of contradiction and paradox and puzzle. Later on, the limits of the theory of types have been pointed out by formal logicians like Gödel, on the one hand, and, language philosophers like Ryle on the other hand. That it is a landmark in the history of logic has not been disputed by any. In terms of the theory of type the empiricist could effectively settle a significant part of their problems regarding logical propositions. But their other and more difficult problems were with the empirical propositions, particularly regarding the truth claim and meaning. Metamorphoses of the theory of verification, including those of confirmation, bear out the empiricist's agony over empirical proposition. For him it is not difficult to show that "metaphysical" world is indifferent to the truth or otherwise of logical propositions, which are true by definition or stipulation.
But it is not so easy to show that in establishment and disestablishment of truth and falsity of empirical propositions the world has any say at all.

The PM technique of extensional analysis of proposition has been used first by Russell and then by Wittgenstein in showing that it is fruitful even in analysing and bringing out the truth or otherwise and meaning of non-logical propositions. Russell’s logical atomism is an example of the thesis. The atomists maintain that a language consists of simple, elementary, or in other words, atomic propositions. The truth of atomic proposition is determined empirically. The statement which cannot be reduced to one atomic proposition is truth-function of more than one such atomic propositions, and the truth-value of this statement depends upon the truth-value of these atomic propositions. So atomic propositions contain the final saying. A proposition is said to be true if it corresponds with fact. "Therefore the world must consist of an indefinitely large number of atomic facts to which the true atomic propositions will correspond; and as the atomic propositions are conceived as being logically independent, so these facts must be conceived as being metaphysically independent. Without such correspondence between language and fact it seemed to the logical atomists that it would be impossible to talk about the world at all."7 It can be pointed out that as any non-atomic proposition is the truth-function of atomic propositions, so any non-atomic fact is a collection of independent atomic facts. "To put the matter in a nutshell, if language consists essentially of nothing but atomic propositions there can be nothing to say about the world except to report in atomic propositions those atomic facts to which the atomic propositions correspond."8 The world is thus taken to be of

8 Ibid., p. 15.
identical structure with, and to be perfectly representable by, a language with the structure of the logical language of Principia Mathematica (PM). The theoretical motive underlying the logical language of PM is, in brief, this. An elementary proposition represents a simple fact directly. And the truth of a general proposition is the function of the truth-values of its elementary components. To decide whether a general statement is genuine or not what is to be done is to see if it could be reduced without remainder into its elementary components. In case it is found that a general statement is not thus reducible, then it is logically decided that it is not a genuine scientific statement. Elementary statements are regarded as ultimate verifiers and themselves not verifiable. An elementary proposition is of the form "This is red". And Russell thinks that there is hardly any logical room for doubting the genuineness of such a proposition. An elementary proposition itself establishes its bonafide. The problem of verifiability is closely connected with that of reducibility and translateability. A general proposition is said to have been verified if it can be shown to be logically reducible to or translatable into a consistent set of elementary proposition.

So the truth-functional logic provides the logical positivist with a very sophisticated technique for analysing scientific statements and thereby distinguishing them from non-scientific (metaphysical) sentences.

It is mainly to Carnap that we owe a satisfactory analysis for the first time of the significance of syntax in logic. He
drew the significant distinction between "object-language" and "meta-language", between language about object and language about language (whatever might be its object), between "formal mode of speech" and "material mode of speech". This distinction no doubt presupposes Russell's theory of Type, but it says something more. In short, he points out that the distinction between genuine and non-genuine concepts, between genuine and non-genuine sentences in a language cannot be logically decided inside the language itself, and for the purpose of decision we have to talk in terms of a meta-language of a type different from the type of language in which the alleged genuine and non-genuine concepts and sentences figure or occur. This view has obvious reference to Gödel's theorems of incompleteness and undecidability. Gödel maintains that the decidability or otherwise of the consistency (or inconsistency) of a system (of logic or mathematics or meta-mathematics) has to be discussed at a level other than the one which is itself the object of discourse. It is a semantic requirement of a logical system (formal or informal).

Gödel attacks a principal problem in the foundations of mathematics. It questions the adequacy of Axiomatic Method which takes for granted without proof certain propositions as axioms or postulates and then deduce from them all other propositions of the system as theorems. Uptil Gödel it was assumed that each department of mathematics can be provided with a set of axioms sufficient for deducing methodically numerous true propositions about a particular
department. Gödel, however, points out that this assumption cannot be accepted. He shows that the axiomatic method has certain basic difficulties, for which even the ordinary arithmetic of the integers can never be fully axiomatised. "What is more, he proved that it is impossible to establish the internal logical consistency of a very large class of deductive systems - elementary arithmetic, for example - unless one adopts principles of reasoning so complex that their internal consistency is as open to doubt as that of the systems themselves. In the light of these conclusions no final systematization of many important areas of mathematics is attainable, and no absolutely impeccable guarantee can be given that many significant branches of mathematical thought are entirely free from internal contradiction."  

The abstract mathematics, dealing with the question whether or not the alleged conclusions are in fact the necessary logical consequences of the initial assumptions, naturally raises another important question, viz., whether a particular set of axioms which is accepted as a basis of a system is internally consistent so that no mutually contradictory formulae can be derived from the axioms. But the fact that the theorems already deduced do not contradict each other, does not rule out the possibility that the very next theorem to be deduced may contradict the one or other of the previous theorems. Gödel shows the incompleteness of the axiomatic method. Now, the axioms can be said to be complete if and only if

all tautologous formulae, i.e., all logical truths expressible in the system can be deduced from them. In order to form a complete axiomatised system, there must be a set of fundamental assumptions from which all the true statements can be derived in a particular field. Previously it was maintained that a complete set of axioms can be collected for any particular field of mathematics. To be more specific, mathematicians were of the opinion that the proposed set of axioms for any field of enquiry was complete. If the thing is different, that is, there lies a possibility of its being incomplete, it can be made complete just by adding a few axioms to the incomplete set. Gödel's credit is that he points out the impossibility of such a view.

Gödel's conclusions can be seen from two standpoints. Firstly, he shows "that it is impossible to give a meta-mathematical proof of the consistency of a system comprehensive enough to contain the whole of arithmetic unless the proof itself employs rules of inference in certain essential respects different from the Transformation Rules used in deriving theorems within the system". Secondly, his conclusion "demonstrates a fundamental limitation in the power of the axiomatic method. Gödel showed that Principia, or any other system within which arithmetic can be developed, is essentially incomplete. In other words, given any consistent set arithmetical axioms, there are true arithmetical statements that cannot be derived from the set".

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10 Ibid., p. 58. 11 Ibid., pp. 58-59.
Gödel shows that it is possible to formulate arithmetical formulae which will represent the meta-mathematical statement about a formalised arithmetical calculus within the calculus. Gödel’s method of representation shows that “neither the arithmetical formula corresponding to a certain true meta-mathematical statement about the formula, nor the arithmetical formula corresponding to the denial of the statement, is demonstratable within the calculus. Since one of these arithmetical formulas must codify an arithmetical truth, yet neither is derivable from the axioms, the axioms are incomplete. Gödel’s method of representation also yields an arithmetical formula corresponding to the metamathematical statement ‘The calculus is consistent’ and also shows that this formula is not demonstratable within the calculus”.¹²

Meta-mathematical statement cannot be established unless rules of inference are used which cannot be represented within the calculus, so that, in the process of proving the statement, rules must be used the consistency of which may be as questionable as the consistency of arithmetic itself.

Gödel proves the essential incompleteness of the axioms of arithmetic. This finding leads to the discovery that an absolute proof of consistency for any deductive system may be logically thought of, in actuality, is impossible. It is pointed out that there is huge number of true arithmetical statements not formally deducable from any particular set of axioms in accordance with a

¹² Ibid., pp. 66-67.
given set of rules of inference. It is clear that if number
theory, for example, is considered axiomatically it cannot cover
the field of arithmetical truth. It can also be mentioned that
the process of mathematical proof—the exploitation of a formalised
axiomatic method are not the same thing. A fixed set of
axioms and transformation rules are at the basis of formalised
axiomatic process. All these conclusions show the limitations.

Mathematics, which has been considered to be complete so long,
displays its incompleteness. Mathematics is never complete.

The central part of Gödel's argument can be depicted in the follow-
ing way. "Gödel showed (i) how to construct an arithmetical
formula $G$ that represents the meta-mathematical statement: 'The
formula $G$ is not demonstratable'. This formula $G$ thus osten-
sibly says of itself that it is not demonstrable". But (ii)
Gödel also showed that $G$ is demonstrable if, and only if, its
formal negation $\sim G$ is demonstrable. But an arithmetical
calculus cannot be said to be consistent if a formula and its own
negation are both formally derivable from the axioms of that system.

Now if the arithmetical system is consistent then both $G$ and $\sim G$
are not deducible from the axioms of arithmetic. It comes to this:
if there is consistency in arithmetic the formula $G$ is formally
undecidable. "Gödel then proved (iii) that, though $G$ is not
formally demonstrable, it nevertheless is a true arithmetical for-

13 Ibid., p. 85. 14 Ibid., p. 85. 15 Ibid., p. 86.
ly definable arithmetical property and this is displayed by every integer when examined "(iv) since G is both true and formally undecidable, the axioms of arithmetic are incomplete". To put it differently, we cannot deduce all arithmetical truths from the axioms. Again, Gödel proves that arithmetic is essentially incomplete. If the case is such that some axioms were added so that the true formula G could be formally derived from the new set, there lies every possibility of formulating another true but formally undecidable formula. "(v) Next, Gödel described how to construct an arithmetical formula A that represents the meta-mathematical statement. 'Arithmetic is consistent', and he proved that the formula 'A\rightarrow G' is formally demonstrable. Finally, he showed that the formula A is not demonstrable. From that it follows that the consistency of arithmetic cannot be established by an argument that can be represented in the formal arithmetical calculus". 17

The axioms of a deductive system can be said to be "complete" if every true statement expressible in the system is formally deducible from the axioms. If the case is different, that is, if every true statement expressible in the system is not deducible, the axioms are "incomplete". But it is shown that G is a true formula of arithmetic not formally deducible within it.

16 Ibid., p. 86 17 Ibid., p. 86.
it points out the axioms of arithmetic are incomplete on the assumption that they are consistent. Further, they are essentially incomplete: even if G is assumed as an additional axiom, the new set would still not be sufficient to derive formally all arithmetical truths. Because if the basic axioms were increased in this way, another true but undecidable arithmetical formula could be construed in the augmented arithmetical calculus. The construction of such a formula in the new system can be done by the same process used originally for distinctly formulating a true but undecidable formula in the initial system. The conclusion will be the same, no matter how many times the initial system is augmented. This shows a fundamental limitation in the power of the axiomatic method. Thus the entire field of arithmetical truth cannot be systematised by laying down permanently a set of axioms from which every true arithmetical statement is formally deducible. There is no justification in imposing limits to the inventions of mathematicians in devising new principles of proof. From this it is clear that there cannot be a final precise logical form of valid mathematical demonstrations. In conclusion it can be said that if arithmetic is consistent its consistency cannot be established by any meta-mathematical reasoning whose representation is possible within the formalism of arithmetic. The main philosophic lesson that we are to take from Godel's logical discovery is very important. The early positivist's craze for formalism is, apart from being philosophically unrewarding, logically untenable.
To say this is by no means to deny the importance of formal logic in philosophy. Gödel's momentous discoveries remind us at the same time that whatever is formulable in an axiomatic system is not on that very account proved or established. This theory has a serious bearing upon the concept of L-true (true in a given constructed language) propositions (see, p. infra-Frege). In spite of all ingenuity of the author's artificial language the question of object-world could not be completely internalised. The inexhaustibility of the objects of our knowledge and the incompleteness of a language expressing those object propositions, though logically speaking distinct are philosophically inter-related.

Two operations may be distinguished with respect to a given linguistic expression, particularly, a (declarative) sentence and its parts. The first operation is the analysis of the expression with the aim of understanding it, of grasping its meaning. This operation is a logical or semantical one; in its technical aspect it is based on the semantical rules concerning the given expression. The second operation consists in investigations concerning the factual situation referred to by the expression. Its aim is the establishment of factual truth. The nature of this operation is not purely logical but also empirical. A distinction can be made between two factors in the given expression regarding these two operations. The first factor is that side of the expression which can be established by the first operation alone, that
is, by the help of understanding alone without using factual knowledge. This is usually called the meaning of the operation. And to explicate it Carnap introduced the technical concept of intension. The second factor is established by both operations together. When we know the meaning, we can discover by careful investigation of facts to which locations, if any, the expression applies in the actual state of the world. This factor is explicated by Carnap by the technical concept of extension. Thus, for every expression which we can understand, there is the question of meaning and the question of actual application; therefore, the expression has primarily an intension and secondarily an extension.

In this connection it may be pointed out that there is a similarity between the concepts of 'extension and intension' and that of 'nominatum and sense'. Frege introduced these concepts of nominatum and sense and maintains that for any name a distinction is to be made between its nominatum and its sense. By nominatum of an expression is meant the object named by it. By sense of an expression is understood the way in which the nominatum is given by it. In ordinary, i.e., extensional uses, the two pairs agree with each other. But in oblique, i.e., non-extensional contexts they differ. This points out that between these concepts there is no incompatibility. Theoretically they do agree, but the difference lies in the practical application, i.e., methodological difference. Both the pairs are useful for the purposes of semantical meaning analysis. The notions of sense and of intension have reference to mean-
By meaning is understood that which is grasped of an expression independent of the facts. The thing is different with the concepts of nominatum and of extension. They are concerned with the application of the expression, depending upon factual consideration. But the concepts of extension and intension are contextually independent. "An expression in a well-constructed language system always has the same extension and the same intension; but in some contexts it has its ordinary nominatum and its ordinary sense, in other contexts its oblique nominatum and its oblique sense." So in both the cases while the general aim is the same, viz., the construction of a pair of concepts suitable as instruments for semantical analysis, the specific aims are different. Frege tries to achieve the general aim by an explication of one pair of concepts, Carnap by the explication of another pair. It can be said that Frege's pair of concepts is used to explain certain traditional distinction and Carnap's pair serves the purpose of explaining another distinction.

A method for analysing and describing the meaning of linguistic expressions, which is also known as the process of semantical meaning analysis is of great use to those expressions of a semantical system S which may be called designators. This is called the Method of extension and intension, is developed by modifying and extending certain customary concepts, especially

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those of class and property. Individual expressions (i.e., individual constants or individual descriptions) and predicates (i.e., predicate constants or compound predicate expressions, including abstract expressions) fall within this group. Analysis has to begin with the semantical notions of truth and L-truth (logical truth) of sentences. From the definition of L-truth it is found that a sentence is L-true if its truth is determined by the semantical rules only. No reference to (extra-linguistic) facts is necessary for this purpose. "Two sentences are called (materially) equivalent if both are true or both are not true. The use of this concept of equivalence is then extended to designators other than sentences. Two individual expressions are equivalent if they stand for the same individual. Two predicates (of degree one) are equivalent if they hold for the same individuals. L-equivalence (logical equivalence) is defined both for sentences and for other designators in such a manner that it holds for two designators if and only if their equivalence follows from the semantical rules alone." 19

If there is equivalence between two designators they are said to be of same extension. If, again, there is L-equivalence between them, then their intension is also the same. Now the entities are to be found out which can be accepted as extensions

or as intensions for the different designators. By the extension of a predicator Carnap means the class of those individuals where it is applicable. By intension he means the property which is displayed by it. The extension of a sentence is its truth-value (truth or falsity); its intension is the proposition which it expresses. Lastly, the extension of an individual-expression is the individual which is the object of its reference; its intension is the concept of a new kind known as individual concept.

"A sentence is said to be extensional with respect to a désignator occurring in it if the extension of the sentence is a function of the extension of the désignator, that is to say, if the replacement of the désignator by an equivalent one transforms the whole sentence into an equivalent one. A sentence is said to be intensional with respect to a désignator occurring in it if it is not extensional and if its intension is a function of the intension of the désignator, that is to say, if the replacement of this désignator by an L-equivalent one transforms the whole sentence into a L-equivalent one." If the case is such that two sentences are constructed out of désignators making any two corresponding désignators L-equivalent which points out that they have the same intension, then it is maintained that their intensional structure is also the same. If the truth-value or, in other words, the extension of a sentence is governed by the rules of semantics, then it is said to be L-determinate. "Again, if the extension of a désignator is completely determined by the rules of semantics only without reference to any factual consideration, it is known as L-determinate désignator."

20 Ibid., p. 1.
A designator if it is L-determinate, its intension is also L-determinate. "If a designator is L-determinate, then all designators L-equivalent to it are likewise L-determinate. We shall say of the common intension of these designators that it is an L-determinate intension. For any extension, there are, in general, many corresponding intensions; but there is among them exactly one L-determinate intension." It can be said that an L-determinate intension by its very nature displays its extension. There is point to point correspondence between extensions and L-determinate intensions; therefore, it would be possible, though not usual, to define extensions as L-determinate intensions.

The method of semantical meaning analysis or the method of extension and intension ascribes to every designator an extension and an intension. The formulations in terms of "extension" and "intension" seem to refer to two kinds of entities. But, in fact, no such duplication of entities is presupposed by this method and that those formulations involve only a convenient duplication of modes of speech which can finally be reduced to one. This reductions can be made in various possible ways, but mainly of three kinds: (i) the reduction of extensions to intensions; (ii) the conversion of intensions to extensions; (iii) the transformation of extensions as well as intensions to neutral entities.

21 Ibid., p. 88.
It is possible to define extensions in terms of intension with the help of the concept of L-determinate intension. The concept of L-determinacy may be applied if the universe of individuals in question exhibit a basic order. But this basic order need not be exhibited by the individual expressions of the object language; it is sufficient that it be expressible in the meta-language. With the help of this method we find that to every intension there corresponds exactly one L-determinate intension; the L-determinate intensions corresponding to any two intensions which are equivalent and hence have the same extension are identical; therefore, there is a one-one correlation between extensions and L-determinate intensions. The method consists simply in identifying extensions with the corresponding L-determinate intensions.

Carnap does not believe in two kinds of entities about classes and properties, intension and extension. According to him, the distinction is merely a distinction of two ways of speaking. Russell formulates his symbolic systems with different expressions for properties and for classes, Carnap's systems (S₁ and S₂) deal with only one kind of expression. He develops a neutral Meta-language M. While in M distinct phrases like "the property Human" and "the class Human" occur, in M' there is only the neutral expression "Human". This is equally true of other types of designators. Thus in M' there is no such duplication of expressions as is found in M. This leads to the removal of the apparent duplication of entities.
To show the possibility of construction of M* and of reducing both extensional and intensional designators into the designators of M does not prove anything more than that, given an extensional language and its rules, some intensional designators may be formulated in it. The mere formulability of certain intensional designators (and predications) within the over-all framework of an extensional language does not prove that a consistent intensional language (not within the boundary of intensional language) may be constructed. The impossibility of formulating intensional language without recourse to extensional one becomes evident when we come to the value discourse, i.e., the analysis of Ethical and Aesthetic statements.

To get rid of the inaccuracies associated with expressions in ordinary languages attempts have been made to formalise semantics. But ordinary language philosophers have expressed serious doubt about the advisability of trying to systematise and formalise semantics. For they think that the meanings of expressions, even of logical constants, are never topic-neutral. Ordinary language-philosophers think that the most important part of semantics falls outside formal logic. Ryle says that the formal logician is concerned only with the logic of "and", "not", "all", "some" etc., and the philosopher really is exploring the logic of the concepts of "pleasure", "seeing", "chance" etc. According to him, the fields of the enquiry of the one is different from that of the other. It has been said
that linguistic dealings are somewhat like market-dealings between men. There is a comparable pressure upon language to evolve idioms which may or may not be separate words, to subserve in stabilized ways different kinds of constantly recurring linguistic negotiations.

The distinction between formal semantics and informal semantics is one of degree and not of kind. Meanings of expressions have certainly their forms or fromulae or rules. Viewed thus, even what we call informal semantics may be regarded as formal one. The distinction lies primarily in the fact that while the rules of formal semantics are carefully drawn up by a man (or group of men), clearly stated and rigorously demonstrated, those of the latter are often found to be elastic, ambiguous and varied. But it seems informal semantics can take note of some such expressions which find no place in formal semantics. It has often been said as the price of its rigour formal semantics looses its elasticity and richness. In fact formal semantics serves in the main the requirements of scientific knowledge.

It is often been questioned, particularly after Gödel, whether strictly formalised semantics is adequate for the purpose of formulating and rigorously proving the propositions of science itself.
LESS FORMAL APPROACH TO SIGNS AND SYMBOLS. Signs are important as signs-in-use. Use is to be understood with reference to the user (his organism to be more precise) and the rules of usage. No sign has any intrinsic or natural meaning of its own. That does not mean signs signify "according to" individual's whims and caprice. The rules governing the use of sign vehicles are not ordinarily formulated by the language-users. If they formulate at all, that is only partial. In fact these rules exist as habits of behaviour. As a result of this only certain sign combinations actually occur while only certain other such combinations are derivative and only certain others are applicable to certain place. Sign-significatum is governed by two restrictions - (1) Ontological, and (2) De-ontological, (rule). Whether we can get at certain results depends partly upon (1) and partly upon (2). Morris's emphasis on the concept of biology (organism) other than psychology indicates the radical character of his pragmatics. The semiosis or the sign-using process helps an organism to note relevant properties of absent objects, or unobserved properties of present objects and this shows the general instrumental significance of ideas. When the sign vehicle, i.e., that which acts as a sign, is present, as an object of response, the organism expects a particular situation and can make itself prepared to some extent for the next development. "Considered from the point of view of pragmatics, a linguistic structure is a system of behaviour; corresponding to analytical sentences are
the relations between sign responses to the more inclusive sign responses of which they are segments; corresponding to synthetical sentences are those relations between sign responses which are not relations of part to whole.\textsuperscript{22} It can be said that from the standpoint of behaviour, signs are "true" when they can correctly determine the anticipations of their users. If they are successful in their functions they exhibit clearly the behaviour which is secretly aroused in the anticipation or explanation. "In a systematic presentation of semiotic, pragmatics presupposes both syntactics and semantics, as the latter in turn presupposes the former, for to discuss adequately the relation of signs to their interpreters requires knowledge of the relation of signs to one another and to those things to which they refer their interpreters. The unique elements within pragmatics would be found in those terms which, while not strictly semiotical, cannot be defined in syntactics or semantics; in the clarification of the pragmatical aspect of various semiotical terms; and in the statement of what psychologically, biologically, and sociologically is involved in the occurrence of signs.\textsuperscript{23} Syntactical rules are there to determine the sign relations between one sign vehicle and other. Semantical rules help to connect sign vehicles with other objects. Pragmatical rules decide the conditions in the interpreters under which the sign vehicle is a sign. The formalist maintains that any axiomatic system can be considered as a language and they are not interested with any things which they


\textsuperscript{23} Ibid., pp. 33-34.
express. The empiricist emphasises the necessity of the relation of things to objects which they denote and whose properties they express. The pragmatist is interested to consider a language as a type of activity for communicative purpose. It has a social origin. The members of a social group are able to satisfy their individual and common needs with the help of language. "A language in the full semiotical sense of the term is any intersubjective set of sign vehicles whose usage is determined by syntactical, semantical, and pragmatical rules." This three-dimensional analysis is useful because the validity of all these standpoints can be appreciated because they are interested with the three aspects of one and the same object.

Now it is clear that there is intimate relation between Syntactics, Semantics and Pragmatics because all of them have signs as their subject-matter. But it may be pointed out that the term 'sign' is not defined by them and thus they are not able to define themselves. Syntactics cannot be included within syntactics. It is a separate semiotical term just as 'semantics and 'pragmatics'. Syntactics deals with the formation and transformation rules. It should be remembered that the rules are possible modes of behaviour and involve the notion of interpreter which, in turn, points out that the term 'rule' has a pragmatical bearing. Semantics deals with signs which denote objects or situations, but to have idea of such relation semantical rules of usage are to be taken into account. This, again, shows that the notion of interpretation is involved in an implicit

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24 Ibid., p. 35.
manner. Pragmatics refers only to signs as interpreted. But "interpreter" and "interpretant" cannot be defined without the use of "sign vehicle" and "designatum" — because these terms are strictly semiotical terms. These discussions point out that the languages of syntactics, semantics, and pragmatics are three dimensional in nature. They denote some aspect of semiosis, they possess a formal structure, and they have a pragmatic bearing in so far as they are used. These three standpoints are important for the study of any sign though no one standpoint is sufficient for the full nature of semiosis. Thus in one sense no limit can be attached to either point of view, i.e., no point where an investigator must replace one standpoint by another. The science of semiotic consists of syntactics, semantics and pragmatics who are mutually irreducible components and possess distinct place in it. It is clear that signs are helpful for the acquisition of knowledge. But they have other functions to perform. As there are various purposes served by signs there have developed more or less specialised languages corresponding to various dimensions of semiosis. The mathematical language is used to express inter-relation of terms, the relation to objects and interpreters are not given importance. The language of empirical science is well-adopted to describe nature, the language of morality, the fine arts, and the applied arts are suitable for the control of behaviour. In these cases all the dimensions of semiosis are present. It may be that some of them are subordinated and to some extent transformed by the stress upon one of the dimensions.
Semiotic makes us acquainted with the main forms of human activity and their mutual relations because all these activities and inter-relationship are expressed by the signs. This is an important help and by this confusion regarding the various functions performed by signs can be avoided. In doing so, semiotic actually performs one of the tasks which can be called philosophical from the traditional standpoint. "Philosophy has often sinned in confusing in its own language the various functions which signs perform. But it is an old tradition that philosophy should aim to give insight into the characteristic forms of human activity and to strive for the most general and the most systematic knowledge possible. This tradition appears in a modern form in the identification of philosophy with the theory of signs and the unification of science, that is, with the more general and systematic aspects of pure and descriptive semiotic." 25

When sign analyses the syntactical, semantical, and pragmatical dimensions of particular processes of semiosis is called sign analysis. This view of Morris suggests that he takes the discipline semiosis in a very comprehensive sense. Sign analysis formulates the rules of usage of given sign vehicles. Logical analysis when taken in the sense of logic, is identical with sign analysis. Considered from the narrower standpoint logical analysis is some part of sign analysis, such as the study of the syntactical relations of the sign vehicle in question. It is possible to carry on

sign analysis (i.e., descriptive semiotic) according to all accepted principles of scientific investigation. To some ordinary language-philosophers this claim of scientific semiosis appears rather extravagant.

According to Morris, the relation between the statement and the state of affair is one many relation. Man interprets the relation, he is the mediator. So here lies the question of doubt, anxiety and uncertainty, because the interpretation depends upon the circumstances, socio-logical and biological, of the interpreter.

IV

BACK TO WITTGENSTEIN'S PICTURESQUE WORLD OF ATOMIC PROPOSITIONS. This view of Morris is obviously inconsistent with the correspondence theory of truth and the spirit of realism. One may argue in favour of Morris that if in one many relationship due importance is attached to the identity of one then it cannot be logically deemed to have offended realism. But then, the critic may point out, many interpretations turn out to be more or less arbitrary, giving rise to what the realist says unjustified scepticism. The realist claims that there is at least one level of cognitive encounter of man with reality which is unquestionable. The point has been argued by Russell and Wittgenstein, among others, in different ways.
Against this, Wittgenstein maintains that the relation between statement and state of affairs is of one-one relation. Man has nothing to do in the interpretation, there exists nothing which man can do between statement and state of affairs. An elementary proposition asserts the existence of a state of affairs. A state of affair is that where objects stand in a determinate relation to one another and hence atomic fact. Atomic facts are the self-subsistent simplest things who exist by themselves. Elementary propositions are a group of absolutely basic propositions. No further analysis of them is possible. It is one consisting entirely of names. A name is a primitive sign, it cannot be analysed or verbally defined. The only possible way of defining a name is by ostensive definition in case the name denotes something observable. A name designates an object and objects are simple. An elementary proposition, thus, consists of names that denote simples.

Wittgenstein agrees with Russell on the point that the terms of a proposition can be said to signify something indirectly, through the terms of the simpler propositions into which it is analysed. But if the terms of the latter propositions of the analysis are themselves analysable in other, their meaning will be determined by the meaning of those other terms. This order of dependence continues as long as the terms at each level of the analysis are still definable. But the series cannot be infinitely long. This process of analysis must come to an end at elementary propositions - consisting entirely of names denoting simples.

It is claimed that these simpless are atomic facts. It is claimed that these simpless provide a sort of "rock-bottom" certainty and last answers to the questions which haunt our mind. So-called general facts are construction of elementary proposition showing atomic facts.

It is comparatively easy to defend correspondence theory of one-one relation at the level of elementary proposition; but it is not easy to clarify what is meant by the realist in the case of alleged correspondence between general fact and general proposition. To avoid this difficulty the realist of the rationalist or Platonic pursuasion abandons the correspondence theory and resorts to a sort of self evident theory of truth on the basis of intuitionism. The atomist realist has of course a different answer to this problem. He adopts a sort of reductive strategy. Truth of general statements depend upon their reducibility or translateability to elementary proposition. Wittgenstein holds that there must be a host of absolutely simple propositions in ordinary language, having no logical complexity. Any proposition containing "ands" and "ors" must ultimately consist of propositions which do not contain them. All other propositions of any language, he maintains, can be regarded as being truth-functions of these elementary propositions. Necessary truths will have the character of the tautologies of the logic, impossible propositions (it is raining and it is not raining) will have the character of contradictions of logic, and the remainder, including all the elementary propositions will be empirical proposi-
tions corresponding to the truth-functions of logic which will be true in some conditions, false in others, and whose truth cannot be ascertained by logical means. Wittgenstein thinks that the artificial language of truth-functions is the skeleton of the language of ordinary discourse. This thesis that language is throughout truth-functional is often called the thesis of extensionality. Every statement any one ever makes must, according to the thesis of extensionality, be either a logically simple statement or else a truth-function of such statement.

Tautologies (necessary truths) and contradictions tell us nothing about the world since they are compatible respectively with any or no possible state of affairs. But they are not nonsensical. They have contribution to the symbolism in the same way that '0' belongs to the symbolism of Arithmetic.

The assumptions underlying logical atomism:
(1) The world is uniquely determined;
(2) Each proposition has one and only one ultimate analysis;
(3) Each proposition has a perfectly determinate sense.

Logical analysis was designed by Wittgenstein to bring out the hidden logical form, which rightly understood, is unique.

(4) The early Wittgenstein assumed that there is a distinction between hidden and apparent logical form. "The apparent logical form of a proposition need not be its real one." "Language disguises thought. So much
so, that from the outward form of the clothing it is impossible to infer the form of thought beneath it, because the outward form of the clothing is not designed to reveal the form of the body, but for entirely different purposes.

About definiteness Wittgenstein in PI (philosophical investigation) changed his view. He thought that definiteness or exactitude is context-bound, relative - relative to appropriate form of life. It is not true to say that every proposition has a perfectly determinate sense. Because we speak many things that are vague, inexact, indefinite - but their meanings are clear to all of us and our purposes are served. The error lies not so much in requiring an absolute determinate sense, as in believing that the very idea of such sense is intelligible.

(5) In T (Tractatus) Wittgenstein thought that the boundary between simplicity and complexity is final and one-way. Later on he realised that (a) there is no unique mode of analysis; analysis may move from one end to the other or the converse; (b) analysis is certainly not the only, nor even the most important way of ascertaining meaning. In fact in PI Wittgenstein argues to the effect that the distinction between simplicity and complexity is relative - relative again to context.

What in one context is regarded simple may be regarded otherwise in other context. He gives an example, one inch line, and asks the question: is it simple or complex? The answer he seems to suggest is this that apart from the way of looking at it from a context, i.e., incomplete isolation question cannot be answered.

Meaning does not consist in the method of verification (T). Meaning is use (PI). The name and the thing named should not be abstracted from all language-games, from all contexts of their employment. All that is actually required, in addition to the words themselves, is the behaviour of human beings, the language games which they play with the words. It is the use of the words which make them alive.

Wittgenstein claims that a picture is a fact and that what constitutes a picture is that its elements are related to one another in a determinate way. The question is how can a series of names represent (picture) a state of affairs? How a list of names can be a picture? Wittgenstein writes T2.15(1) "The fact that the elements of a picture are related to one another in a determinate way represents that things are related to one another in the same way."

Pitcher puts the thing in this way: "It is only the structural features of reality . . . that the picture qua fact represents."

Picture may be said to be composed of elements. The elements represent the objects. "Objects make up the substance of the world". (T2.021). The fact that the elements are arranged in the way they are represents the fact that the objects are so arranged in reality.

The elements, i.e., in a proposition are not merely a series or list. They are somewhat like a "nexus" or "concatenation" of names. To quote Wittgenstein's own words "A proposition is not a
medley of words*. He likens proposition to musical notes. The obvious point of similarity is the pattern "displayed" by elements of music (i.e., musical notes) and names in a proposition.

Wittgenstein does not say that propositional signs are pictures; rather, he says that propositions — primarily elementary propositions — are pictures of reality. A proposition is not a "spatial" picture but a "logical" picture of the situation it describes. To be a logical picture three conditions must be fulfilled. (1) The wholes must possess the same number of elements, (ii) there must be one-to-one correspondence between the elements in each whole; (iii) the structure or the principle of arrangement in both must be identical. The way in which the parts of the proposition are connected describes a possible combination of elements in reality. Thus a proposition states something only in so far as it is a picture. A proposition communicates a situation to us, and so it must be essentially connected with the situation. And the connection is that it is its logical picture. So it follows from the picture theory of propositions that the elementary propositions are logical pictures of reality and as all propositions can be analysed into elementary propositions — all propositions are truth-functions of elementary propositions.

Whether a proposition is elementary is determined by its form. Without form we cannot know atomic fact. Atomic fact is immediately given in atomic form. The problem of form and matter is of utmost importance. There can be no idea or impression with-
out form. Form is empty without matter. Matter is always in the form. Now we can take form in one of the various senses:

Form as

(1) Principle of identification
(2) Principle of characterisation
(3) Principle of individuation
(4) Principle of universalisation
(5) Principle of conceiving
(6) Principle of permanence.

One might say, as Wittgenstein does, atomic facts are pictured in atomic form of the atomic proposition. The question is: what sort of relation picturing is? If picturing is one-one relation between one atomic fact and one elementary form of proposition, then the (4), (5) and (6) interpretations of matter-form relations raise certain difficulties.

Re: (4) If form is as particular as the atomic fact is, then what is the rationale of taking form as universal? Re: (5) If form is said to be the principle of conceiving and if form is what makes the picturing of atomic fact possible, one might ask, whether conceiving may not be erroneous?

Wittgenstein's answer that form shows it is open to the objections ordinarily raised against the self-evident theory of truth. Mr. Russell writes: "Self-evidence has degrees: it is not a quality which is simply present or absent, but a quality
which may be more or less present; in gradations ranging from absolute certainty down to an almost imperceptible faintness*.

Let us consider a proposition, say, "The sun is rising", which has been accepted as self-evident. The judgment about the sun, taken in earlier times as self-evident, is now rejected flatly, because it conflicts with our established system of astronomy. Hence, we see, it is the half-conscious recognition that what we are asserting is connected with a sub-system more or less important, of our real world. This theory makes truth entirely subjective. What is obvious to one may not be so to other. There was a time when the opposite of the truth "earth is the centre of the universe" was inconceivable*. But now this judgment is rejected and we accept that "the sun is the centre". What is inconceivable in one age may not be so in another. We have seen that even the axioms of mathematics like "parallel lines cannot meet" no longer appear to be indubitable. Obviousness by itself cannot be the sole test of truth. Re: (b) If form is taken to be the principle of permanence, and the relation between form and matter is said to be one-one then how can we believe rationally that the atomic fact (i.e., "matter") pictured in the form is less permanent than the form itself. In that case it is difficult to distinguish the content or matter and form of atomic propositions in terms of permanence. Re: (1) To identify one thing we need something other than what it is. To identify a proposition as elementary we need a form and corresponding to one atomic fact there is only one elemen-
Further, it must be presumed that there is a necessary relation between that elementary form and its corresponding atomic fact. Here the problem arises as to how to identify that unique elementary form which is appropriate and necessary for the identification of the atomic fact, and from which it is different.

Here again Wittgenstein falls back upon the notion of self-evidence.

If we characterise a unique atomic fact by non-unique character (predicative expression) then how to determine the correctness or otherwise of the uniqueness of the unique atomic fact? For several unique atomic facts may possibly be characterised by the one and same property, character or predicative expression. Re: (2) The problems of identification and characterisations are very intimate. To identify is to give a character. Characterisation tends to ignore or destroy the individuality of the unique atomic fact characterised. For the same characterisation may apply to more than one fact. And in that case the question arises whether the characterisation is successful, or, to put it more radically, whether it is characterisation at all. Re: (3) Atomic fact by the principle of individuation becomes what it is in a proposition and it needs atomic form to determine the particular atomic fact in question. But if the relation is of one-one, the same difficulty arises - how to determine that the principle has individuated, and in fact can individuate the unique atomic fact. In T, Wittgenstein maintains that the meaning of a name is the object it denotes.
But in PI, he criticises this view. It is a misuse of the word "meaning" to use it to signify the thing that corresponds to the name. What corresponds to the name is its bearer, not its meaning. When a man is destroyed, his name remains as it is. It does not lose its meaning. So the bearer of a name is one thing, and its meaning is another. The meaning of a name is given by the various descriptions which apply to the name and enable one to identify it.

It is clear now that it is useless to speak of absolutely simple, indestructible elements of reality, i.e., Wittgenstein's objects and their arrangements, i.e., of state of affairs. As there are no objects, there can be no words to name them and therefore no elementary preposition. With the removal of both that which is supposed to be the picture and that which is supposed to be pictured, the picture theory breaks down and dissolved into nothingness.

The philosophy of Wittgenstein, the way he described it, has no loopholes. Because the atomic facts we get from experience which are basic and unquestionable, and the whole philosophy is a logical construction out of this atomic facts. If this be so, then the whole philosophy becomes unquestionable as the atomic facts are. But this cannot be accepted because in the first place, what Wittgenstein says is against the history of empiricism. Empiricism necessarily leads to scepticism. But in the philosophy of Wittgenstein scepticism cannot enter into; as the atomic facts from experience are basic and everything is logically constructed out of them. Secondly, it is against the history or practice of science.
There are many difficulties in scientific practice and the theory of Wittgenstein does not square up with the practice of the scientists.

So from psychologism there is a retreat to form again. What we get psychologically from experience, we cannot hold them before the eye of mind unless there is a form of it which is universal.

Logical empiricist wants that the task of the philosopher is to logically analyse the statements of science. Philosophy as understood by the logical empiricist is philosophy of science. Different theories of meaning have been formulated to differentiate science (or sense) from metaphysics (or nonsense).

Logical empiricists agree that analysis of scientific statements means bringing out the logical character of the statements of science. They further assume that logic and mathematics (i.e., the language of science) are identical at bottom.

Modern logic is mathematical logic and in the analysis of scientific statements logical empiricists use the fundamental concepts of mathematics. They rely on the authority of Principia Mathematica (of Russell and Whitehead).
THE EMPIRICAL WORLD NOT SO PICTURESQUE. One might say that philosophy of logical positivism is being defined by (a) scientific method and (b) logical language. In other words, whatever is inconsistent with (a) or (b) is on that very ground excluded from the scope of scientific philosophy.

What the basic position of empiricism means:

(1) Whatever we know, particular or universal, we know on the basis of the sensible, the particular;

(2) The sensibles are discrete, atomic, momentary, unconnected;

(3) Whatever is not immediately sensible is questionable.

Being a consistent empiricist Hume ended up with (3). Hume's empiricism is regarded by modern empiricist as psychological analysis of knowledge. By contrast the modern empiricist's analysis of knowledge may be regarded as logical. The question may be raised: what additional advantage the logical analysis enjoys over those of psychological analysis?

Hume thinks that scientific knowledge is conventional abstraction from practical, commonsensical knowledge. Unlike Hume the modern empiricist thinks that scientific knowledge is the para-
Committed to the paradigm character of science as knowledge, the task of the modern empiricist was, according to Hume, rather tame, i.e., to try to show the dogma is correct. Logicism appeared to be a sort of cure of Humean scepticism. The logical empiricist thought that starting with Hume's premise in theory of knowledge one could escape his unfortunate conclusion, through-going theoretical scepticism.

Hume's analysis posed a threat to the prestige of Newtonian science. Kant wanted to vindicate it in one way. One might say that Russell's logic provided logical empiricists another way to vindicate (this time) the glory of (Einsteinian) science.

Reichenbach has expressed concern over the scientific philosopher's excessive reliance on formal (truth-functional) logic, and relative indifference to probability logic. He thinks in order to be fair to the matter of knowledge our reliance on formal logic should be tempered by necessary use of probability logic. Otherwise we run the danger of stifling the growth (the open texture) of science. The method of philosophy, i.e., logic, should not be allowed to logicise philosophy, to fit it artificially to the static logical requirements of formal logic.

The point has been emphasised by Kemeny in a different way. He says that some concepts of science are bound to remain vague, i.e., cannot be defined exactly in terms of any operation. This is particularly true of dispositional and theoretical concepts.
The point of operationalism is that an exact concept must be operationally defined. In other words, the meaning of an exact concept or theory is to be determined in terms of certain operation. Operationism is a variation of verificationism. It has been made popular by Bridgman.

The critics have pointed out that operationism is plagued by all the difficulties of verificationism. Operations as such are not of much significance; they don't take us much further. Operational concepts have no magic in them, since there is no magic in numbers and measurements themselves. It has been said that operations presuppose certain theories. This point of the critic may be met by the operationist. But then the point at issue is how to interpret the theories themselves.

On this crucial issue the operationist and his realist critic hold different views. The operationist thinks that the theories which are in the background of the operations may, in fact must, themselves be interpreted in terms of operations. But this view has been seriously contested by the rationalist - realist, who holds that the theories presupposed by the operations are not wholly amenable to operational interpretations. In other words, the primacy of theory (and not that of operations) is to be clearly recognised. According to the operationist a well-defined set of operations is both necessary and sufficient to define a concept, however theoretical it might be. As opposed to the descriptivist, who thinks theories are primarily designed to describe the structural
properties of the world (or objects thereof), the operationist holds that theories are constructions and the question of their being able to describe the world stems out of a metaphysical theory of knowledge. But the latter thinks otherwise. He holds that the descriptive properties of a theory can never be satisfactorily reduced to, or defined in terms of, earlier operations.

Logical atomism of Wittgenstein may be regarded as a sort of adaptation of operationism. In *Tractatus* Wittgenstein says that the truth of atomic proposition is immediately established. Truth is said to be a relation of correspondence between atomic fact and atomic proposition.

The truth of general statement cannot be immediately determined for "corresponding" to general statements there is no general fact. So the truth value of general statement is to be established reductively or truth-functionally, i.e., reducing the general statements into its elementary sentential components. But the trouble is that the truth of the elementary components into which general statements are sought to be reduced may itself be, in fact has been, questioned. The breakdown of the picture theory of proposition has thrown the reductive method of determining truth value out of gear.

There seem to be two different senses of "correspondence" relevant to a theory of truth. (1) Correspondence as correlation; where correspondence is a weak relation, a mere correlation of the members of two or more groups of things in accordance with some principle, for example, mathematician's one-to-one correspondence.
There is another sense where correspondence is a richer relation of harmony or agreement between the two or more things. This is known as correspondence as congruity. The latter can be qualified as perfect or just, while this is not the case with the former. Now the question is: which of the senses is to be taken in explaining the correspondence theory of truth? Traditional account of this theory is obviously on the side of the latter interpretation: supporters of the theory tended to think of a proposition and the fact it states as two separate complexes which exactly fit each other. The agreement is perfect. Wittgenstein in his *Tractatus* worked out this conception of the correspondence theory more elaborately than had ever been done before, came to the conclusion that at least elementary proposition, those to which all others are reducible by analysis, are perfect (logical) pictures of the states of affairs they describe. The congruity that exists between a proposition and the reality it describes is thus considered to be the same intimate kind as that which exists between a perfect representation of something and that of which it is the representation. Here the difficulties are obvious, for it is just in virtue of a connection between (a) the parts of the proposition and (b) the parts of the fact it describes, that the proposition as a whole is congruent with - i.e., corresponds to the fact as a whole. And naturally the problem is: how to determine, even roughly, how many constituents a proposition has? It is clear that in the proposition "The snow is white", there are exactly three constituents.
But if the same proposition is expressed by saying "snow-white", are we to say that when a speaker of this new language says "snow-white", he is expressing a proposition with only one constituent? If so, how could that be the same proposition as that one with three constituents? It may be answered that the former proposition also has three constituents because when we say "snow-white" what we actually mean is this "The snow is white". But it can be put in a different way. It can be said with equal justice that when we utter "snow-white" we mean snow white, and when we say "the snow is white", it also means "snow-white".

If we say that the two propositions in question are identical, then the identity of them does not depend on the identity of the constituents, but rather on the identity of the facts or state of affairs they describe. But then since the correspondence of two things involves some pairings of the respective parts of these two, if one of these two propositions corresponds to the state of affairs, the other cannot. Because the supporters of correspondence theory define states of affairs as real complex entities with a certain fixed number of constituents.

Again if it is said that the two sentences express one and the same proposition, the number of their constituents has nothing to do with the number of expressions in either of the two sentences. There also arises the problem: How are we to determine this number?
If it is accepted that the search for the number of constituents should be abandoned—because this is unimportant for it has no right answer. But then at the same time we have to abandon the hope of construing truth in terms of correspondence-as-congruity, since this relation of correspondence between two things requires the pairing of their respective parts.

Wittgenstein says that a proposition consists of names, and one element should be the name of the corresponding element of the fact. But our knowledge does not consist merely in naming. To know is not merely to give a name. For example, when we say, "The chalk is white"—we do not simply utter certain names but we describe it. And description involves bringing under a concept and not merely naming. The main defect of this theory is that it says knowledge is the picture of reality. But actually, knowledge is an interpretation of the fact and in knowing a fact we are not picturing or copying a fact but interpreting it.

One condition of this theory is that the structure of both proposition and fact must be identical. In what sense could the structure of knowledge and of fact be identical? Structure means principle of arrangement. As for example, when we project a map, there are certain fixed rules according to which it is done. The projected figure may have no similarity with the original figures. Yet if the rules are obeyed, the map becomes correct. If we accept "structure" in this sense,
then there cannot be any distinction between a true and a false picture. For one can draw a picture by an after thought.

According to Wittgenstein all forms of generalised knowledge can be analysed into atomic propositions. But he himself is unable to give any example of the atomic proposition. Now atomic proposition is something which cannot be further defined or analysed. This may be said of the facts which describe the sense-data, e.g., "this red" and the proposition "This is red" is an atomic proposition. But this also cannot be taken as an atomic proposition. For, here, the word "red" is not a proper name, but a description, and description implies bringing something under a concept.

One test of a theory of truth is that it should not explain only truth but also falsity. For Wittgenstein the world consists of facts. Facts can be stated only by proposition; and there is always fact corresponding to every proposition. Now, if we are to determine the truth and falsity of a proposition, we have to refer it to the fact. But how can we distinguish between a 'true fact' and a 'false fact', for 'false facts do not exist. Hence we cannot distinguish between true and false propositions. All propositions become true.

Wittgenstein believes in direct correspondence as is shown in his picture theory. But this relation of direct correspondence does not hold because of obvious difficulties.
According to Ramsey, the word "truth" is only a linguistic muddle. Truth and falsehood are applied to propositions. A proposition is either self-evidently true (i.e., given) or described to be true, but in any case truth and falsehood apart from propositions are meaningless. They are, by themselves, cannot influence a proposition in any way whatsoever. Yet we take their help when we want to express our convictions to others.

"True" and "false" are the two among millions of words which are used to convey one's ideas to others. Hence they have exactly the same value and status as other words. Words in our everyday life act as symbols. A fact will be a fact independently of our assertions as regards their truth.

Words and sentences are said to be true. A statement is made by an individual at a particular point of time. A sentence is a colligation of words while a statement is made in words. Now it can legitimately be asked when is a statement true. The answer is - when it corresponds to a fact. A fact is a historic situation existing in the world. When words correspond to facts it gives rise to two types of conventions - descriptive, - when it merely tallies with an event or situation in the world, and demonstrative conventions correlate the words (which are statements) with the historic situations (i.e., facts) in the world.

A fact is only an alternative expression for true statement. Wittgenstein has commented in his correspondence theory that

a statement should be reduced to its atomic properties and then it should be found out whether each part of it corresponds to a atom in corresponding fact. Austin believes in indirect correspondence determined by conventions. He suggests the modification of Wittgensteinian theory of correspondence. Austin purifies the same theory and says that one should not concentrate on breaking the statements into atomic ones, but take it in toto. Hence a statement is true when it has a similar fact corresponding to it. But the difficulty of the correspondence theory is that the names given to objects are accidental because there is no necessity about it. It is convention and nothing more which prompts us to attach certain names to certain objects. Because under different circumstances different meanings can be attached to the same object. It is because of this reason the correspondence theory by itself has no status of its own. Though Austin has given a purified version of correspondence theory, it is no better.

Any satisfactory theory of truth must be able to cope equally with the problem of falsity. Because a proposition as soon as it is elevated in the status of a proposition should be judged to be true or false.

One of the obvious difficulty of correspondence theory is that certain statements may be true without having any corresponding fact to it. For instance when you see a chair and say that "this is a chair" or say "this is not a chair", both the statements
are equally true. But in the former there is a corresponding fact to it whereas in the latter case there is not. How would correspondence theory get about answering such questions?

Austin claims to have purified the correspondence theory. According to Austin, a statement is true when it is related in a certain conventional way to something in the world other than itself (i.e., fact). But Strawson points out that this theory needs no purification, but elimination. A statement is that which is judged to be true or false. Speaking the truth is not the manner of speaking but saying something true. The same statement may be uttered in different languages without affecting the truth value in any way. An individual is prompted to make a statement because there must have occurred one episode which made him do so. In case of statements they are referred to an event which is called a fact. A description can fit or can fail to fit the thing or person to which it is applied. When a statement is made, it is at the same time characterised i.e., described and referred to. This act of referring is known demonstration. The object referred to is the material correlate of the referring part of the statement. The quality or property possessed by the referent is the pseudo-material correlate of its describing part. Fact to which the statement corresponds is the pseudo-material correlate of the statement as a whole. Facts cannot be said to exist just as a glass can be said to. Hence it would be proper to say that facts are what true statements state and not that what

statements are about. Facts are there regardless of what we think or say about them. But in our everyday life when we want to communicate to one another and state that something is true we unconsciously fall back upon the facts without which the truth of the proposition cannot be asserted.

Strawson is against conventional relation of correspondence. Austin says that photographs and maps are not true in the way the statements are true because the relation of a map or a photograph to what it is a map or photograph of is not at all a conventional relation. Strawson points out why talk of exceptions, a statement is not supposed to describe the fact to which it corresponds.

To the question what is obedience a philosopher might answer - obedience is a conventional relation between a command and its execution. A command is obeyed when it corresponds to an execution. This is correspondence theory of obedience.

In any case whatever the type of correspondence may be if we try to get at the root of the problem, we should see that we are not carried away by analogies, models or metaphors. We somehow arrive at nothing concrete. It cannot be properly explained what is this fact to which a thing is said to correspond if it is to be true. If we try to explain it properly we can only say why a "fact" is a "fact" and "event in time" and so on. But does this really explain the actual nature of the fact itself? To find out the meaning of the word "true" is to see how it fits in to the frame of discourse.
Strawson points out that facts are unalterable entities. Austin was right in saying that a statement is true if it is found to correspond to a fact of this world. The meaning of the statement is conventionally determined. Hence the meaning of the statement is dependent on the subject - therefore, subjective. But the fact is a hard fact of the world which by no way can be influenced or changed by us. Both Austin and Strawson agree as regards the conventional correspondence, but their difference lies simply in this: Strawson says that by changing the conventions of language the facts can no way be attended. There may be several ways of expressing a proposition to be true. It may be self-evident, "true" may be a just predicate attached to a sentence. You may also make a true statement while you actually witness that which we assert, e.g., while seeing the cow graze, you say "the cow is grazing.

The words "true" and "false" are necessary and indispensable. A proposition or a statement has to be either true or false no matter in what language we express it - in English, in French, or in German. Other words like "exaggerated", "vague", "rough", "misleading", "general" etc. are just ornamental to a language, which is rich shall have plenty of these at its disposal. But these in no way alter the usefulness of the language. "True" and "false" are the only two words no matter in what language they are expressed serve the most important of all its purposes.

It is true that correspondence theory holds in certain cases, but it is also true that it fails miserably in others. It fails specially in cases of existential statements, those which have unrestricted generality and negative statements. It cannot be said that corresponding to any statement which would fall under any of these classes there would be something corresponding to it. Mr. Austin's correspondence theory is successful only in cases of affirmative subject-predicate statements i.e., to statements in making which we refer to some one or more localised thing or group of things in a positive way. It cannot either explain the hypothetical or disjunctive statements.

There can be no sentence which has got no truth-value. 31

Having a truth value is an essential part of each simple sentence as each part of every complex sentence. Falsity is closely connected with "truth" as invalidity with validity. We cannot explain something to be true without knowing what it is like for that thing to be false. Similarly if we judge something to be invalid we would also know that which would make it valid. The meaning (i.e., true, false or valid, invalid) of the things would remain the same no matter in what way we express it. For instance if we say just "p", it is as much true as saying "p is true". The utterance of the word "true" would not make it truer. From this it would automatically follow that true is not a predicate but an essential character of a sentence.

The "truth" and "falsity" if they exist anywhere, they exist in the individual's mind. When we express a statement we merely express our convictions. Our convictions may be true or false depending on the education which we have; is sound or unsound. When two individuals make a bet, each for the time being believes that what he thinks must be correct, but they have to wait for sometime to find out which one of them is in the right and who on the wrong. Similarly in the case of an individual making a statement, at the time of the making he thinks what he states has to be true but the future incidents may reveal that he was entirely on the wrong. Hence the truth or falsity of a statement is ultimately objectively and not subjectively determined. Both bets and statements are conditional because they cannot be totally isolated from the conditions that determine them.

Correspondence theory is correct only in so far as it points out that the truth and falsity of a statement can be determined only by an external force which makes it true or false. But the question of correspondence should not arise because there are as we have already seen plenty of statements corresponding to which there are no facts. We can judge a statement to be either true or false by finding out whether it fits in to a body of statements already existing in the world. This is the realist attitude towards truth.

A statement can be judged to be either true or false only if there is something by virtue of which it can be judged to be so.
It is also important that we should be able to test its truth or falsity in a finite time. This limitation is not trivial, because a statement like "A city will never be built here" contains an unlimited generality which fail the test. It will be similar in the case of the province of mathematics because there too the mathematician does not bother himself with the field which he can never survey.

The truth and falsity of a statement is not explained by merely analysing the truth-values of its terms, but by finding out whether it coheres with other conditions or not. Our investigations into each department may bring forth that which was not there but this bringing into existence is not of our own making but is compelled by other conditions which have already been discovered.

The theory of truth is neither totally subjective nor totally objective. It is something subjective governed by an objective compulsion. It is an individual who judges the thing to be true or false though not according to his whim but by a host of external conditions which are already there.

Truth and falsehood are properties of propositions while validity and invalidity are properties of arguments rather than of propositions or statements. There is a connection between the validity or invalidity of an argument and the truth or falsehood of its premises and conclusion, but the connection is by no means a simple one.
Some valid arguments contain true propositions only, but an argument may contain false propositions exclusively, and be valid nevertheless. This shows although some valid arguments have true conclusions, not all of them do. The validity of an argument does not guarantee the truth of its conclusion. On the other hand it can be shown that although some invalid arguments have false conclusions, not all of them do. The falsehood of its conclusion does not guarantee the invalidity of an argument. But the falsehood of its conclusion does guarantee that either the argument is invalid or at least one of its premises is false.

Validity may be logical, i.e., formal validity and extra-logical i.e., material validity. Scientific systems are formally valid in so far as these are systems of logically connected sentences and scientific systems are materially valid in so far they are systems of factually true (or practically successful) sentences.

The scientist has to establish a link between two worlds, the world of experimentalist i.e., the universe of facts; and the world of the theoretician, i.e., the world of Mathematics. Facts are known and particular, whereas theories are universal and hence can never be known to be entirely true. Because the theories are universal in nature and in principle at least are applicable to an infinity of events. Mathematics is almost indispensable for their statement.

The scientist records his experience in the mathematical language devised by the theoretician. The theoretician tries to
formulate a general mathematical proposition, incorporating the results of experience. Then he develops this theory mathematically, deriving certain predictions of facts. These predictions are, of course, still mathematical propositions, and must be translated back into everyday language before they can be checked.

There are two conditions which an argument must satisfy to establish the truth of its conclusion. It must be valid, and all of its premises must be true. The logician is interested with only one of those conditions. To determine the truth or falsehood of premises is the task of scientific enquiry in general, since premises may deal with any subject matter at all. But determining the validity or invalidity of arguments is the special province of deductive logic. The logician is concerned with the question of validity even for arguments whose premises might happen to be false.

It might be said that we must confine our attention to arguments having true premises only. But it is often necessary to depend upon the validity of arguments whose premises are not known to be true. Modern scientists investigate their theories by deducing conclusions from them which predict the behaviour of observable phenomena in the laboratory or observatory. The conclusion is then tested directly by observation, and if it is true, tends to confirm the theory from which it was deduced, while if it is false, this disconfirms or refutes the theory. In either case,
the scientist is vitally interested in the validity of the argument by which the testable conclusion is deduced from the theory being investigated, for if that argument is invalid his whole procedure is without point. This account shows that questions of validity are important even for arguments whose premises are not true.

It is also to be pointed out that validity and invalidity are characteristics not only of truth-functional (logical) arguments (i.e., where truth functional logical constants occur essentially) but also of non-truth-functional arguments. So this concept of validity is used also in non-logical spheres. This concept is used in Traditional logic and also used in Modern logic. Again it is not pre-eminently a logician's concept. Even in ordinary discourse we make use of the concept of validity. The purely logical concepts like the concept of '→' or '⇒' (implication) can be defined at our sweet will. We can give them stipulative or arbitrary definition. But the concept of validity cannot be so defined. Here the definition is analytic or conceptual. We try to capture the concept and analyse it. There is no mechanical procedure of deciding whether or not any definition of validity is correct. It can be evident intuitively and then we have to test it against actual examples. We can try to capture the concept of validity by the procedure of logical construction, i.e., we make some elementary combinations stipulatively, and then see whether some or other elementary combinations reflect the con-
cept of validity. So a part of the procedure can be explained in terms of stipulative definition; but the logicians are under the obligation to fulfill certain conditions. We can try to define the concept of validity in the following way.

To prove 1. $P \Rightarrow Q$ is valid, first of all certain conditions are to be fulfilled.

(a) $L. E.$ (logically equivalent)
(b) it should not be counter-intuitive. $\sim(C.I.)$
(c) it must be of practical use ($P. U.$).

Now we can define this:

1. $P \Rightarrow Q$ is valid
2. It is impossible that $P$ is true and $Q$ is false.
3. It is impossible that $(P \sim Q)$.
4. It is necessary that $\sim(P \sim Q)$.
5. It is necessary that $(P \supset Q)$.

Here, in this case, no transition from one step to another is counter-intuitive. Here 5 follows from 1 intuitively. This definition of validity in 5 steps is a gradual development and psychologically clarified.
LOGICAL ANALYSIS AND SCIENCE. Philosophy is the logical analysis of scientific language. Let us first see what the above words mean. By logic we mean a system of rules defining relations between propositions. Science is nothing but the systematic development of one department of Nature. It is supposed to be precise, compact and definite. Language is a set of signs connectable by a set of rules. Without a language we are helpless. Because it is the only means by which we can convey to another what we think. Science is totally dependent upon language because as soon as something is discovered or a hypothesis is confirmed, it is necessary to convey the results to everyone concerned. To express the axioms which are the starting points of sciences, language is indispensable.

Now the question may arise: what language would be adequate for science? Ordinary language will not be adequate for this purpose because it is not bothered with the special terms without which sciences cannot advance. Moreover ordinary language is the cause of misunderstanding because sometimes it seems to be ambiguous and obscure. We use vague words when we cannot clearly define them and we hide our ignorance under the shield of vague words. Sometimes we use words that mean too much, i.e., the words which have two or more than two different meanings. There are
also words which arouse emotions. They are to be carefully handled. So it is seen that ordinary language is full of obscurities, and so somehow deficient or faulty, so for the clarification and the dissolution of problems a logically perfect language is to be constructed in place of ordinary language. Again it may be pointed out that without ordinary language, the scientific language cannot be developed. The vague, obscure, indefinite, imprecise ordinary language is the ground of the clear, definite, precise scientific language.

Language deals mainly with signs and symbols. Natural signs are found in case of ostensive definitions, demonstrative symbols, and ego-centric words. In such cases we are definite of what we are talking about. Hence the word "this" is often used to designate the object which we mean. Here the contribution of the individual is very important. Because of this reason this language becomes subjective, hence erroneous. This is the reason why ostensive definitions fail, as there is no ego-centric word. This automatically leads on to the discovery of conventional signs. Certain meanings are attached to certain words because of conventions. This touch of unanimity elevates the status of conventional language. Thus we can define scientific language as a set of conventional signs connectable by a set of conventional rules.

Russell-Whitehead project (PM) is an attempt to offer an adequate language to science. It is assumed in the PM that
there are atomic proposition and atomic fact and there is direct correspondence between them. But such a correspondence is not possible in the actual field. If the correspondence is self-evident then the difficulties of self-evident theory would arise. Otherwise the difficulties of direct correspondence theory would arise. Hence the theory of Russell and Whitehead that all propositions would be true if they are reduced to atomic propositions and are found to correspond to atomic facts is not tenable. Hence what Russell and Whitehead assumed to be true in their PM ultimately breaks down. And with this there has been a terrible blow on the ideal language of science. Mathematical language is supposed to be precise and hence is used by all the sciences. But with the breakdown of scientific language mathematics as well as scientific practice is inadequate and hence suffer. Then the question arises: why then, scientists are using mathematical and geometrical language for the purposes of science knowing full well that these are defective?

Scientific language is essential for the purpose of sciences because the scientists think that ordinary language is vague, obscure and unsystematic and hence they construct a language which they think to be more precise, systematic, and accurate. But that too we find has its own limitations. In any case the foundations of this language is found in the ordinary language. Therefore the task of the ordinary language is more important. Because it is ordinary language on which the language of science depends
for the clarification of its expressions. Mathematical and logical languages are various abstract idealisations of concrete everyday language. Ordinary language is the most perfect meta-language which makes good the deficiencies and defects of abstract higher-order languages.

From this one should not think that ordinary language is an alternative to mathematical or logical language in the domain of science. In fact it is no alternative at all, certainly not in the field of science. The abstract purpose of scientific expression cannot be achieved in ordinary language. Scientific objects are very much unlike our ordinary objects of sense-experience. As scientific objects are abstractions from ordinary sense-objects, one might say, scientific language is an abstraction from ordinary language. The former may presuppose the latter, but one is not a substitute of the other.

The view developed in this chapter, namely, Philosophy is Logical Analysis of Scientific Statements, is intimately connected with, and in the main result of, the view developed in the previous chapter, Philosophy as the Theory of Scientific Statement. The advocates of these two concepts of philosophy share in common the view that science is the main concern, and also perhaps the senior partner, of philosophy. But while the upholders of the philosophy as theory of scientific knowledge assert that however limited it may be, philosophy has an autonomous role of its own and that there are philosophical theories, the defenders of the fourth view repu-
mediate these suggestions. Philosophy, according to them, is nothing more than a technique - logical technique, a reflective and conceptual enquiry into the method of science. In brief, philosophers like Carnap think philosophy is nothing more than a technique and a method of analysis. Those who claim philosophy is more than a technique and method and has its own theories are often criticised by these philosophers on the alleged ground of their being metaphysical and extravagant in their claim. But it is to be borne in mind that the austerity and modesty of the proponents of the fourth view could not save them from the severe criticism from left and right. The pro-transcendental philosophers have accused them of uncritical servility to a narrow concept of logic and science, the ordinary language philosophers have taken them to task for ignoring the fact that artificial languages are hopelessly inadequate to clarify the fundamental notions as truth and meaning.