SYMPOSIUM : THE RELEVANCE OF PSYCHOLOGY TO LOGIC.

By Mr. R. B. Braithwaite, Bertrand Russell and Dr. Friedrich Waismann.

I.—*By* R. B. Braithwaite.

All students of logic will be acquainted with the discussion which occurs at the beginning of every treatise on logic as to the differing ways in which logic and psychology deal with thinking. Logic, it is said, is a branch of philosophy concerned with the nature and formal relations of the objects of thought and with the conditions for the validity of inference : as Johnson defines it, it is " the analysis and criticism of thought." Psychology, on the other hand, is concerned, as analytic or philosophical psychology, with the nature of acts of thinking, and as a natural science it aims at establishing causal laws governing such acts. The two subjects treat of related topics, but their aims are entirely different, and the considerations which are relevant to one are irrelevant to the other. For psychology deals with acts of thinking as events in time and the causal relations between them ; logic deals with timeless propositions and their timeless logical relations.

Such is the orthodox doctrine, which I believe in the main to be correct. My excuse for re-opening the subject is that of recent years some of the principal problems of logic, those concerned with meaning, with knowledge and rational belief, where logic overlaps epistemology, have presented such difficulties that many philosophers and more psychologists have attempted to deal with them " naturalistically " by invoking the aid of the causal laws of psychology. In particular, Bertrand Russell, since his welcome return to philosophy (in the academic sense of the word), has treated these questions psychologically in two papers to the Aristotelian Society : " The Limits of Empiricism,"

published in the *Proceedings*, 1935–1936 (which will be referred to as E), and the Presidential Address " On Verification " delivered on November 8th of last year, which will be published in the *Proceedings*, 1937–1938 (I shall refer to this as V : since it is not yet publicly published I shall give somewhat extensive quotations from it). My contribution to this Symposium will be mainly devoted to criticism of some of the doctrines of these two papers. I am concentrating my attention on them partly because Russell is the only " psychologizing " logician whom I know who appears to be at all aware of the philosophical objections to the psychological method of treatment and who makes heroic attempts to meet them, and partly to express my respect to the Aristotelian Society's President, from whom I, in common with all my contemporaries, have learnt so much. It is notorious that the only way in which a philosopher can show his gratitude to his master is by trying to tear him to pieces.

It is only right to mention that these papers of Russell contain various important discussions which are not germane to the subject of this Symposium. The first paper (E) addresses some very pertinent questions to the mathematical finitists. The second paper (V) contains a cogent criticism (with which I am in complete agreement) of the purely formal treatment of language by some Logical Positivists. It also includes a psychological treatment of the verification of statements about the future in terms of " expectation " which is relevant to this Symposium and which I should have criticized if my contribution had not seemed quite long enough without it.

The topics which I am selecting for discussion are those of the meaning for me of a sentence which I use to express a fact which I directly know, and of the nature of my direct and indirect knowledge. Although Russell holds that " ' meaning ' is essentially social " (V. 8), he does not discuss in these papers the extremely difficult problems concerned with " public " meaning and communication. Nor does he discuss the relation of " public " knowledge to " private " knowledge. Although he sometimes uses " we "

instead of "I" or "he," the problems he treats are exclusively those of the meaning of words to the speaker and of the knowledge possessed by one person. Like him, I shall confine myself to these "private" problems, and shall usually discuss them in egocentric language.

A remark about terminology may be helpful. I shall take Russell to task for treating what is really the question of direct knowledge under the heading of belief; but in quoting and commenting on him it is convenient to use his language; so I shall use "belief" in a sense which permits of a case of belief's being also a case of knowledge. A "proposition" Russell defines as "that which remains unchanged when a sentence is translated from one language into another, or from speech into writing or *vice versa*" (V. 1). This is a very bad way of distinguishing a proposition from a sentence (does not the paper on which I write an English sentence "remain unchanged" when I write below its translation into French?); but Russell's intention is clear: he proposes to use the word "proposition" for the common meaning of sentences which have the same meaning. I shall follow Russell in using the word in this wide sense: "proposition" will then in certain cases cover what may also be called a fact, and it will be good sense to speak of knowing a proposition. In my talk of "*pronouncing token-sentences of a type-sentence*" I am using the language of Professor Stebbing's Inaugural Address to the Joint Session of 1935; and I borrow "probabilification" from Professor Price's Inaugural Lecture.

A.—Meaning.

In *The Analysis of Mind*, Russell advocated a general causal theory of meaning, and his recent articles show that he still holds such a theory of meaning. "It is in virtue of their causes and effects that words have 'meaning' . . . In a person who knows a language, there are causal relations between words and what they mean: a cat causes the word 'cat,' and the word 'cat' causes expectation of a cat, or perhaps the actual sight of one. These causal

relations constitute the understanding of a language." (E. 135.) But in neither of the recent papers does he discuss the question in general: in the first of them he discusses the causal theory of meaning in relation to cases of direct or incorrigible sense-knowledge, in which the causal theory is perhaps particularly plausible but which, as he sees, present a peculiar difficulty for such a theory of meaning. So, in discussing the theory, I shall confine myself to such a case.

Russell describes such a case in the following language. " Suppose that I see a cat and say ' there is a cat ' . . . I doubt whether any empiricist will deny, in the case supposed, that I know (1) a sensible fact expressed, perhaps inaccurately, by the words ' there is a cat ' ; (2) that I say ' there is a cat ' ; (3) that I say ' there is a cat ' because a cat (or a sensible appearance resembling that of a cat) is there." (E. 135–136.)

In his discussion of this case, and elsewhere in similar contexts, Russell speaks of what *we* know and when *we* know that *our* words express something. But the " we " is here the editorial " we " : Russell would not wish to maintain that I have direct knowledge of a causal relationship between someone else's sense-experiences, as he wishes to maintain that I have of one between my own ; and the problem he is discussing is only that of *my* direct knowledge. So his " we," " our " in the following quotations should be read " I," " my."

Before stating and discussing Russell's analysis, I must comment upon the three facts which he says he knows in his cat case :—

(1) It is clear from (3) and from Russell's remarks in other places, that he is using the sentence " There is a cat " to express not a fact about a material object cat, but a fact about a " sensible appearance resembling that of a cat " (called in another place " a visual occurrence which I classified as feline " : E. 137.) He is using the sentence, therefore, to express a proposition about sense-data for whose expression we have no convenient language. Provided that I make clear that I (like Russell) wish only to

discuss in this section propositions about sense data, I don't think that confusion should result from my following Russell in using language which is, strictly speaking, incorrect.

(2) Russell modifies my saying " cat " into my intending or willing to say " cat," since whether or not I am in fact able to utter the word is irrelevant. I agree that my being gagged or paralyzed does not affect the question of meaning, for presumably when I with a gag in my mouth am trying to say the word " cat " I am using some symbolism, visual, auditory, kinæsthetic or laryngeal, which is synonymous with the word " cat ", even though I cannot specify it in any other way. The general question of whether or not I can think at all without using symbols is not at issue : Russell is only considering meaning when there are symbols used by me ; so the question of my being compelled by force of circumstances to use symbols other than spoken words does not seem to me important enough in this discussion to make it worth while to complicate the exposition by allowing for it. So I shall assume that the symbols I use are always spoken words, which I hear when I am pronouncing them.

(3) It is (3) that (as Russell says) " raises difficulties," some of which, I feel, are due to Russell's language :—" I say ' there is a cat ' because a cat (or a sensible appearance resembling that of a cat) is there." What does Russell mean by " because " ? I think that there is no doubt that he is using it to express a relationship of " expressing." For he introduces his discussion with the remark that " we [I] must believe that my words ' express ' a piece of knowledge . . . though the word ' express ' remains to be defined." (E. 135.) And he follows the statement that " it is (3) that raises difficulties " by the sentences :—" What do we [I] know when we [I] know that our [my] words ' express ' something which we [I] see ? I see a cat and say ' there is a cat.' Someone also says ' why did you say " there is a cat " ? ' and I reply ' because I saw a cat.' I feel just as sure of the second statement as of the first." (E. 136.) So I think that I am not doing an injustice to Russell in stating his (3) in such a way as not to use the word " because " :—

namely as the conjunction of the three propositions : I say " there is a cat " ; there is a cat ; " there is a cat " expresses that there is a cat. The first two of these propositions are merely (2) and (1) repeated : the extra proposition, which I will call (3′) is the one whose analysis raises the relevant difficulties.

But my statement of (3′) requires qualification. The sentence " there is a cat " does not express that there is a cat to a Frenchman ignorant of English, nor does it express it if I am using the word " cat " to mean dog. What is true is that the particular sentence used by me on a particular occasion expresses for me that there is a cat. If (2) is analyzed into the conjunction of the two propositions : (2*a*) I pronounce *s*, and (2*b*) *s* is a sentence of the type " there is a cat "—where *s* is a demonstrative symbol (a " logically proper name ") used to stand for the particular sentence which I am using on the particular occasion, then (3′) can be restated as *s* expresses for me that there is a cat. Or, in the language of Professors Moore and Stebbing, (2*b*) = *s* is a token-sentence of the type " there is a cat," (3′) = I attach the meaning that there is a cat to *s*.

We now have the four propositions all of which, on a suitable occasion, I know :—

(1) There is a cat ;

(2*a*) I am now pronouncing *s* ;

(2*b*) *s* is a token-sentence of the type " There is a cat " ;

(3′) I attach to *s* the meaning that there is a cat.

Russell's contention is that the proposition (3′) states a causal relationship between the sensible appearance of the cat which I see and the words which I pronounce, and that this relationship is one which, in the cat case, I directly know. " I think that the word ' because ' (in sentence (3)) must be understood as expressing a more or less causal relation, and that this relation must be *perceived*, not merely inferred from frequent concomitance " (E. 137). Elsewhere he speaks of the perceived relation as being " at

least partly, that of cause and effect" (E. 136), as "the relation of causation, or some relation intimately connected with it" (E. 137), and as a "causal or quasi-causal relation" (E. 137). The reasons Russell gives for qualifying in this mysterious manner the "causalness" of his perceived relation are that it "may be one which is only present in some instances of causation, not in all," and that "it differs from causation as ordinarily understood in science in one important respect, namely that certain conditions must be present if the antecedent is to give rise to the consequent" (E. 138). Neither of these reasons seem to me good ones. For the ordinary treatment of causality and causal laws allows for the possibility that the causal law in question only holds between things of a certain sort (*e.g.*, the laws of physics can only refer to physical events), and that the cause may be only a part-cause. It is not necessary to introduce "quasi-causation" to deal with these obvious facts. So I shall ignore Russell's qualifications, and shall take it that he wishes to assert that, in the cat case, I directly perceive that my seeing the cat is a part-cause of my pronouncing the words.

I can hardly *argue* against this position. All I can say is that, to the best of my knowledge, I do not perceive such a relationship. I believe that sometimes in cases like the cat case, such a causal relation holds: I believe that, under certain conditions, my seeing a cat is a part-cause of my saying certain words; but this belief is one to be justified inductively: it may be so strong and so reasonable that it is legitimate to call it (if it is true) knowledge, but it is never direct knowledge. And as in all cases where direct knowledge is alleged, there can be no profitable argument. Russell says that I perceive something which, so far as I know, I do not perceive.

Russell's doctrine that, in reference to "meaning," I sometimes directly know a causal relationship is in many ways analogous to the contention of many philosophers that I directly know a causal relationship in cases of volition. According to both views, I can know directly that one thing is a part-cause of another without knowing the other

necessary conditions, and I can know directly that one thing is a causal ancestor of another without knowing the intermediate links in the causal chain. These consequences seem to me very difficult to stomach.

But there is a particular objection that can be urged in the case discussed by Russell. Russell analyzes (3′) into (1) is a part-cause of (2*a*) ; and says that I directly know this. But direct knowledge of a relationship between facts entails direct knowledge of both of the facts : I cannot know a complex fact made up of other facts in certain relations without knowing these separate facts. At least this seems to me the case in all other cases of direct knowledge of relationship of facts : I can't speak for direct knowledge of causal relationship because I don't believe in such knowledge. When, for example, I directly know that one fact about my visual field is earlier than another, I must know both the facts separately. And it would seem very strange, to put it mildly, if I could know directly that *p* was a part-cause of a fact *q* without knowing directly both *p* and *q*. Nevertheless, if Russell's analysis of " expressing " is right, I must be able to know this directly in his case. For I can perfectly well know that *s* expresses for me that there is a cat when in fact there is no cat. That is to say, I can use a sentence of the right type to express something which is false. Of course I should in such a case be deliberately lying : there is no possibility of innocent error, since (following Russell) I am taking There is a cat to be a proposition which is directly known to be true or directly known to be false. But an analysis of meaning must leave a place for lying.

A supporter of Russell's theory would doubtless meet this objection by saying that he was only concerned with cases in which I was using language to express something known to be true : and that my use of language to express something known to be false must be treated differently. To which I should rejoin : What justification is there for treating it differently ? and how should it be treated differently ? I see no satisfactory answers to either of these questions.

A reason which tends to confuse the issue is that there is a proposition about the " meaning " of *s* which is only true when there is a cat, namely, the proposition that *s* is valid for me. For the proposition that *s* expresses for me that there is a cat entails the proposition that *s* is valid for me if and only if there is a cat : consequently, assuming (3′), the proposition that *s* is valid for me is only true under the actual condition of there being a cat. But the proposition (3′) itself—that *s* expresses for me that there is a cat—is logically independent of the fact (if it be a fact) that there is a cat.

It is obvious from Russell's exposition that he is not at all enamoured of his analysis, and that he only puts it forward because he can think of no other way of accounting satisfactorily for his knowledge of meaning in the cat case, which he rightly takes to be fundamental. The difficulty arises out of there being a set of three propositions which, taken separately, appear very plausible but which, taken together, are logically incompatible. This " inconsistent triad " consists of the three propositions :—

(*a*) The relation of meaning holding between " cat " and the cat presented to me is a causal relation ;

(*b*) I know directly that " cat " means the presented cat ;

(*c*) I never know directly that a causal relation holds.

A holder of the causal or " naturalistic " theory of meaning is committed to (*a*) : he must therefore deny either (*b*) or (*c*). Most " naturalists " deny (*b*) and say that, although in suitable cases I do know that a word means the thing it stands for, this knowledge is always indirect and is based upon other empirical knowledge. That I use the word " cat " for a cat and not for a dog is to be justified inductively by experience of, for example, my vocal reactions to cats. Russell is clear-sighted enough to see that this is a grossly inadequate explanation, and consequently he is compelled to deny (*c*) and to assert direct knowledge of causal relationships. I am convinced that

the right method of dealing with the inconsistent triad is to deny (*a*), and to produce some other, non-naturalistic, account of the relation of meaning. I will try to give such an account for the perplexing problem of Russell's cat.

The clue to the solution lies, I think, in a proposition which has not yet been considered—a general proposition about my use of language at the time at which I am speaking. Consider the proposition (4) : Any language which I am now using I am using in such a way that to every token-sentence of the type " There is a cat " I attach the meaning that there is a cat. This proposition (4) is logically related to (2*a*), (2*b*) and (3′) in the same way in which Any Conservative Prime Minister is generally respected is logically related to Mr. Chamberlain is a Conservative, Mr. Chamberlain is a Prime Minister, Mr. Chamberlain is generally respected. (3′) is a logical consequence of the conjunction of (4), (2*a*) and (2*b*).

Moreover if I am asked (or ask myself) what is my reason for knowing (3′)—that I am attaching a certain meaning to the particular sentence *s*, I should have to say " That is the way in which I was using the words at that minute," *i.e.*, I should give as my reason proposition (4). My knowledge of (3′) is of course incorrigible, if my knowledge of (2*a*), (2*b*) and (4) is incorrigible ; but it is based on my knowledge of these three propositions in the sense that they are the reasons which I should give in answer to a demand for my reasons.

How do I know this major premiss (4) ? I answer that I sometimes directly know it by introspection. In the cat case, for example, I should say that introspection tells me directly and incorrigibly that I am using language in such a way that any token-sentence of type " There is a cat " is to mean that there is a cat. That is to say, I know directly and incorrigibly that I am using language in the particular way in which I am using it at that moment, which in the cat case is also using language in its ordinary sense. I may, of course, also use language in a non-ordinary way, " private " sense : I may use a token-sentence of type " There is a dog " to mean that there is a

cat. But in this case also I may know directly how I am using language.

It is tempting to say that my knowledge of (4) is itself derived from a set of premisses one of which is (3′). For the conjunction (3′) together with (2*a*), (2*b*) and the new proposition (2*c*) that no sentence other than *s* is both pronounced by me and is of type "There is a cat," entails that to all token-symbols of type "There is a cat" pronounced by me now I attach the meaning that there is a cat, since there is only one such token-symbol. Just as the four propositions Mr. Chamberlain is a Conservative, Mr. Chamberlain is a Prime Minister, no one except Mr. Chamberlain is both Conservative and Prime Minister, Mr. Chamberlain is generally respected together entail that all Conservative Prime Ministers are generally respected. But my proposition (4) is wider than the proposition (call it 4′) entailed by (3′), (2*a*), (2*b*) and (2*c*). (4′) states merely that all the token-symbols of the right type which I am in fact using have in fact a certain meaning attached to them by me: it is equivalent to the purely negative proposition that there are no token-symbols of the right type used by me which have not a certain meaning. Consequently it is true if there are no token-symbols of the right type used by me; and if in fact I am pronouncing one and only one token-symbol of the right type, to which symbol I am attaching the meaning, it logically follows. But my proposition (4) states also something about unrealized possibilities: it states that, whether or not I am pronouncing token-sentences of the required type to which I attach the required meaning, if I pronounced other token-sentences which in fact I am not pronouncing, I should attach to them also the required meaning.

This proposition is a general proposition of the sort which have caused so much trouble to philosophers—general propositions about unrealized possibilities. Causal laws are general propositions of this sort, and the problems of the nature of "causal necessity" are essentially problems of the analysis of these general propositions. I do not propose to discuss what I take to be the correct analysis;

except to say that I think that Ramsey's and Carnap's method of treatment of such propositions is the correct one. The essential feature of such a proposition, according to these authors, is that from such a proposition together with a particular proposition another particular proposition logically follows. Proposition (4) is the proposition such that from it and (2*a*) and (2*b*), (3′) logically follows. And such that from it and propositions similar to (2*a*) and (2*b*) in every respect except that they are about some particular symbol other than *s*, the proposition corresponding to (3′) logically follows. When (as in the cat case) I know by introspection that I am using symbols in such a way that these " consequence-relations " held, I know (4) directly and base my knowledge of (3′) upon it.

I should not wish to maintain that whenever I ask myself how I use language on a particular occasion, I can always give an incorrigible answer. To take the famous case of the heap, I don't think I know incorrigibly whether or not I use the word " heap " in such a way that There is a heap of stones entails that there are more than 100 stones here. And I certainly don't know incorrigibly whether or not I use the arithmetical words and symbols in such a way that the primitive propositions of arithmetic entail Fermat's Last Theorem. But in the case where my use of language in question is that a token-sentence of type " *p* " means that *p*, it seems to me that if I consider the matter I always know incorrigibly whether or not I am using language in this way.

These general propositions about my use of language at a particular moment are what have been called " rules." This word is not very appropriate for two reasons. In the first place the ordinary use of " rule " is for some law laid down by authority beforehand : to use it in connexion with propositions about how I use language makes it appear as if how I use language was somehow settled before I used the language in question, which is not usually the case. It is only so when I deliberately introduce a new word into my language by definition, explicit or implicit : I do settle to use the words " is hygroscopic " as synonymous with

" absorbs water from the air," before I in fact use the word " hygroscopic." But when I learnt the use of the word " cat," I did not first of all learn that There is a cat entails that there is an animal, entails that it is false that there is no cat, etc. I used " cat " first, and subsequently (if at all) considered how I was using the word " cat." In the second place it seems wrong to call an empirical proposition a rule, since rules are expressed in the imperative and not in the indicative.

So I should prefer to use the word " rule " not for the whole proposition about my language, but for what is expressed by the adverbial part of the sentence expressing such a proposition. To take the cat case, the rule would then be expressed by the adverbial phrase " in such a way that any token-sentence of type ' There is a cat ' is to have the meaning that there is a cat attached to it." Call this rule R. Then the proposition (4) can be expressed as " I am now using language in accordance with R " or " I am now using language R-wise." The rule-phrase qualifies adverbially the sentence " I am now using language." Thus a rule is not a proposition at all, and the nasty question as to whether it itself is logically necessary or contingent (a question discussed at the Joint Session of 1936) does not arise. To treat rules in this way will clarify other problems. For example, to take the sentences which occur in Carnap's formal treatment of language as expressing rules in my sense rather than propositions will avoid, I think, many of the criticisms that can legitimately be urged against Carnap's method. Carnap's " pure syntax " would then treat of rules, not of propositions : propositions about the usage of language according to rules would fall under a different classification, corresponding to Tarski's realm of " semantics." But I obviously must not pursue this matter here.

To return to the cat case : the fundamental fact, so I maintain, is that I can know directly that I am using language in a certain way. This important proposition is a general proposition about unrealized possibilities. I should not call it a causal proposition : I should prefer to classify it separately as a semantical proposition ; but anyone who

held that a causal proposition was simply a universal empirical proposition about unrealized possibilities would, of course, call it causal. Such a person might say that I was in agreement with Russell upon his main point, that in the cat case I directly knew a causal proposition. But the causal proposition which Russell says he perceives is quite different from the general proposition (call it causal if you like) which I think I directly know. Russell's proposition entails the presence of a cat: his relation "can only be perceived when it holds between two parts of a sensible whole" (E. 138): in an ordinary sense of the word "about," it states something about the cat's presence and something about the effects of the cat's presence. Neither of these, in my view, enter into the question. Except in a very peculiar sense of "about," my proposition is not about the cat at all: it is about my use of the word "cat." How I use language is logically quite independent of any non-linguistic facts (with a possible exception in the case of my use of demonstrative symbols): I may use the sentence "There is a cat" to mean there is a cat, whether or not there is a cat present; and if I choose, I may use the sentence "There is a dog" to mean there is a cat, whether or not there is a cat or a dog present. The problem is that of how I use my language, not of what causes me to utter certain sounds.

B.—Direct Knowledge.

In his Presidential Address to the Aristotelian Society this year ("On Verification") Bertrand Russell treats, among other topics, of the problem which has greatly exercised the minds of contemporary philosophers: Is there any direct and incorrigible knowledge; and, if so, what is the nature of such knowledge? Like all philosophers who are not adherents of the Coherence Theory of Truth (represented, to mention two recent books only, by C. R. Morris' *Idealistic Logic* and Carnap's *Logical Syntax of Language*), Russell believes that there is direct knowledge; and since I agree with him, I shall not discuss this, the main question,

at any length. But the account which he gives in his Address of the peculiar nature of this type of knowledge is based upon psychological considerations which I believe to be absolutely irrelevant to the question at issue. And it is these considerations which I wish to discuss.

I have said that Russell accepts cases of direct and incorrigible knowledge because that is the simplest way of saying that he disagrees with the coherentists. But Russell does not discuss the question in terms of knowledge (the word in fact does not occur until half way through his discussion) : he discusses it in terms of *belief* in " basic " propositions. And he gives a definition of such propositions in psychological terms.

" By a ' basic ' proposition I mean one which is completely believed in virtue of a single experience " (V. 2). But this is " only a preliminary definition," and Russell qualifies it later : " Let us add to our definition of a ' basic ' proposition a clause which will not take us outside psychology : let us add that it is to be one which we cannot be led to doubt either by reasoning or by subsequent experience. I am still taking this in the sense of what this or that individual cannot be made to doubt " (V. 4)—so the " we " of the first clause is to be understood in the singular. Still later he restates the definition in a slightly different way : " For every individual, there are, at every moment, ' basic ' propositions, *i.e.*, propositions which he believes in virtue of some particular experience, and which, for the time being, he cannot be made to doubt " (V. 6).

My comments on these definitions, and on Russell's exposition of them, are as follows. In the first place, Russell is concerned, as he says, " with what people actually do believe in virtue of experience, not with what they ' ought ' to believe " (V. 2). The use of the word ' ought ' here is not clear ; but I take it from the context that Russell wishes to exclude a proposition which I should believe in virtue of a single experience if I had that experience, although in fact, not having that experience, I don't believe it. A basic proposition for Russell is then a particular sort of *creditum*, not a particular sort of *credibile*. Now a pro-

position in itself is not necessarily believed ; it is only necessary that it could be believed : so the *differentia* of a basic proposition is of a double kind—that the proposition should in fact be believed, and that it should be believed in a particular way.

Secondly, what is this particular way of belief? What does Russell mean by " in virtue of a single experience " ? It is pretty clear that he means by this something causal. He takes the instance of someone reading or appearing to read the words " Santander has fallen " in a newspaper ; and says that, whatever is the basic proposition which you believe—whether it is a proposition about Santander or about words on the page or about shadows on the paper—you would " believe *something* as a result of what you had seen, and this something would be a basic proposition " (V. 3). " As a result of " is presumably used here to express the causal relation which I have discussed in Section A of this paper.

Thirdly (and this is the question of particular importance in connexion with direct knowledge), what does Russell mean by his phrase " cannot be led (made) to doubt " ? He introduces his qualifications " to ensure at least the possibility of [basic propositions] being always correct " (V. 4) ; by which he must mean to ensure the possibility *in principle* of all basic propositions being true, since even without any criterion of indubitability it *might* be the case that all propositions believed as a result of causes of a particular sort were true. This possibility can, according to Russell, be ensured by a consideration " which will not take us outside psychology " (V. 4) ; and this remark (together with Russell's expressed wish to eliminate in his definition " all the logical and epistemological elements in the problem " (V. 2)) implies that the " cannot " of the definitions is a causal " cannot." Russell must mean that a basic proposition is one which it is psychologically impossible for me to doubt. That is, the causal laws governing my mind are such that there are no facts which together with these laws would entail my doubting a basic proposition. The principal difficulty, however, about

Russell's qualifying phrase is that the two statements of it given by Russell are quite obviously inconsistent. On p. 4 he says that a basic proposition " is to be one which we cannot be led to doubt either by reasoning *or by subsequent experience* " ; on p. 6 he says that it is one " which, *for the time being*, he cannot be made to doubt." According to the latter definition a proposition which it is psychologically impossible for me to doubt for the time being (presumably this means at the time when my belief in it is caused by the observed fact in the appropriate way) is a basic proposition, even though later facts would lead me to doubt it ; and one of Russell's examples accords with this definition. " I have often doubted whether it was raining or not, but I had no doubts on the day when I travelled thirty miles on the roof of a horse-drawn coach from Ullapool to the railway ; and if there exists a sceptic who could have suspended judgement on that occasion, ' I desire ' him ' to be produced '." (V. 5.) But it is surely the case that if Russell had later become convinced that he had been in a state of hypnosis on that day and that his hypnotist had suggested to him that he would believe completely that it was raining, he would have been led to doubt that it was raining on that occasion.

It seems to me quite impossible to defend a definition of basic propositions in terms of psychological indubitability, if the indubitability in question is merely indubitability at the moment. For if I completely believe any proposition whatever, that complete belief, though it does not exclude the possibility of doubting the proposition at another time, does exclude the possibility of doubting it at the same time as that at which I am completely believing it. If " doubting " is to be defined in terms of disbelieving or of believing with less than certainty, believing completely and doubting are logically incompatible. But even if " doubting " means something independent of belief, believing completely and doubting will be psychologically incompatible, since there are psychological laws preventing a person doing both at the same time. So if I completely believe any proposition whatever, I cannot doubt it *for the time being :* and indubit-

ability, in this sense, cannot be the distinguishing feature of basic propositions.

So I shall assume that Russell's first definition of indubitability holds good, and that a basic proposition is one which I cannot be led to doubt *subsequently* to my completely believing it. Now this account has considerable plausibility : it appears to settle a difficult problem of epistemology by reference to psychological considerations. Of course Russell would not profess to know exactly what are these psychological considerations ; he would not profess to know what are the laws of his mind which prevent his doubting : but the philosopher may, Pilate-wise, rejoice in ridding himself of an awkward case by handing it over to the scientist. Philosophers have frequently done this in other cases (*e.g.*, that of continuity and infinity) to the satisfaction of everyone—though it must be confessed that in the case of infinity the mathematicians have unfortunately returned the case to the philosophers.

But I do not think that to hand the question over to psychology solves the important epistemological question—that concerned with direct incorrigible *knowledge*. Russell's criterion for incorrigibility is indubitability. But these are quite different : the first is in terms of a logical impossibility, the latter in terms of a causal impossibility. It may be the case that the laws governing the workings of my mind are such as to prevent my ever doubting a proposition, but that does not entail that I never ought to doubt it—that I shall never have evidence which, if I were rational, should make me disbelieve it. And it is this that is entailed by my belief being incorrigible. To take the case of Russell's belief that it rained during the coach journey and the possibility that he might have been hypnotized at the time, if he is irrational enough he may never be prepared to admit that he had been hypnotized, however strong the evidence ; so that he would never be led to doubt the proposition. But that does not show that his belief was incorrigible, only that Russell was unreasonable in not being prepared to give up the belief.

So I think that a criterion in terms of psychologically

causal impossibility will not work. But I also think that a criterion in terms of belief or doubt is itself grossly unsatisfactory. For the propositions in question are not those which I believe, even "completely," but those which I know: and not those which I cannot be led to doubt, but those to which no further evidence is relevant. This last phrase can be expressed, as I have expressed it above, in terms of belief, but only by also introducing moral terms such as what I "ought to believe." I can say if I like that my knowledge is incorrigible means that no evidence ought to make me abandon it, but this is only another way of saying that no evidence can be relevant to it, or to use Professor Price's language, that no evidence can "support" it. The questions at issue are all epistemological, not psychological.

That Russell cannot escape from epistemology is shown by the two surprising questions which, Russell says, "arise at this point [*i.e.*, after he has given his psychological definitions]; (1) Is there ever reason to believe a basic proposition to be false? (2) Is there ever reason to believe a basic proposition to be true?" (V. 6). These are surprising questions to ask, because the whole purpose of introducing basic propositions is that they should be known incorrigibly to be true; and that Russell's treatment makes it sensible to ask these questions shows that there is a good deal that is wrong about it.

Russell and I are agreed, I think, upon the fact of direct knowledge, and upon the sorts of things which I can directly know. What we disagree about is that he gives a psychological account of direct knowledge which I think is incorrect and misleading. The account I should give is that sometimes I do directly know a fact, where "directly" is used to mean that there are no reasons for my piece of knowledge other than the piece of knowledge itself. When I use a sentence to express something which I directly know, the sentence expresses something true; and if I know how I am using language, I can know that the sentence expresses something true. Conversely, when I use a sentence to express something which I directly know to be false, and

know how I am using language, I can know that it expresses something false. The only way in which anything that can at all reasonably be called a causal proposition is relevant, is that the reason I should give for knowing that a sentence I use expresses something true or false, is a general proposition about my use of language, the " semantical " proposition which I have discussed in Section A. But if I am not concerned with the particular symbol used (and Russell is not concerned with this in his paper " On Verification "), even this " semantical " proposition is irrelevant. I simply know directly that such-and-such is the case, and that is all there is to say on the matter.

Since I have used the word " incorrigible " as applied to my knowledge on several occasions, I should perhaps say something about it. It is sometimes said that all knowledge must be incorrigible since corrigible knowledge is a contradiction in terms. Certainly I know p at time t entails that p is true, which entails that at no time shall I know p to be false. But I do not mean by " incorrigible " merely what in fact will not be corrected, I mean something whose correction is logically impossible. The difference, as I take it, between I know p incorrigibly and I know p corrigibly is that, while both of them entail that in fact at no time shall I know p to be false, the former entails that it is logically impossible that I should at any time know p to be false, whereas the latter entails that this proposition is logically contingent. All my direct empirical knowledge is incorrigible ; so also is all my knowledge of logically necessary propositions and all my indirect empirical knowledge obtained by deduction from my direct empirical knowledge. That my knowledge in all these cases is incorrigible depends, I think, upon the fact that I am using language in the way in which I am using it : in the case of direct empirical knowledge discussed in Section A, it depends upon the fact that, if I use the sentence " There is a cat " to mean something which I directly know at the moment, it is logically impossible that any fact about the future should correct what I am now expressing by the sentence.

C.—Indirect Knowledge.

In neither of the papers I am considering does Russell treat at any length of knowledge which is not, in my sense, direct. But he lightly touches on a causal theory of "derived" knowledge which I wish to dispute. After saying that "basic propositions, in the purely psychological sense in which we have defined them, are important because all our other empirical beliefs are derived from them," he goes on to say :—"When I say 'derived,' I do not mean 'logically deduced'; I mean something more causal. Our other empirical beliefs would not exist if our basic beliefs did not exist, but usually there is no valid argument which justifies this connexion. We say 'A is going to marry B.' 'How do you know?' 'Because C told me.' But it is logically possible for C to utter certain sounds without A and B proceeding to marry each other; the argument, therefore, is a bad one . . . As a matter of psychology, the situation is clear; certain experiences cause certain basic beliefs, and these in turn cause others in virtue of our mental habits, among which correct and incorrect reasoning are included" (V. 4).

Russell's argument depends upon the implicit premiss that, if the "derived" propositions which I believe cannot be logically deduced from my basic propositions, the relation between them can only be a causal one. A non-demonstrative argument is, he implies, a "bad" one, and must therefore be justified, if at all, by considerations which fall outside logic. But this is to ignore the whole logic of probable inference. We all know that this branch of logic is in a very controversial and unsatisfactory state : philosophers hotly dispute the nature of "probabilification," the relation which makes one proposition probable relatively to another; yet I cannot believe that there is any disagreement as to there being cases of probabilification. [Philosophers are by no means agreed upon the nature of the "entailment" holding in demonstrative inference; but Russell does not deny that there are cases of entailment.]

Surely I frequently (indeed usually) have grounds for a rational belief which are not demonstrative grounds?

Russell may reply that what he is proposing is a causal analysis of "probabilification." But even if ultimately it is found that a satisfactory criterion for the validity of probable inference requires reference to causal laws, it cannot be the simple reference to the cause of my belief which Russell suggests. If the pragmatists and positivists are right, and the probabilification of an inductive conclusion must be defined in terms of the prophetic value of the use in general of inductive methods, and this prophetic value is to be estimated by means of an empirical generalization which might possibly be called a causal law, yet what actually causes me to believe the inductive conclusion is not relevant to its probability. Whatever be the analysis of "probabilified by" or "grounded upon," to say that my belief in q is grounded upon a belief in p cannot possibly mean that the former is caused by the latter, even though this is in fact the case; for I can quite well have a belief in q which is caused by a belief in p, when my belief in q is not grounded on my belief in p, *e.g.*, if my belief that all dons are clever causes me to believe that all clever people are dons.

Russell's use of the word "derived" tends to confuse the issue, since it leads one to think that what is relevant is some method of derivation (logical or, as he thinks, causal) by which my mind has passed from belief in the grounds to the "derived" belief. But, in order that my belief in q should be grounded on my belief in p, it is not necessary that I should have believed p first, and then have seen its logical connexion with q, and thus have passed to a belief in q: all that is required is that, if I am asked or ask myself for the grounds of my belief in q, I should mention a proposition p which I believe, and which in fact entails or probabilifies q. I do not think it even necessary that I should be able to say in what the logical connexion consists, but only that there is a logical connexion: "God has not been so sparing to Men to make them barely two-leg'd Creatures, and left it to Aristotle to make them Rational";

and a man's belief in the conclusion of a syllogism is not irrational because he is unable, and might always be unable however much logicians lectured him, to see why it is that it follows from the premisses.

The situation is a little different in the case of inference itself. We should not say that a man had inferred *q* from *p* unless he had seen, at least dimly, the nature of the connexion ; and we should not say that he had inferred *q* from *p* unless he came to believe or know something which he did not believe or know before. [In the case of probable inference, unless at least he increased the degree of his rational belief in *q*.] So the temporal order of his beliefs is relevant to the fact of inference. It is necessary that he should believe his premisses *before* believing his conclusion. If the importance of this temporal order be held to make inference part of the domain of psychology, well and good ; psychologists can certainly examine such questions as to whether or not high-grade morons can reason syllogistically ; but no psychological causal law is relevant to the validity of an inference, which is the preserve of logic.

I conclude that the orthodoxy of the treatises is right, and that problems of logic and theory of knowledge cannot be solved by considerations which belong to the science of psychology. But the strength of the " naturalistic " heresy is due to its having recognized the importance of a factor shamefully neglected by philosophers—how language is used. The naturalists have given a wrong account of the relevance to logic of the use of language : they have said that what causes me to use words is relevant instead of how I use words ; but they have compelled philosophers to attend to language. It should be the task of logicians, by taking account of the right linguistic considerations, to strengthen Philosophy against the onslaught of the infidel psychologists.

II.—*By* Bertrand Russell.

Mr. Braithwaite's opening paper has the great merit of concentrating on the important issues, and making it clear what they are. I need, therefore, waste no time on minor matters. His paper is concerned with three problems: meaning, direct knowledge, and indirect knowledge. I shall deal with the first two.

I should like, however, as a preliminary, to say a word or two as to the definition of logic. Mr. Braithwaite professes agreement with the traditional definition, which maintains that logic is "concerned with the nature and formal relations of the objects of thought and with the conditions for the validity of inference." I have no objection to make as regards the validity of inference, but the other clause of the definition appears to me misleading. What is meant by an "object" of thought? Is it at all clear that a thought has an "object"? Is a false proposition an object? Logic is certainly concerned with (*inter alia*) "or" and "not." These are clearly not themselves "objects"; by themselves, they are mere words. We must therefore suppose, if we accept Mr. Braithwaite's definition, that a disjunction—say "to-day is Tuesday or Wednesday"—is an object of thought. In a sense, of course, this is true. I am thinking about this disjunction at this moment, and therefore it may be called the object of my thought. But when I try to find something other than the phrase, I find myself driven to one or other of two alternatives: I can consider the class of all phrases that "have the same meaning," *i.e.*, can be regarded as translations of the given phrase; or I can consider the state of mind expressed by the phrase. It may be that to-day is Tuesday, and it may be that to-day is Wednesday, but there is no third thing, Tuesday-or-Wednesday, that to-day can

be. If there were no such mental phenomena as doubt or hesitation, the phrase " to-day is Tuesday or Wednesday " would be devoid of significance. Similar considerations, I should say, apply to " not." The non-mental world can theoretically be completely described without the use of such logical words as " or," " not," " all," and " some " ; but certain mental occurrences—*e.g.*, my belief that to-day is Tuesday or Wednesday—cannot be described without the use of such words. This is one important respect in which, on my view, logic is dependent upon psychology. This, however, is a large subject, which I will pursue no further.

I. *Meaning.*—The problem of meaning is one which seems to me to have been unduly neglected by logicians ; it was this problem which first led me, about twenty years ago, to abandon the anti-psychological opinions in which I had previously believed. The problem is a difficult one to state rightly, because we are concerned with the relation between words and things that are not words. (When I say " things," I must explain, like Mrs. Wilfer, that " I do not mean the word in any way whatever.") When we say that " cat " means cat, we appear to be uttering a triviality. What we are trying to say, however, is by no means trivial : we are trying to say that a certain set of similar noises, all resembling the following noise, " CAT," means a certain set of sensible phenomena, visual, tactile, and auditory. This is not quite right, since it leaves out the unity of a cat, and what distinguishes two appearances of the same cat from appearances of different cats. But for our purposes this complication may be ignored. We can avoid it by taking names of sensible qualities, such as " white," " hard," " sweet."

I am taking the simplest possible case. The meaning of " or " or " the " or " procrastination " would raise much greater difficulties. In the simplest case, say " white," the word is a set of similar noises, and its meaning is a set of similar sensible occurrences, in this case visual.

One of my complaints about philosophers when they treat of language—and this applies to Mr. Braithwaite as much as to others—is that they always consider it from the

point of view of those who are fully equipped linguistically. They seem to think that

> As Pallas by Jove was begot
> In armour all brilliantly burnished,
> So Man with his Liddell and Scott
> And old Lindley Murray was furnished.

They consequently imagine that the normal use of language is conventional, while theirs, being above convention, is like that of Humpty Dumpty, who explains that when he uses a word it means what he chooses. But neither of these is the case with a child. The meaning of a word is an objective fact, which he discovers just as he discovers the taste of sugar.

Mr. Braithwaite advances what seems, at first sight, a very strong argument against my view of meaning, when he says that, if it were correct, it would make lying impossible. Lying, as every one who has considered Epimenides knows, is a very ticklish subject. Tarski, in his book "Der Wahrheitsbegriff in den formalisierten Sprachen," contends—I think truly—that the paradox of the liar can only be solved by assuming an infinite hierarchy of languages, having the property that the words "true" and "false," as applied to propositions in the *nth* language, are themselves words in the $(n + 1)th$ language. It follows that the language of lowest order does not contain the words "true" and "false" at all. I contend that, in the language of lowest order, which I call the "object-language," it is impossible to lie, for reasons which I will explain shortly. The theory of meaning which Mr. Braithwaite criticizes is only strictly applicable to the object-language. I must apologize to him for introducing, at this point, a whole theory which I had not elaborated when I wrote the paper that he is criticizing; but at any rate I shall show that I take his criticism seriously.

The object-language, as I define it, consists of object-words, and these are such as can each be understood by a person who knows no other word whatever. This excludes such words as "or" and "not," "true" and "false," for

these words require a verbal context. It does not exclude such a word as " triangle," because a person might learn to recognize a triangular Gestalt without knowing the verbal definition. It excludes " mortal," because this word involves " not " or " all." For persons of merely human powers of perception, it excludes " chiliagon." It excludes all numbers in their logical purity, but admits small numbers as applied to familiar patterns, *e.g.*, dice. It excludes logical words, and syntactical words such as " than." Its exclusions, as the above examples show, are partly logically necessary, and partly due to the accidents of our perceptive apparatus.

The hierarchy of languages is so constructed that each contains all its predecessors. Thus the words of the object-language occur in languages of all orders. But their use is more limited in the object-language that in any other, since they can only be employed in ways involving no verbal context. This amounts, in effect, to saying that in the object-language an object-word can only be employed to assert the sensible presence of the object that it means. It is so employed in teaching children to talk, and in such exclamations as " fire ! " or " mad dog ! "

The distinction between the object-language and the secondary language (which immediately succeeds it in the hierarchy) may be illustrated by a very simple example. Suppose, coming home hungry late at night, you go to the larder to see what there is, you may enumerate each item as you find it ; this is the primary language. But suppose you go to look for sifted sugar, and for a moment you think the salt is sugar ; you taste it and say " not sugar." This is the secondary language, because the word " sugar," or some other symbol for sugar, was already in your mind, and was not suggested to you by sugar. Negative, narrative, optative, and hypothetical uses of language all first become possible in the secondary language. Before any of these uses of language become possible, the object-language must have been learnt. You cannot say significantly " I wish I had a horse " unless you know what " horse " means, and you can only learn what " horse " means by hearing this

word pronounced in the presence of a horse. (I ignore the case of the person who, having never seen a horse, learns the definition of the genus *equus* in studying zoology.) Thus the object-language is logically, psychologically, and biographically prior to those of higher order.

There are no denials in the object-language, but only assertions. The word " assertion " has two senses, which must be distinguished. In one sense, it is opposed to denial : this sense is required when a proposition is first considered, and then pronounced to be true. This sense, which is that involved in answering a question, does not occur in the object-language, in which propositions cannot be merely considered. To revert to the illustration of the larder : you see successively a number of objects, of which you remark " this is cheese," " this is butter," and so on ; these are assertions in the object-language. But after mistaking the salt for sugar, you set to work to look for the sugar, and at last you say : " This *is* sugar." This is an assertion in the secondary language, because the word " sugar " (or some equivalent) was already in your mind. It should be noted that, in the object-language, the words " this is " are superfluous ; they are only required for translation into a language of higher order.

With regard to the question whether, when I see a cat and say " cat," I can *perceive* a quasi-causal relation between what I see and what I say, I am far from feeling dogmatic. There are, however, certain points that I should like to make as against Mr. Braithwaite.

First : I must insist that the relation I intend is quasi-causal, not causal. I am inclined to think that the relation of cause and effect, as ordinarily understood, is a smoothly logical relation manufactured from cruder materials, in the same sort of way in which the spatial relations of geometry are manufactured from the less regular relations between percepts. The relation with which I am concerned, which I believe to hold between percept and word, is one which holds whenever a percept leads to a bodily movement ; as Mr. Braithwaite suggests, I should put under the same head whatever I could accept in the view that volitions can

be perceived and are instances of causation. Mr. Braithwaite, having refused to allow that the relation which I think I perceive may be only quasi-causal, not causal, proceeds to object, very properly, to the view that we can know *a* to be part cause of *b* without knowing the other necessary conditions, and also to the view that we can know *a* to be a causal ancestor of *b* without knowing the intermediate links. I should not maintain either of these propositions, although, in order to avoid them, I am driven into a realm of rash hypothesis. Transitions appear to be more staccato than was formerly thought, and it is quite possible that between sensation and motor impulse there are no intermediate links. By introducing the case of the man suffering from paralysis I meant to make it clear that I was concerned with the motor impulse, not with the actual movement. I am inclined to think that, whenever I notice a horse, I have an impulse to say " horse," though the impulse may be inhibited. To perceive the impulse is not the same thing as to perceive an actual utterance of the word " horse " ; the latter is analogous to the perception of occurrences which are not acts of mine, while the former belongs to psychology.

I am, however, prepared to abandon the theory that we perceive such quasi-causal relations as the above if any one will offer me an acceptable account of how I know the relation between an object-word and its meaning.

Mr. Braithwaite's theory, to my mind, is very difficult to accept. He offers us the following proposition : " Any language which I am now using I am using in such a way that to every token-sentence of the type ' there is a cat ' I attach the meaning that there is a cat." He goes on to say : " How do I know this major premiss ? I answer that I sometimes directly know it by introspection. In the cat case, for example, I should say that introspection tells me directly and incorrigibly that I am using language in such a way that any token-sentence of type ' there is a cat ' is to mean that there is a cat."

I am inclined to agree that if Mr. Braithwaite's introspection tells him all this, it must be very incorrigible.

He goes on to say: "The fundamental fact, so I maintain, is that I know directly that I am using language in a certain way. This important proposition is a general proposition about unrealized possibilities . . . . The problem is that of how I use my language, not of what causes me to utter certain sounds."

I have two objections to this theory: first, that Mr. Braithwaite's introspection is too loquacious; secondly, that he is thinking of a late and highly developed stage of language, which presupposes simpler stages to which his account is not applicable.

To begin with the second objection: the sort of case to which his theory seems most suited is that of learning a new technical term. I learn (say) the definition of the word "cycloid," and I resolve that henceforth I will use the word in this sense. We learn in this way the meaning of the word "sphere," but not of the word "ball." The word "ball" *is* the name of a certain sort of object; we do not *decide* to use the word in this sense, but find ourselves with an association analogous to that between a dog and his bark. We might, of course, after learning to speak, decide always to say "dog" instead of "cat," but it would not be possible for a child to begin speaking in this way, any more than he could practise acrobatics before having learnt to walk. A child using the word "cat" is not conscious of a general rule about unrealized possibilities, to the effect that if he were seeing numbers of other cats he would call them all "cat"; he uses the word on impulse, in the same sort of way in which he blinks in presence of a bright light.

As to Mr. Braithwaite's introspection, I wish he had told us more. His language suggests a volition, such as "I will never desert Micawber," which also dealt with unrealized possibilities. So he, apparently, makes a resolution: "I will never (while my present mood lasts) say 'dog' when I mean 'cat'." But although his language suggests this interpretation, I do not believe he really means this, and I wish he had made clear what he does mean. As he says in relation to my theory, "I can hardly *argue*

against this position. All I can say is that, to the best of my knowledge, I do not perceive such a relationship." This is unsatisfactory, and I should have wished to get the discussion on to a plane where argument would have been possible.

Before abandoning the subject of meaning, there is one other criticism I have to make of Mr. Braithwaite, and that is that he offers no definition of the term. Perhaps he thinks it indefinable. But I wish he had either asserted this view or offered a definition.

II. *Direct Knowledge.*—Part of what Mr. Braithwaite says under this head is due to a misunderstanding, for which, I admit, my language was partly responsible. In giving a psychological theory of " basic propositions," I was not intending to give a theory of direct knowledge ; I stated (*Verification*, p. 2) that " if the psychological question can be made clear, it may then become possible, without risk of confusion, to reintroduce the logical and epistemological questions which we shall have thrust aside to begin with." My purpose may be explained as follows : Any person's empirical beliefs, if examined, are found either to follow, by arguments valid or invalid, demonstrative or probable, from other empirical beliefs, or to have as their antecedent not a belief, but an experience. If you ask a man why he thinks snow is white, he will say " because I see it is." That is to say, at this point he bases his verbal belief upon a non-verbal occurrence. It seemed to me clear that the psychology of this process should be understood before we can hope to explain " direct knowledge." For what is directly *known* must be a sub-species of what is, in the above sense, directly *believed* as the result of an experience.

I agree with Mr. Braithwaite when he says : " I do not think that to hand over the question to psychology solves the important epistemological question—that concerning incorrigible *knowledge*." But when he says : " It seems to me quite impossible to defend a definition of basic propositions in terms of psychological indubitability," he is assuming that I meant my basic propositions to be such as would give incorrigible knowledge ; the question at this point, in fact, is verbal.

There is, however, a question at issue which is not verbal, but it is chiefly a question of method. To avoid the verbal question, let us give the name " primary beliefs " to those beliefs which, as a psychological matter of fact, arise directly out of experiences, not out of other beliefs. (I am using a vague term " arise out of," so as to leave open the nature of the connection.) I maintain that direct knowledge, if any, must be a sub-class of primary beliefs, and that the study of primary beliefs is likely to throw light on direct knowledge. Mr. Braithwaite, on the contrary, thinks this preliminary psychological inquiry unnecessary.

I will try to give some of my reasons for this view. In the first place, the word " knowledge " is, I think, much more ambiguous than most epistemologists realize. There is a sense in which I know an experience merely because I have it ; there is another sense in which I only know it if I " notice " it, but since noticing is a matter of degree, this sense cannot be made precise. Then again there is the difference between knowing an experience and knowing a proposition. If we want to find a basis for empirical science, we cannot be content with an unverbalized awareness, but must demand sentences in which what we know is asserted. We cannot consider the epistemological problem solved if we stop short of the verbal expression of what we know. We are thus involved in the problem of meaning, and in spite of Mr. Braithwaite's arguments I remain persuaded that this is a psychological problem.

There is, however, another reason for starting from the consideration of primary beliefs. Such beliefs, as they exist in the uncritical, are found, on examination, to be subject to various kinds of error. When I think I see a cat, it may be a young lynx, it may be something in a cinema which I mistake for a " real " cat, or it may even be a hallucination due to delirium tremens. On such grounds, by merely common-sense arguments, we are led to the sense-datum as the only thing that is indubitable. The sense-datum, however, is not a proposition, and what we are in search of is an indubitable proposition. To make a proposition out of a sense-datum, we must analyse or classify

it. I shall assume that we are not so rash as to say " this is a cat," which embodies an induction. I shall assume that we assign to the sense-datum some predicate which involves no reference to other actual or possible occurrences, such as " this is white." We cannot find anything safer to say than this. But why is this supposed to be indubitable? Because (*a*) we have been persuaded throughout that there was *something* we were sure of, (*b*) no arguments are possible to prove that we do not perceive a sense-datum when we think we do, nor can the future show that it was not of the sort we believed it to be. But for (*a*), (*b*) would be inconclusive. The argument is one of Cartesian doubt, which presupposes the existence of a point at which scepticism becomes impossible.

For Mr. Braithwaite, this is inadequate. He means by " incorrigible," he tells us, " something whose correction is logically impossible." I do not believe that any extra-logical proposition expressed in words is incorrigible in this sense, for, if the meaning of the words is fixed in advance, they may not be correctly applicable to the given experience, and if the meaning is not fixed in advance, nothing definite is asserted.

We have thus arrived, I think, at the real point at issue between Mr. Braithwaite and me. I hold that, in a critical scrutiny of what passes for knowledge, the ultimate point is one where doubt is psychologically impossible, whereas he holds that it is one where doubt is logically absurd. I agree at once that his view, if defensible, is more satisfactory than mine, for what I cannot doubt may nevertheless be false, whereas his direct knowledge is sure to be true. But his advantage is more apparent than real, for he will, I think, find it impossible to give any concrete example which he knows incorrigibly to be an incorrigible piece of knowledge. He says, for example :

" If I use the sentence ' There is a cat ' to mean something which I directly know at the moment, it is logically impossible that any fact about the future should correct what I am now expressing by the sentence."

This, as it stands, is a tautology, since what I *know* is

true by definition, and therefore cannot hereafter be proved false. To give practical importance to the statement, it is necessary to suppose that I can sometimes know that the sentence " There is a cat " means something which I am directly knowing at the moment. But if by " cat " I mean something not defined in terms of my present datum, I must compare my datum with this something, which is an operation in which error is possible ; while if I define the word " cat " in terms of my present datum, I am not asserting anything.

I do not deny that it is possible to define a class of propositions which are sure to be true ; what I do deny is that any given empirical proposition can ever be known to belong to this class.

Let us take once more an instance in which the possibility of error is as small as possible. Suppose you look at a patch of colour, and think " this is yellow." I should not consider this proposition false if you had a different meaning for the word " yellow " from that which most people have ; that would only mean that you were using a language other than correct English. Nor should I consider your judgment wrong if the yellow colour was due to jaundice or yellow spectacles. There are, however, possibilities of suggestion : you may have been about to think " this is green " when somebody said it was yellow, or the source of suggestion may have been in yourself. I should say that, if the word " yellow " is caused by the object without verbal or other symbolic intermediary, your judgment must be true, but in a given instance you can never be sure that this is the case. To repeat one of Mr. Braithwaite's arguments, how can you be sure that you are not hypnotized ? Thus while, on the one hand, I admit that propositions in the object-language, when directly caused, without symbolic intermediary, by an object of perception, and when they assign to that object an intrinsic predicate, are always true, on the other hand I deny that we can ever be sure that a given belief is of this kind.

The discussion, on both sides, has been confined to our knowledge of present sensible occurrences. I think, how-

ever, that it might, with advantage, be widened so as to include memory. Memory is just as essential as perception to empirical knowledge; if all beliefs that depend upon memory were cut out, the remnant would be a very small fragment of what we believe ourselves to know about the world. In regard to memory, the three following propositions, however difficult to reconcile, are, I think, all undeniable: (1) Memory is fallible, in a sense in which perception is not; (2) no memory is verifiable, since nothing in the present or future can make anything in the past logically necessary; (3) it is impossible to doubt that there have been past events.

A theory of empirical knowledge may, if it is as contemptuous of indubitability as Mr. Braithwaite, say that, in spite of (3), we do not *know* that there were past events. Certainly our knowledge of the past is not, in his sense, incorrigible, since it is always logically possible for our memories to be mistaken. If the world had come into existence five minutes ago, exactly as it then was, our memories of earlier times would be what they are, but would all be false. Why do we regard this hypothesis as merely silly? Is it not because of the psychological indubitability of the past?

Ignoring this general question, we must still admit that, since particular memories are fallible, all the empirical premisses for our knowledge of the past are more or less doubtful. Why should not our knowledge of the present, in so far as it is expressed in words, be also more or less doubtful?

In conclusion, I agree that "problems of logic and theory of knowledge cannot be [wholly] solved by considerations which belong to the science of psychology." I disagree, however, in that I doubt whether the problem of direct knowledge is soluble at all, and that I think the question whether it is soluble is illuminated by psychological considerations, although these *alone* cannot be decisive.

III.—*By* Friedrich Waismann.

In my contribution to this Symposium I do not propose to enter into a detailed discussion of the various points brought forward by Mr. Braithwaite and by Mr. Russell. Two of my reasons for this are that I am largely in agreement with Mr. Braithwaite's views as to the relation of logic and psychology, and that Mr. Russell's paper is principally concerned with Mr. Braithwaite's particular arguments. So I think it best for me to make a few independent remarks on the subject of the Symposium.*

I should like to take this opportunity of thanking Mr. Braithwaite for the kind help he has given me in writing this paper in English.

Of the various aspects of the question included in the title I will try to throw some light upon three topics :—

I. The question as to whether there is any indubitable knowledge of immediate experience ;

II. The way in which mental acts like believing or doubting are relevant to logic ;

III. The misunderstandings which I think are involved in any causal theory of meaning.

I.

Since the time of Descartes philosophers have always been deeply interested in the question whether any of the knowledge we possess is absolutely indubitable and forms the basis of the rest of our knowledge. It is well known that philosophers, under sceptical criticism, have retreated step by step to the position that it is only momentary experience

* I wish to emphasize my indebtedness to Dr. Wittgenstein, to whom I owe not only a great part of the views expressed in this paper but also my whole method of dealing with philosophical questions. Although I hope that the views expressed here are in agreement with those of Dr. Wittgenstein, I do not wish to ascribe to him any responsibility for them.

which is beyond all doubt. When I am looking at a rose, and utter the words " This is red," there seems to be no possibility of questioning its truth. Even if I am dreaming, it is true that I am having an experience of redness. Many philosophers have distinguished between propositions such as this, which they take to be indubitable, and other empirical propositions, for example, about physical objects, which can be refuted by experience in the future and which can therefore be said to be of the nature of hypotheses. Is this view tenable ?

The answer to this question depends partly upon what we understand by a proposition. Many philosophers hold that what a proposition is cannot be defined, because the characteristic feature in it is a specific state of mind which we have when we make a judgment. In order to clarify this question, let us use a method which I think is helpful philosophically, namely, to invent games with words which throw light upon our actual language. Each of these games can be described exactly and completely, without reference to the complication of mental processes which every sentence of our language involves.

We will describe three games and draw some conclusions from their comparison.

(1) A person A who cannot use any language has been trained to point to a red or to a green piece of material whenever he hears the words " red " or " green " respectively. He learns the game by someone showing him what he is to do until he imitates it. We take his imitating the game to be the criterion of his understanding it.

If I say " red " and he points to the green material, we say that this is wrong. But in what sense is it wrong ? Is it a mistake or a slip ? There can be no doubt as to the answer : it is a slip comparable to the case where someone makes a slip of the tongue, makes a slip in calculation, etc. ; it is a wrong move in the game, but it is entirely different from a mistake in the sense of a mistaken belief.

(2) Now we will modify the game.

There is a lamp in the room which shows red and green at irregular times. A is to watch the lamp and to say

which colour he sees. It is assumed that he knows nothing about the use of the words " red " and " green " in our ordinary language, except in this game. He learns the game in a manner similar to that in which he learned the first one.

Supposing that the lamp shows red and A, looking at it, says " green "—in what sense can we speak of an error? Let us remember first that A has learned the use of the words " red " and " green " only in this game ; he does not know the meaning of the words " true " and " false," or of such phrases as " it is correct," " it is incorrect." Therefore we, who are watching him, can only ask whether A has used the words correctly, that is, in a way which is in accordance with the rules of the game. We cannot ask whether he expresses with the words " red " and " green " what is true or what is false. Analogously to the first game this, too, is a case of a slip, the only difference being that he says the wrong word, instead of pointing to the wrong colour. In this game there is no occasion for mistake in the sense of mistaken belief. A can use the words according to the rules ; if he does not do so, he does not play the game. But within the game there is no possibility of speaking of " true " or " false."

(3) Now we will describe a game in which the opposition true-false does apply. Let us suppose that A is to guess which colour the light will be. When the lamp lights up he can say : ". What I've guessed is correct " or " it is incorrect " ; " it is true " or " it is false." And this can be said by those who play the game, not only by those who watch it.

The question before us now is this : Which are the features that account for the fact that we can speak of an error in the sense of a false opinion with regard to the third game, but not with regard to the first two games? The answer to this question will throw light upon the nature of judgment.

One might say that in the second game the words " red " and " green " do not express a statement. They merely are names for the colours of the light. It is only in the

third game that A wants to describe a fact with these words, and that is why his utterance can be true or false. This answer, although it points to a real distinction, is not satisfactory, for it is precisely the nature of the difference between naming and describing which we want to get clear about.

There are at first sight two answers :

(*a*) The difference is psychological. When the speaker, by uttering the words " red " or " green," expresses an opinion or expectation, a peculiar mental process occurs. This differs from what is felt in naming something. There occurs a specific act of believing or thinking or supposing, and that is what makes the utterance a statement.

Whether or not there is such a peculiar mental act of believing we will not discuss now. But even if there is, reference to that state of mind will be of no help. Although we have not investigated the processes occurring in A's mind when he is playing the third game, still we say that he makes judgments. We do not wish to maintain that there is not an experience peculiar to judgments, but we draw attention to the fact that this experience is not the criterion for our deciding whether a given case is a judgment or not ; therefore, the reference to such an experience would be superfluous.

The second answer is this :

(*b*) In the third game, in which A had to guess, the words " red " and " green " are compared with reality, they are in accordance or in discordance with reality, and that is why they can be said to be true or false. A closer examination of this answer will show that it also is not satisfactory. In the second game as well as in the third one, the word " red " was explained by demonstrative definition, and this explanation constitutes, as is generally said, a connection between the word " red " and the perception of the red light. In applying the demonstrative definition to the game (2), A looks at the lamp and gives a name to the colour of the light—is it not correct to describe this as a comparison ? We could even imagine the game (2) modified in such a way that A has a sheet of paper on which there are green and red patches of colour next to the written words " green "

and " red." Whenever the coloured light appears, he compares the light with the colours on his paper till he finds the right one, then passes across to the word written next to it, and utters the word. In the game (3) where he has to guess, he utters the word before the coloured light appears and the word is subsequently compared with reality ; in the game (2) the light appears first and the word is uttered afterwards. This is the only difference I can see. The words " red " and " green " have as much, or, if one prefers, as little connection with reality in the second game as in the third.

The real reason for the difference must be found in the different rules for the games. And here we can notice the following difference : In the second game it is not permissible to give the wrong name ; in other words, if A, looking at the red light says " green," this is contrary to the convention ; he violates the rules and thus ceases to play the game. In the third game, on the other hand, he remains within the rules of the game even when he guesses wrongly. There are the two possibilities of his guessing the colour and of his not guessing it, and these possibilities are distinguished within the game as " true " and " false." This is what constitutes the difference, and not any process of believing or judging which might accompany uttering the words.

We do not wish to maintain that the uttering of the word is true or false *because* it is a statement, but rather that it is a statement because it *can* be true or false, that is, because both possibilities occur within the game.

We are led by considerations such as these to the formulation of what is essential to a proposition : a proposition is what can be true or false ; that is, a proposition is something which obeys certain rules of a calculus of truth-values. Thus a proposition is always to be understood as embodied in such a calculus. There are many different calculuses of truth-values ; hence the concept of proposition is limited in different ways according to the calculus to which it is referred. So to have an exact concept of proposition, it is necessary to specify the calculus which defines it. Ordinary

language is, of course, so blurred that we cannot derive from it a clear-cut notion of proposition.

To take an analogous case : if we are asked to define a real number, we would describe the calculus of real numbers. In the same way we would define proposition by describing a particular propositional calculus.

Let us return to the original question as to whether we possess any indubitable knowledge. It is obvious that if I say " There is a chair in the next room," I am asserting a proposition which may be true or false. Even if it is false, my asserting it is not excluded by the rules of my language. But now let us take the example of my looking at a coloured patch in my visual field and saying " This is yellow." Suppose that what I see is in fact blue. In what sense is my utterance false ? We must not forget that the colour-words " yellow," " blue," etc., are explained by demonstrative definitions and that these definitions form part of the grammar of the colour-words. Therefore, if I say, while referring to a blue patch in my visual field, " This is yellow," I am sinning against the rules of grammar. In this case, following the rules for the use of colour-words which can be codified in a list, I am compelled to choose the word " blue " and I have not freedom to choose any other colour-word. This case is therefore entirely different from that of game (3), in which the player has a free choice to choose as he wishes. In game (3) there are two choices, each of which would be in accordance with the rules of the game ; in our case the choice has been predetermined by the rules of grammar previously fixed. My utterance, " This is yellow," is a falsely formed propostiion, but not a false proposition.

What is the case in this example holds, I think, of every description of immediate experience. If I describe a pain, a sound, or any other experience, the only question that can be raised is whether or not I use the words correctly in accordance with the rules of language ; but not whether my utterance is true or false. What, then, is the nature of the utterance ? It is not a proposition, if we understand by a proposition something which can be true or false. We

can say, if we like, that it is a border-line case of proposition in a rather similar way to that in which a tautology is a degenerate case. But it is perhaps clearer to say that it is not a proposition at all. It corresponds to what Schlick has called a "*Konstatierung*," a term which he used to describe the only synthetic propositions which cannot be doubted. We are now in a position to separate what is true from what is false in Schlick's view: I cannot doubt a *Konstatierung*, not because I am so sure of it that I cannot mistrust it, but because to doubt it doesn't make sense. In speaking of doubting, we must be very careful to distinguish the kind of doubt referring to the truth of the proposition from the kind of doubt referring to the correct use of words. In the case which we are considering only "grammatical doubt" is possible.

If this analysis is correct, it shows that Mr. Russell is mistaken in thinking that "in a critical scrutiny of what passes for knowledge, the ultimate point is one where doubt is psychologically impossible." At the same time, it confirms and explains Mr. Braithwaite's view that what is in question is "something whose correction is logically impossible."

Such an account as I have given removes, I think, a good deal of the mysterious air which many philosophers have attributed to descriptions of immediate experience. My account shows that there are no such things as empirical judgments which are indubitably true. Every empirical proposition can be doubted, and what cannot be doubted is not an empirical proposition.

II.

In this section I want to say a little more about the problems involved in the attitude of doubt, chiefly in order to see more clearly if it is true that the study of particular mental phenomena is important for the logician. Consider a case in which a child is instructed to look at a lamp which shows successively three different colours and then to call out the names of the three different colours.

What he has learnt is only the use of the colour-words, but not the use of propositions. Is the child able to doubt? The next question is: What do we mean by the word "doubt" in such a case? Perhaps that the child hesitates, stammers or that the words are accompanied by a feeling of uncertainty? Suppose the child hesitates in uttering the word "red." Shall we say that the child doubts that he has seen a red colour? Or that he is doubtful as to whether he is using the right word? But the question leads us in a wrong direction. The child uttered the word "red" and hesitated—that's all that happened. To ask whether the child's doubt refers to the fact or to the use of the word would only be correct if he were able to ask himself questions like these: "Was the light really red?" "Is this really the right word?" that is to say, if he had learnt to think in propositions. In what does the possibility of doubting consist? It consists in the fact that a more complicated game can be played by adults than by this child.

It is obvious that a child who has only learnt to call out the names of things, but who is not familiar with the use of propositions and the difference of true and false, is not in a position to doubt. In this sense we may say that the possibility of doubting is bound up with the language, and that this possibility appears as soon as the learning of language has reached a certain stage of development.

On the other hand, there are cases in which we do speak of an animal's doubting. A horse wades through a river, testing the depth at each step. If someone is inclined to call this behaviour "doubt," we will not object; we would only point out that what is here meant by "doubt" is just *defined* by this behaviour.

In the first case doubting is not a state of mind which stands as it were *behind* the words. And this brings me to an important point. The relation between the doubt as to whether or not the light was red and the proposition which expresses this doubt is not of the same nature as the relation between a toothache and the proposition which states that I have toothache. A toothache may exist without being expressed in language; but a doubt cannot exist

without such an expression. For doubting expression in some form of symbolism is essential.

It is true a person can be in a mood of uncertainty ; if we wanted to describe such a state of mind with the help of the verb " to doubt," we should have to use it in an intransitive way. This use of the verb " to doubt " is similar to the intransitive use of the verbs " to be afraid " and " to yearn " ; for there are certainly cases where we speak of an experience of yearning without reference to an object, and then we mean by it a certain objectless feeling : " *Ich sehne mich und weiss nicht recht nach was.*" In the same way we may speak of an intransitive fearing, if we want to describe certain bodily sensations of anxiety, *e.g.*, a feeling of constriction in the throat. But such experiences do not constitute what in ordinary life we mean by " fearing," " longing," " doubting." In the ordinary use of these verbs it is essential that they should refer to objects, that is to say, that it does not make sense to say, " I am doubtful, but I don't know of what."

Brentano said that it is this reference to objects which is characteristic of mental states like thinking, doubting, wishing, fearing, hoping, etc. In opposition to him, I hold that the reference of a thought, a doubt, etc., to its object is determined by language. A doubt cannot exist without a language in which it is expressed ; nevertheless, to doubt something is not the same as to utter the words, " I doubt whether . . ." The doubt is more than the words in which it is expressed. Let us, therefore, introduce a distinction which may be shown by the contrast of the phrases

" expression of the doubt " " description of the doubt "

and analogously

" expression of the wish " " description of the wish "

" expression of the fear " " description of the fear "

etc.

Expression of the doubt is the proposition expressing the doubt ; description of the doubt is the proposition describing what occurs in the mind of a person when he is doubting.

The situation then is this : " to be doubtful of . . ." has not the same meaning as the phrase " to express a

doubt." The relation between the two facts is that the expression of a doubt is part of that doubt, so that the doubt could not exist without its expression. The words expressing the doubt may be accompanied by a peculiar state of mind, say, a feeling of uncertainty, or they may be part of a characteristic form of behaviour. The description of the doubt is, therefore, composed of the expression of the doubt together with the description of certain other occurrences.

But this is by no means essential. A person may express a doubt without feeling a specific experience or without showing a characteristic form of behaviour. In such a case the words do not allude to a hidden mental state in the mind of the doubter, indeed, their utterance may be the only process which takes place.

In the case where there is a certain feeling of uncertainty behind the words, it can be said that the intensity of doubting is revealed by the modulation and timbre of the voice. That is to say, we can use the modulation of the voice to indicate the intensity of the doubt. In many cases the hesitating sound would represent the doubtful state of mind. On the other hand, this cannot be the criterion for doubt ; since it is perfectly possible for a person to speak in a hesitating voice and to behave as if he were in doubt without in fact being in such a state.

In practical life we make use of various symptoms in order to diagnose whether a person merely pretends to doubt or is really doubting. But none of these symptoms can be said to be the defining criterion for doubt.

Mr. Russell in the paper of this symposium is very near to the truth when he explains that " my belief that to-day is Tuesday or Wednesday cannot be described without the use of such words [' or,' ' not,' etc.]." He implies that the description of the belief must contain the expression of the belief. But the way in which he develops his view is open to criticism. He writes : " If there were no such mental phenomena as doubt or hesitation, the phrase ' to-day is Tuesday or Wednesday ' would be devoid of significance. The non-mental world can theoretically be completely described without the use of such logical words as ' or,' ' not,'

'all' and 'some'; but certain mental occurrences—*e.g.*, my belief that to-day is Tuesday or Wednesday—cannot be described without the use of such words. This is one important respect in which, on my view, logic is dependent upon psychology." This whole train of thought is surely erroneous. If the word "doubt" is used to express the fact that a person is in a mood of uncertainty or that an animal behaves in a characteristic way, this feeling or this behaviour can be completely described without the use of such logical words as "or" and "not." But what Mr. Russell has in mind are, of course, other cases of doubting. He appears not to notice that, when he is describing a doubt as to whether to-day is Tuesday or Wednesday, he is describing an expression of the doubt and, therefore, has to use logical words. Mr. Russell is misled by the ambiguity of such words as "mental phenomenon," "mental occurrence," which are used in such a way that they designate in some cases what may be called private experiences, in other cases operations with symbols or dispositions to do such operations.

I agree with Mr. Russell that our logic is not a system unalterable to all eternity like the Platonic ideas, but that the way in which logic is embodied in our ordinary language and the direction in which we develop it when we construct a formal system is induced and guided by various occasions and conditions of our life. In this connection, I should like to say that there is a wide field of most fascinating questions as to the relation between logic and life. But it seems to me that the example chosen by Mr. Russell, with its appeal to such phenomena as belief and doubt, is unfortunate.

I have said that the rules of our logic are induced by certain experiences, so that if these experiences had been different, another system of rules would be more suitable, in the same way in which one system of geometry can fit a given system of physics better than another one. This raises questions of a peculiar and difficult kind. Let us imagine a language which contains merely the words "and" and "if," but not "or." What would be involved in saying that there are certain circumstances by which the

members of such a tribe would be induced to invent the concept " or " ? What would such a process be like ? Shall we say that the introduction of the concept " or " would be caused by these circumstances ? What would it mean to speak of causation in such a case ? I will not deny that one can look at things from such an angle. But I would prefer to compare this case with the discovery of a new system in logic or mathematics. Should we say that a mathematical discovery is " caused " by the circumstances which preceded it ? Certain situations may be the occasion for people to invent a concept like " or " ; nevertheless, there is a gulf between these situations and the invention of the concept " or."

Therefore, the problem lies deeper than Mr. Russell seems to think. In any case, it would be an over-simplification to say that words like " or " are read off from a state of mind, *e.g.*, from a feeling of uncertainty, as a tune is read off from the notes. Such a view would imply that the idea of " or " was pre-existent in the mind, and that all we have to do is to translate it from an amorphous form into the articulate form of language.

III.

What puzzles Mr. Russell most is the relation between an object-word and its meaning. He says that if I describe what I am seeing at this moment and utter certain words, this utterance is causally produced by the situation ; and that the study of such causal processes is necessary for getting a clear understanding of the function of our language. I think that this view is the result of a misunderstanding, upon which I hope to be able to throw some light.

Let us start with the idea of a transition, which may be explained by a few examples :—

(1) A move in the game of chess is the transition from one position of the chessmen to another according to the rules of the game.

(2) Suppose someone is addressing envelopes and using a list which correlates the names of people with their

addresses. In looking up the address of a person he is making a transition in this list.

(3) Another example would be the use of a list of colours. If the name of a colour is called, I have to pass over from the name to the corresponding colour and to copy it.

(4) In solving an algebraic equation, I have to transform it step by step. Each of these steps is a transition according to the rules of algebra.

(5) Every deduction is a transition from one proposition to another in a calculus.

What then is the difference between a causal connection and such a transition? For example, what is the difference between a calculation made by a machine and that made by a person? An important difference is that a person's calculation can be justified by rules which the person can give when he is asked for; not so the calculating of a machine, where the question, "Why do these numbers appear?" can only be answered by describing the mechanism, that is to say, by describing causal connections. On the other hand, if we ask the person why he has calculated in such a way, he will appeal to the rules of arithmetic. He will not reply by describing the mode of action of a hidden mechanism in his brain.

Does this mean that we contrast the act of calculating with the working of a machine? Or, to put it more exactly, that the behaviour of the calculator does not obey causal laws? By no means. We do not deny that his behaviour is caused by the situation and by previous circumstances. He would not act as he does if he had not undergone a process of education. But this process of education, as Mr. Russell admits, is irrelevant.

Let us imagine a case in which a person has to call out the names of the colours which a lamp shows. There are two ways to consider it :—

(1) The colour of the lamp automatically causes the uttering of the word.

(2) The case is a transition from the colour of the lamp to the word according to given rules.

From this example we can see the two ways in which we can look at language. Language may be regarded as a kind of mechanism, to explain the mode of operation of which is a task for psychology. But this is not the way in which a logician describes language. What he is interested in is the geometry of language, not its physics.

What we have said can be expressed by saying : We look upon language not as a mechanism, but as a calculus. To put it more accurately : We *compare* language to a calculus. It wouldn't be correct to say : language is *not* a mechanism, is *is* a calculus. There is no question that words produce many various effects and are in their turn caused by various processes. All we want to maintain is that the logician considers language, not as a mechanism, but as a calculus. In saying this, we are not making any statement about language, but are giving the point of view from which the logician wishes to consider language.

The calculus proceeds no matter what are the causes which determine its separate steps. If a person paints a surface red at the command " Red ! " this process may be regarded as a transition in a calculus. The actual procedure may be :

(1) The word " red " has been explained to him by a demonstrative definition. Before carrying out the command, he recalls the colour of the specimen.

(2) The word produces his action in an automatic way.

(3) The person uses a list correlating colour-words with colours. If he hears the command " Red ! " he looks for the corresponding word on the list, passes across from it to the colour and copies it.

The fact that he obeys the command, *i.e.*, that he chooses the right colour, may be causally explained by the hypothesis that there is a linking mechanism of a particular kind ; but whatever the mechanism, one and the same transition is represented.

The explanation of a word can play a double rôle :—

(1) The explaining is the cause of the word's being used in a particular way ;

(2) The explanation is the ground for this use.

We should not use the words of our mother-tongue in the way we do, unless we had learned this use. In this sense a word's having been explained to me is the cause of my understanding of the word; but this account wouldn't justify the use of the word. There is a connection between the two rôles of explanation, and it is this fact which misleads us into thinking that the meaning of a word is the way in which it functions causally. It would be more correct to say that the meaning of a word is its purpose. For purpose and causal functioning are connected in such a way that an effect which never occurs would not be said to be purposed.

If we explain a word by means of a demonstrative definition, we use a gesture to guide the eyes of the other person in a certain direction. Influences such as these play an important part in our original learning of language. In speaking of training, we lay stress upon the causal, in using the word "explanation," the normative aspect; in the latter case we *compare* the words and the gestures of a demonstrative definition with rules in the fully-developed language.