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## I.—ON THE NOTION OF CAUSE.

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In the following paper I wish, first, to maintain that the word "cause" is so inextricably bound up with misleading associations as to make its complete extrusion from the philosophical vocabulary desirable; secondly, to inquire what principle, if any, is employed in science in place of the supposed "law of causality" which philosophers imagine to be employed; thirdly, to exhibit certain confusions, especially in regard to teleology and determinism, which appear to me to be connected with erroneous notions as to causality.

All philosophers, of every school, imagine that causation is one of the fundamental axioms or postulates of science, yet, oddly enough, in advanced sciences such as gravitational astronomy, the word "cause" never occurs. Dr. James Ward, in his *Naturalism and Agnosticism*, makes this a ground of complaint against physics: the business of science, he apparently thinks, should be the discovery of causes, yet physics never even seeks them. To me it seems that philosophy ought not to assume such legislative functions, and that the reason why physics has ceased to look for causes is that, in fact, there are no such things. The law of causality, I believe, like much that passes muster among philosophers, is a relic of a bygone age, surviving, like the monarchy, only because it is erroneously supposed to do no harm.

In order to find out what philosophers commonly understand by "cause," I consulted Baldwin's *Dictionary*, and was rewarded beyond my expectations, for I found the following three mutually incompatible definitions:—

> "CAUSALITY. (1) The necessary connection of events in the time-series . . . .
>
> "CAUSE (notion of). Whatever may be included in the thought or perception of a process as taking place in consequence of another process . . . .
>
> "CAUSE AND EFFECT. (1) Cause and effect . . . . are correlative terms denoting any two distinguishable things, phases, or aspects of reality, which are so related to each other, that whenever the first ceases to exist, the second comes into existence immediately after, and whenever the second comes into existence, the first has ceased to exist immediately before."

Let us consider these three definitions in turn. The first, obviously, is unintelligible without a definition of "necessary." Under this head, Baldwin's *Dictionary* gives the following:—

> "NECESSARY. That is necessary which not only is true, but would be true under all circumstances. Something more than brute compulsion is, therefore, involved in the conception; there is a general law under which the thing takes place."

The notion of cause is so intimately connected with that of necessity that it will be no digression to linger over the above definition, with a view to discovering, if possible, *some* meaning of which it is capable; for, as it stands, it is very far from having any definite signification.

The first point to notice is that, if any meaning is to be given to the phrase "would be true under all circumstances," the subject of it must be a propositional function, not a

proposition.* A proposition is simply true or false, and that ends the matter: there can be no question of "circumstances." "Charles I's head was cut off" is just as true in summer as in winter, on Sundays as on Mondays. Thus when it is worth saying that something "would be true under all circumstances," the something in question must be a propositional function, *i.e.* an expression containing a variable, and becoming a proposition when a value is assigned to the variable; the varying "circumstances" alluded to are then the different values of which the variable is capable. Thus if "necessary" means "what is true under all circumstances," then "if $x$ is a man, $x$ is mortal" is necessary, because it is true for any possible value of $x$. Thus we should be led to the following definition:—

"NECESSARY is a predicate of a propositional function, meaning that it is true for all possible values of its argument or arguments."

Unfortunately, however, the definition in Baldwin's *Dictionary* says that what is necessary is not only "true under all circumstances" but is also "true." Now these two are incompatible. Only propositions can be "true," and only propositional functions can be "true under all circumstances." Hence the definition as it stands is nonsense. What is meant seems to be this: "A proposition is necessary when it is a value of a propositional function which is true under all circumstances, *i.e.* for all values of its argument or arguments." But if we adopt this definition, the same proposition will be necessary or contingent according as we choose one or other of its terms as the argument to our propositional function. For example, "if Socrates is a man, Socrates is mortal," is necessary

* A propositional function is an expression containing a variable, or undetermined constituent, and becoming a proposition as soon as a definite value is assigned to the variable. Examples are: "A is A," "$x$ is a number." The variable is called the *argument* of the function.

if Socrates is chosen as argument, but not if *man* or *mortal* is chosen. Again, "if Socrates is a man, Plato is mortal," will be necessary if either Socrates or *man* is chosen as argument, but not if Plato or *mortal* is chosen. However, this difficulty can be overcome by specifying the constituent which is to be regarded as argument, and we thus arrive at the following definition:

"A proposition is *necessary* with respect to a given constituent if it remains true when that constituent is altered in any way compatible with the proposition remaining significant."

We may now apply this definition to the definition of causality quoted above. It is obvious that the argument must be the time at which the earlier event occurs. Thus an instance of causality will be such as: "If the event $e_1$ occurs at the time $t_1$, it will be followed by the event $e_2$." This proposition is intended to be necessary with respect to $t_1$, *i.e.* to remain true however $t_1$ may be varied. Causality, as a universal law, will then be the following: "Given any event $e_1$ there is an event $e_2$ such that, whenever $e_1$ occurs, $e_2$ occurs later." But before this can be considered precise, we must specify how much later $e_2$ is to occur. Thus the principle becomes:

"Given any event $e_1$, there is an event $e_2$ and a time-interval $\tau$ such that, whenever $e_1$ occurs, $e_2$ follows after an interval $\tau$."

I am not concerned as yet to consider whether this law is true or false. For the present, I am merely concerned to discover what the law of causality is supposed to be. I pass, therefore, to the other definitions quoted above.

The second definition need not detain us long, for two reasons. First, because it is psychological: not the "thought or perception" of a process, but the process itself, must be what concerns us in considering causality. Secondly, because it is circular: in speaking of a process as "taking place in

consequence of" another process, it introduces the very notion of cause which was to be defined.

The third definition is by far the most precise; indeed as regards clearness it leaves nothing to be desired. But a great difficulty is caused by the temporal contiguity of cause and effect which the definition asserts. No two instants are contiguous, since the time-series is compact; hence either the cause or the effect or both must, if the definition is correct, endure for a finite time; indeed, by the wording of the definition it is plain that both are assumed to endure for a finite time. But then we are faced with a dilemma: if the cause is a process involving change within itself, we shall require (if causality is universal) causal relations between its earlier and later parts; moreover, it would seem that only the later parts can be relevant to the effect, since the earlier parts are not contiguous to the effect, and therefore (by the definition) cannot influence the effect. Thus we shall be led to diminish the duration of the cause without limit, and however much we may diminish it, there will still remain an earlier part which might be altered without altering the effect, so that the true cause, as defined, will not have been reached, for it will be observed that the definition excludes plurality of causes. If, on the other hand, the cause is purely static, involving no change within itself, then, in the first place, no such cause is to be found in nature, and in the second place, it seems strange—too strange to be accepted, in spite of bare logical possibility—that the cause, after existing placidly for some time, should suddenly explode into the effect, when it might just as well have done so at any earlier time, or have gone on unchanged without producing its effect. This dilemma, therefore, is fatal to the view that cause and effect can be contiguous in time; if there are causes and effects, they must be separated by a finite time-interval $\tau$, as was assumed in the above interpretation of the first definition.

What is essentially the same statement of the law of

causality as the one elicited above from the first of Baldwin's definitions is given by other philosophers. Thus John Stuart Mill says:—

"The Law of Causation, the recognition of which is the main pillar of inductive science, is but the familiar truth, that invariability of succession is found by observation to obtain between every fact in nature and some other fact which has preceded it."*

And Bergson, who has rightly perceived that the law as stated by philosophers is worthless, nevertheless continues to suppose that it is used in science. Thus he says:—

"Now, it is argued, this law [the law of causality] means that every phenomenon is determined by its conditions, or, in other words, that the same causes produce the same effects."†

And again:—

"We perceive physical phenomena, and these phenomena obey laws. This means: (1) That phenomena *a*, *b*, *c*, *d*, previously perceived, can occur again in the same shape; (2) that a certain phenomenon P, which appeared after the conditions *a*, *b*, *c*, *d*, and after these conditions only, will not fail to recur as soon as the same conditions are again present."‡

A great part of Bergson's attack on science rests on the assumption that it employs this principle. In fact, it employs no such principle, but philosophers—even Bergson—are too apt to take their views on science from each other, not from science. As to what the principle is, there is a fair consensus among philosophers of different schools. There are, however, a number of difficulties which at once arise. I omit the question of plurality of causes for the present, since other graver questions have to be considered. Two of these, which are forced on our attention by the above statement of the law, are the following:—

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* *Logic*, Bk. III, Chap. V, § 2.
† *Time and Free Will*, p. 199.
‡ *Ibid.*, p. 202.

(1) What is meant by an "event"?

(2) How long may the time-interval be between cause and effect?

(1) An "event," in the statement of the law, is obviously intended to be something that is likely to recur, since otherwise the law becomes trivial. It follows that an "event" is not a particular, but some universal of which there may be many instances. It follows also that an "event" must be something short of the whole state of the universe, since it is highly improbable that this will recur. What is meant by an "event" is something like striking a match, or dropping a penny into the slot of an automatic machine. If such an event is to recur, it must not be defined too narrowly: we must not state with what degree of force the match is to be struck, nor what is to be the temperature of the penny. For if such considerations were relevant, our "event" would occur at most once, and the law would cease to give information. An "event," then, is a universal defined sufficiently widely to admit of many particular occurrences in time being instances of it.

(2) The next question concerns the time-interval. Philosophers, no doubt, think of cause and effect as contiguous in time, but this, for reasons already given, is impossible. Hence, since there are no infinitesimal time-intervals, there must be some finite lapse of time $\tau$ between cause and effect. This, however, at once raises insuperable difficulties. However short we make the interval $\tau$, something may happen during this interval which prevents the expected result. I put my penny in the slot, but before I can draw out my ticket there is an earthquake which upsets the machine and my calculations. In order to be sure of the expected effect, we must know that there is nothing in the environment to interfere with it. But this means that the supposed cause is not, by itself, adequate to insure the effect. And as soon as we include the environment, the probability of repetition is diminished, until at last, when

the whole environment is included, the probability of repetition becomes almost *nil.*

In spite of these difficulties, it must, of course, be admitted that many fairly dependable regularities of sequence occur in daily life. It is these regularities that have suggested the supposed law of causality; where they are found to fail, it is thought that a better formulation could have been found which would have never failed. I am far from denying that there may be such sequences which in fact never do fail. It may be that there will never be an exception to the rule that when a stone of more than a certain mass, moving with more than a certain velocity, comes in contact with a pane of glass of less than a certain thickness, the glass breaks. I also do not deny that the observation of such regularities, even when they are not without exceptions, is useful in the infancy of a science: the observation that unsupported bodies in air usually fall was a stage on the way to the law of gravitation. What I deny is that science assumes the existence of invariable uniformities of sequence of this kind, or that it aims at discovering them. All such uniformities, as we saw, depend upon a certain vagueness in the definition of the "events." That bodies fall is a vague qualitative statement; science wishes to know how fast they fall. This depends upon the shape of the bodies and the density of the air. It is true that there is more nearly uniformity when they fall in a vacuum; so far as Galileo could observe, the uniformity is then complete. But later it appeared that even there the latitude made a difference, and the altitude. Theoretically, the position of the sun and moon must make a difference. In short, every advance in a science takes us farther away from the crude uniformities which are first observed, into greater differentiation of antecedent and consequent, and into a continually wider circle of antecedents recognized as relevant.

The principle "same cause, same effect," which philosophers imagine to be vital to science, is therefore utterly otiose. As

soon as the antecedents have been given sufficiently fully to enable the consequent to be calculated with some exactitude, the antecedents have become so complicated that it is very unlikely they will ever recur. Hence, if this were the principle involved, science would remain utterly sterile.

The importance of these considerations lies partly in the fact that they lead to a more correct account of scientific procedure, partly in the fact that they remove the analogy with human volition which makes the conception of cause such a fruitful source of fallacies. The latter point will become clearer by the help of some illustrations. For this purpose I shall consider a few maxims which have played a great part in the history of philosophy.

(1) "Cause and effect must more or less resemble each other." This principle was prominent in the philosophy of occasionalism, and is still by no means extinct. It is still often thought, for example, that mind could not have grown up in a universe which previously contained nothing mental, and one ground for this belief is that matter is too dissimilar from mind to have been able to cause it. Or, more particularly, what are termed the nobler parts of our nature are supposed to be inexplicable, unless the universe always contained something at least equally noble which could cause them. All such views seem to depend upon assuming some unduly simplified law of causality; for, in any legitimate sense of "cause" and "effect," science seems to show that they are usually very widely dissimilar, the "cause" being, in fact, two states of the whole universe, and the "effect" some particular event.

(2) "Cause is analogous to volition, since there must be an intelligible *nexus* between cause and effect." This maxim is, I think, often unconsciously in the imaginations of philosophers who would reject it when explicitly stated. It is probably operative in the view we have just been considering, that mind could not have resulted from a purely material world. I do not profess to know what is meant by "intelligible"; it seems to

mean "familiar to imagination." Nothing is less "intelligible," in any other sense, than the connection between an act of will and its fulfilment. But obviously the sort of nexus desired between cause and effect is such as could only hold between the "events" which the supposed law of causality contemplates; the laws which replace causality in such a science as physics leave no room for any two events between which a nexus could be sought.

(3) "The cause *compels* the effect in some sense in which the effect does not compel the cause." This belief seems largely operative in the dislike of determinism; but, as a matter of fact, it is connected with our second maxim, and falls as soon as that is abandoned. We may define "compulsion" as follows:—"Any set of circumstances is said to compel A when A desires to do something which the circumstances prevent, or to abstain from something which the circumstances cause." This presupposes that some meaning has been found for the word "cause"—a point to which I shall return later. What I want to make clear at present is that compulsion is a very complex notion, involving thwarted desire. So long as a person does what he wishes to do, there is no compulsion, however much his wishes may be calculable by the help of earlier events. And where desire does not come in, there can be no question of compulsion. Hence it is, in general, misleading to regard the cause as compelling the effect.

A vaguer form of the same maxim substitutes the word "determine" for the word "compel": we are told that the cause *determines* the effect in a sense in which the effect does not *determine* the cause. It is not quite clear what is meant by "determining"; the only precise sense, so far as I know, is that of a function or one-many relation. If we admit plurality of causes, but not of effects, that is, if we suppose that, given the cause, the effect must be such and such, but, given the effect, the cause may have been one of many alternatives, then we may say that the cause determines the effect,

but not the effect the cause. Plurality of causes, however, results only from conceiving the effect vaguely and narrowly and the cause precisely and widely. Many antecedents may "cause" a man's death, because his death is vague and narrow. But if we adopt the opposite course, taking as the "cause" the drinking of a dose of arsenic, and as the "effect" the whole state of the world five minutes later, we shall have plurality of effects instead of plurality of causes. Thus the supposed lack of symmetry between "cause" and "effect" is illusory.

(4) "A cause cannot operate when it has ceased to exist, because what has ceased to exist is nothing." This is a common maxim, and a still more common unexpressed prejudice. It has, I fancy, a good deal to do with the attractiveness of Bergson's "*durée*": since the past has effects now, it must still exist in some sense. The mistake in this maxim consists in the supposition that causes "operate" at all. A volition "operates" when what it wills takes place; but nothing can operate except a volition. The belief that causes "operate" results from assimilating them, consciously or unconsciously, to volitions. We have already seen that, if there are causes at all, they must be separated by a finite interval of time from their effects, and thus cause their effects after they have ceased to exist.

It may be objected to the above definition of a volition "operating" that it only operates when it "causes" what it wills, not when it merely happens to be followed by what it wills. This certainly represents the usual view of what is meant by a volition "operating," but as it involves the very view of causation which we are engaged in combating, it is not open to us as a definition. We may say that a volition "operates" when there is some law in virtue of which a similar volition in rather similar circumstances will usually be followed by what it wills. But this is a vague conception, and introduces ideas which we have not yet considered. What

is chiefly important to notice is that the usual notion of "operating" is not open to us if we reject, as I contend that we should, the usual notion of causation.

(5) "A cause cannot operate except where it is." This maxim is very widespread; it was urged against Newton, and has remained a source of prejudice against "action at a distance." In philosophy it has led to a denial of transeunt action, and thence to monism or Leibnizian monadism. Like the analogous maxim concerning temporal contiguity, it rests upon the assumption that causes "operate," *i.e.*, that they are in some obscure way analogous to volitions. And, as in the case of temporal contiguity, the inferences drawn from this maxim are wholly groundless.

I return now to the question, What law or laws can be found to take the place of the supposed law of causality?

First, without passing beyond such uniformities of sequence as are contemplated by the traditional law, we may admit that, if any such sequence has been observed in a great many cases, and has never been found to fail, there is an inductive probability that it will be found to hold in future cases. If stones have hitherto been found to break windows, it is probable that they will continue to do so. This, of course, assumes the inductive principle, of which the truth may reasonably be questioned; but as this principle is not our present concern, I shall in this discussion treat it as indubitable. We may then say, in the case of any such frequently-observed sequence, that the earlier event is the *cause* and the later event the *effect*.

Several considerations, however, make such special sequences very different from the traditional relation of cause and effect. In the first place, the sequence, in any hitherto unobserved instance, is no more than probable, whereas the relation of cause and effect was supposed to be necessary. I do not mean by this merely that we are not sure of having discovered a true case of cause and effect; I mean that, even when we have

a case of cause and effect in our present sense, all that is meant is that, on grounds of observation, it is probable that when one occurs the other will also occur. Thus in our present sense, A may be the cause of B even if there actually are cases where B does not follow A. Striking a match will be the cause of its igniting, in spite of the fact that some matches are damp and fail to ignite.

In the second place, it will not be assumed that *every* event has some antecedent which is its cause in this sense; we shall only believe in causal sequences where we find them, without any presumption that they always are to be found.

In the third place, *any* case of sufficiently frequent sequence will be causal in our present sense; for example, we shall not refuse to say that night is the cause of day. Our repugnance to saying this arises from the ease with which we can imagine the sequence to fail, but owing to the fact that cause and effect must be separated by a finite interval of time, *any* such sequence *might* fail through the interposition of other circumstances in the interval. Mill, discussing this instance of night and day, says:—

"It is necessary to our using the word cause, that we should believe not only that the antecedent always *has* been followed by the consequent, but that as long as the present constitution of things endures, it always *will* be so."*

In this sense, we shall have to give up the hope of finding causal laws such as Mill contemplated; any causal sequence which we have observed may at any moment be falsified without a falsification of any laws of the kind that the more advanced sciences aim at establishing.

In the fourth place, such laws of probable sequence, though useful in daily life and in the infancy of a science, tend to be displaced by quite different laws as soon as a science is successful. The law of gravitation will illustrate

* *Loc. cit.*, § 6.

what occurs in any advanced science. In the motions of mutually gravitating bodies, there is nothing that can be called a cause, and nothing that can be called an effect; there is merely a formula. Certain differential equations can be found, which hold at every instant for every particle of the system, and which, given the configuration and velocities at one instant, or the configurations at two instants, render the configuration at any other earlier or later instant theoretically calculable. That is to say, the configuration at any instant is a function of that instant and the configurations at two given instants. This statement holds throughout physics, and not only in the special case of gravitation. But there is nothing that could be properly called "cause" and nothing that could be properly called "effect" in such a system.

No doubt the reason why the old "law of causality" has so long continued to pervade the books of philosophers is simply that the idea of a function is unfamiliar to most of them, and therefore they seek an unduly simplified statement. There is no question of repetitions, of the "same" cause producing the "same" effect; it is not in any sameness of causes and effects that the constancy of scientific laws consists, but in sameness of relations. And even "sameness of relations" is too simple a phrase; "sameness of differential equations" is the only correct phrase. It is impossible to state this accurately in non-mathematical language; the nearest approach would be as follows:—"There is a constant relation between the state of the universe at any instant and the rate of change in the rate at which any part of the universe is changing at that instant, and this relation is many-one, *i.e.* such that the rate of change in the rate of change is determinate when the state of the universe is given." If the "law of causality" is to be something actually discoverable in the practice of science, the above proposition has a better right to the name than any "law of causality" to be found in the books of philosophers.

In regard to the above principle, several observations must be made—

(1) No one can pretend that the above principle is *a priori* or self-evident or a "necessity of thought." Nor is it, in any sense, a premiss of science: it is an empirical generalization from a number of laws which are themselves empirical generalizations.

(2) The law makes no difference between past and future: the future "determines" the past in exactly the same sense in which the past "determines" the future. The word "determine," here, has a purely logical significance: a certain number of variables "determine" another variable if that other variable is a function of them.

(3) The law will not be empirically verifiable unless the course of events within some sufficiently small volume will be approximately the same in any two states of the universe which only differ in regard to what is at a considerable distance from the small volume in question. For example, motions of planets in the solar system must be approximately the same however the fixed stars may be distributed, provided that all the fixed stars are very much farther from the sun than the planets are. If gravitation varied directly as the distance, so that the most remote stars made the most difference to the motions of the planets, the world might be just as regular and just as much subject to mathematical laws as it is at present, but we could never discover the fact.

(4) Although the old "law of causality" is not assumed by science, something which we may call the "uniformity of nature" is assumed, or rather is accepted on inductive grounds. The uniformity of nature does not assert the trivial principle "same cause, same effect," but the principle of the permanence of laws. That is to say, when a law exhibiting, *e.g.*, an acceleration as a function of the configuration has been found to hold throughout the observable past, it is expected that it will continue to hold in the future, or that, if it does

not itself hold, there is some other law, agreeing with the supposed law as regards the past, which will hold for the future. The ground of this principle is simply the inductive ground that it has been found to be true in very many instances; hence the principle cannot be considered certain, but only probable to a degree which cannot be accurately estimated.

The uniformity of nature, in the above sense, although it is assumed in the practice of science, must not, in its generality, be regarded as a kind of major premiss, without which all scientific reasoning would be in error. The assumption that *all* laws of nature are permanent has, of course, less probability than the assumption that this or that particular law is permanent; and the assumption that a particular law is permanent for all time has less probability than the assumption that it will be valid up to such and such a date. Science, in any given case, will assume what the case requires, but no more. In constructing the *Nautical Almanac* for 1915 it will assume that the law of gravitation will remain true up to the end of that year; but it will make no assumption as to 1916 until it comes to the next volume of the almanac. This procedure is, of course, dictated by the fact that the uniformity of nature is not known *a priori*, but is an empirical generalization, like "all men are mortal." In all such cases, it is better to argue immediately from the given particular instances to the new instance, than to argue by way of a major premiss; the conclusion is only probable in either case, but acquires a higher probability by the former method than by the latter.

In all science we have to distinguish two sorts of laws: first, those that are empirically verifiable but probably only approximate; secondly, those that are not verifiable, but may be exact. The law of gravitation, for example, in its applications to the solar system, is only empirically verifiable when it is assumed that matter outside the solar system may be ignored for such purposes; we believe this to be only

approximately true, but we cannot empirically verify the law of universal gravitation which we believe to be exact. This point is very important in connection with what we may call "relatively isolated systems." These may be defined as follows:—

A system relatively isolated during a given period is one which, within some assignable margin of error, will behave in the same way throughout that period, however the rest of the universe may be constituted.

A system may be called "practically isolated" during a given period if, although there *might* be states of the rest of the universe which would produce more than the assigned margin of error, there is reason to believe that such states do not in fact occur.

Strictly speaking, we ought to specify the respect in which the system is relatively isolated. For example, the earth is relatively isolated as regards falling bodies, but not as regards tides; it is *practically* isolated as regards economic phenomena, although, if Jevons' sun-spot theory of commercial crises had been true, it would not have been even practically isolated in this respect.

It will be observed that we cannot prove in advance that a system is isolated. This will be inferred from the observed fact that approximate uniformities can be stated for this system alone. If the complete laws for the whole universe were known, the isolation of a system could be deduced from them; assuming, for example, the law of universal gravitation, the practical isolation of the solar system in this respect can be deduced by the help of the fact that there is very little matter in its neighbourhood. But it should be observed that isolated systems are only important as providing a possibility of *discovering* scientific laws; they have no theoretical importance in the finished structure of a science.

The case where one event A is said to "cause" another

event B, which philosophers take as fundamental, is really only the most simplified instance of a practically isolated system. It may happen that, as a result of general scientific laws, whenever A occurs throughout a certain period, it is followed by B; in that case, A and B form a system which is practically isolated throughout that period. It is, however, to be regarded as a piece of good fortune if this occurs; it will always be due to special circumstances, and would not have been true if the rest of the universe had been different though subject to the same laws.

The essential function which causality has been supposed to perform is the possibility of inferring the future from the past, or, more generally, events at any time from events at certain assigned times. Any system in which such inference is possible may be called a "deterministic" system. We may define a deterministic system as follows:—

A system is said to be "deterministic" when, given certain data, $e_1, e_2, \ldots, e_n$, at times $t_1, t_2, \ldots, t_n$ respectively, concerning this system, if $E_t$ is the state of the system at any time $t$, there is a functional relation of the form

$$E_t = f(e_1, t_1, e_2, t_2, \ldots, e_n, t_n, t). \qquad (A)$$

The system will be "deterministic throughout a given period" if $t$, in the above formula, may be any time within that period, though outside that period the formula may be no longer true. If the universe, as a whole, is such a system, determinism is true of the universe; if not, not. A system which is part of a deterministic system I shall call "determined"; one which is not part of any such system I shall call "capricious."

The events $e_1, e_2, \ldots, e_n$ I shall call "determinants" of the system. It is to be observed that a system which has one set of determinants will in general have many. In the case of the motions of the planets, for example, the configurations of the solar system at any two given times will be determinants.

We may take another illustration from the hypothesis of psycho-physical parallelism. Let us assume, for the purposes of this illustration, that to a given state of brain a given state of mind always corresponds, and *vice versâ*, *i.e.*, that there is a one-one relation between them, so that each is a function of the other. We may also assume, what is practically certain, that to a given state of a certain brain a given state of the whole material universe corresponds, since it is highly improbable that a given brain is ever twice in exactly the same state. Hence there will be a one-one relation between the state of a given person's mind and the state of the whole material universe. It follows that, if $n$ states of the material universe are determinants of the material universe, then $n$ states of a given man's mind are determinants of the whole material and mental universe—assuming, that is to say, that psycho-physical parallelism is true.

The above illustration is important in connection with a certain confusion which seems to have beset those who have philosophized on the relation of mind and matter. It is often thought that, if the state of the mind is determinate when the state of the brain is given, and if the material world forms a deterministic system, then mind is "subject" to matter in some sense in which matter is not "subject" to mind. But if the state of the brain is also determinate when the state of the mind is given, it must be exactly as true to regard matter as subject to mind as it would be to regard mind as subject to matter. We could, theoretically, work out the history of mind without ever mentioning matter, and then, at the end, deduce that matter must meanwhile have gone through the corresponding history. It is true that if the relation of brain to mind were many-one, not one-one, there would be a one-sided dependence of mind on brain, while conversely, if the relation were one-many, as Bergson supposes, there would be a one-sided dependence of brain on mind. But the dependence involved is, in any case, only logical; it does not mean

that we shall be compelled to do things we desire not to do, which is what people instinctively imagine it to mean.

As another illustration we may take the case of mechanism and teleology. A system may be defined as "mechanical" when it has a set of determinants that are purely material, such as the positions of certain pieces of matter at certain times. It is an open question whether the world of mind and matter, as we know it, is a mechanical system or not; let us suppose, for the sake of argument, that it is a mechanical system. This supposition—so I contend—throws no light whatever on the question whether the universe is or is not a "teleological" system. It is difficult to define accurately what is meant by a "teleological" system, but the argument is not much affected by the particular definition we adopt. Broadly, a teleological system is one in which purposes are realized, *i.e.*, in which certain desires—those that are deeper or nobler or more fundamental or more universal or what not—are followed by their realization. Now the fact—if it be a fact—that the universe is mechanical has no bearing whatever on the question whether it is teleological in the above sense. There might be a mechanical system in which all wishes were realized, and there might be one in which all wishes were thwarted. The question whether, or how far, our actual world is teleological, cannot, therefore, be settled by proving that it is mechanical, and the desire that it should be teleological is no ground for wishing it to be not mechanical.

There is, in all these questions, a very great difficulty in avoiding confusion between what we can infer and what is in fact determined. Let us consider, for a moment, the various senses in which the future may be "determined." There is one sense—and a very important one—in which it is determined quite independently of scientific laws, namely, the sense that it will be what it will be. We all regard the past as determined simply by the fact that it has happened; but for the accident that memory works backward and not forward,

we should regard the future as equally determined by the fact that it will happen. "But," we are told, "you cannot alter the past, while you can to some extent alter the future." This view seems to me to rest upon just those errors in regard to causation which it has been my object to remove. You cannot make the past other than it was—true, but this is a mere application of the law of contradiction. If you already know what the past was, obviously it is useless to wish it different. But also you cannot make the future other than it will be; this again is an application of the law of contradiction. And if you happen to know the future—*e.g.*, in the case of a forthcoming eclipse—it is just as useless to wish it different as to wish the past different. "But," it will be rejoined, "our wishes can *cause* the future, sometimes, to be different from what it would be if they did not exist, and they can have no such effect upon the past." This, again, is a mere tautology. An effect being *defined* as something subsequent to its cause, obviously we can have no *effect* upon the past. But that does not mean that the past would not have been different if our present wishes had been different. Obviously, our present wishes are conditioned by the past, and therefore could not have been different unless the past had been different; therefore, if our present wishes were different, the past would be different. Of course, the past cannot be different from what it was, but no more can our present wishes be different from what they are; this again is merely the law of contradiction. The facts seem to be merely (1) that wishing generally depends upon ignorance, and is therefore commoner in regard to the future than in regard to the past, (2) that where a wish concerns the future, it and its realization very often form a "practically independent system," *i.e.*, many wishes regarding the future are realized. But there seems no doubt that the main difference in our feelings arises from the fact that the past but not the future can be known by memory.

Although the sense of "determined" in which the future is

determined by the mere fact that it will be what it will be is sufficient (at least so it seems to me) to refute some opponents of determinism, notably M. Bergson and the pragmatists, yet it is not what most people have in mind when they speak of the future as determined. What they have in mind is a formula by means of which the future can be exhibited, and at least theoretically calculated, as a function of the past. But at this point we meet with a great difficulty, which besets what has been said above about deterministic systems, as well as what is said by others.

If formulæ of any degree of complexity, however great, are admitted, it would seem that any system, whose state at a given moment is a function of certain measurable quantities, *must* be a deterministic system. Let us consider, in illustration, a single material particle, whose co-ordinates at time $t$ are $x_t$, $y_t$, $z_t$. Then, however, the particle moves, there must be, theoretically, functions $f_1, f_2, f_3$, such that

$$x_t = f_1(t), \qquad y_t = f_2(t), \qquad z_t = f_3(t).$$

It follows that, theoretically, the whole state of the material universe at time $t$ must be capable of being exhibited as a function of $t$. Hence our universe will be deterministic in the sense defined above. But if this be true, no information is conveyed about the universe in stating that it is deterministic. It is true that the formulæ involved may be of strictly infinite complexity, and therefore not practically capable of being written down or apprehended. But except from the point of view of our knowledge, this might seem to be a detail: in itself, if the above considerations are sound, the material universe *must* be deterministic, *must* be subject to laws.

This, however, is plainly not what was intended. The difference between this view and the view intended may be seen as follows. Given some formula which fits the facts hitherto—say the law of gravitation—there will be an infinite number of other formulæ, not empirically distinguishable from

it in the past, but diverging from it more and more in the future. Hence, even assuming that there are persistent laws, we shall have no reason for assuming that the law of the inverse square will hold in future; it may be some other hitherto indistinguishable law that will hold. We cannot say that *every* law which has held hitherto must hold in the future, because past facts which obey one law will also obey others, hitherto indistinguishable but diverging in future. Hence there must, at every moment, be laws hitherto unbroken which are now broken for the first time. What science does, in fact, is to select the *simplest* formula that will fit the facts. But this, quite obviously, is merely a methodological precept, not a law of Nature. If the simplest formula ceases, after a time, to be applicable, the simplest formula that remains applicable is selected, and science has no sense that an axiom has been falsified. We are thus left with the brute fact that, in many departments of science, quite simple laws have hitherto been found to hold. This fact cannot be regarded as having any *a priori* ground, nor can it be used to support inductively the opinion that the same laws will continue; for at every moment laws hitherto true are being falsified, though in the advanced sciences these laws are less simple than those that have remained true. Moreover it would be fallacious to argue inductively from the state of the advanced sciences to the future state of the others, for it may well be that the advanced sciences are advanced simply because, hitherto, their subject-matter has obeyed simple and easily-ascertainable laws, while the subject-matter of other sciences has not done so.

The difficulty we have been considering seems to be met partly, if not wholly, by the principle that the *time* must not enter explicitly into our formulæ. All mechanical laws exhibit acceleration as a function of configuration, not of configuration and time jointly; and this principle of the irrelevance of the time may be extended to all scientific laws. In fact we might interpret the "uniformity of nature" as

meaning just this, that no scientific law involves the time as an argument, unless, of course, it is given in an integrated form, in which case *lapse* of time, though not absolute time, may appear in our formulæ. Whether this consideration suffices to overcome our difficulty completely, I do not know; but in any case it does much to diminish it.

It will serve to illustrate what has been said if we apply it to the question of free will.

(1) Determinism in regard to the will is the doctrine that our volitions belong to some deterministic system, *i.e.*, are "determined" in the sense defined above. Whether this doctrine is true or false, is a mere question of fact; no *a priori* considerations (if our previous discussions have been correct) can exist on either side. On the one hand, there is no *a priori* category of causality, but merely certain observed uniformities. As a matter of fact, there are observed uniformities in regard to volitions; thus there is some empirical evidence that volitions are determined. But it would be very rash to maintain that the evidence is overwhelming, and it is quite possible that some volitions, as well as some other things, are not determined, except in the sense in which we found that everything must be determined.

(2) But, on the other hand, the subjective sense of freedom, sometimes alleged against determinism, has no bearing on the question whatever. The view that it has a bearing rests upon the belief that causes compel their effects, or that nature enforces obedience to its laws as governments do. These are mere anthropomorphic superstitions, due to assimilation of causes with volitions and of natural laws with human edicts. We feel that our will is not compelled, but that only means that it is not other than we choose it to be. It is one of the demerits of the traditional theory of causality that it has created an artificial opposition between determinism and the freedom of which we are introspectively conscious.

(3) Besides the general question whether volitions are

determined, there is the further question whether they are *mechanically* determined, *i.e.*, whether they are part of what was above defined as a mechanical system. This is the question whether they form part of a system with purely material determinants, *i.e.*, whether there are laws which, given certain material data, make all volitions functions of those data. Here again, there is empirical evidence up to a point, but it is not conclusive in regard to all volitions. It is important to observe, however, that even if volitions are part of a mechanical system, this by no means implies any supremacy of matter over mind. It may well be that the same system which is susceptible of material determinants is also susceptible of mental determinants; thus a mechanical system may be determined by sets of volitions, as well as by sets of material facts. It would seem, therefore, that the reasons which make people dislike the view that volitions are mechanically determined are fallacious.

(4) The notion of *necessity*, which is often associated with determinism, is a confused notion not legitimately deducible from determinism. Three meanings are commonly confounded when necessity is spoken of:—

($\alpha$) An *action* is necessary when it will be performed however much the agent may wish to do otherwise. Determinism does not imply that actions are necessary in this sense.

($\beta$) A *propositional function* is necessary when all its values are true. This sense is not relevant to our present discussion.

($\gamma$) A *proposition* is necessary with respect to a given constituent when it is the value, with that constituent as argument, of a necessary propositional function, in other words, when it remains true however that constituent may be varied. In this sense, in a deterministic system, the connection of a volition with its determinants is necessary, if the time at which the determinants occur be taken as the constituent to be varied, the time-interval between the determinants and the

volition being kept constant. But this sense of necessity is purely logical, and has no emotional importance.

We may now sum up our discussion of causality. We found first that the law of causality, as usually stated by philosophers, is false, and is not employed in science. We then considered the nature of scientific laws, and found that, instead of stating that one event A is always followed by another event B, they stated functional relations between certain events at certain times, which we called determinants, and other events at earlier or later times or at the same time. We were unable to find any *a priori* category involved: the existence of scientific laws appeared as a purely empirical fact, not necessarily universal, except in a trivial and scientifically useless form. We found that a system with one set of determinants may very likely have other sets of a quite different kind, that, for example, a mechanically determined system may also be teleologically or volitionally determined. Finally we considered the problem of free will: here we found that the reasons for supposing volitions to be determined are strong but not conclusive, and we decided that even if volitions are mechanically determined, that is no reason for denying freedom in the sense revealed by introspection, or for supposing that mechanical events are not determined by volitions. The problem of free will *versus* determinism is therefore, if we were right, mainly illusory, but in part not yet capable of being decisively solved.

## II.—THE NATURE OF WILLING.

*By* G. Dawes Hicks.

"From its first dawn to its highest actual achievement, we find," says William James, "that the cognitive faculty, where it appears to exist at all, appears but as one element in an organic mental whole, and as a minister to higher mental powers—the powers of will. Such a thing as its emancipation and absolution from these organic relations receives no faintest colour of plausibility from any fact we can discern." And again, "The willing department of our nature dominates both the conceiving department and the feeling department, or, in plainer English, perception and thinking are only there for behaviour's sake." The account which Bergson has to offer of the nature of intellectual apprehension is very similar. Our intellect, he argues, has been cast in the mould of action. "In order to act, we begin by proposing an end; we make a plan, then we go on to the detail of the mechanism which will bring it to pass." These two writers reach, however, very different conclusions respecting the character of the knowledge obtained by the intellect as thus conceived. Just because, in his view, the function of intellect is not theoretical insight but action, just because intelligence, in its natural state, aims at a practically useful end, Bergson holds it to be disqualified as an instrument for the acquisition of philosophical truth. The living reality escapes its ken. From mobility itself the intellect turns aside, since it has nothing to gain in dealing with it. It starts always from immobility, as though this were the ultimate reality, and, when it tries to form an idea of movement, it does so by constructing movement out of immobilities put together. Fashioned for the needs of action, intelligence looks upon reality as though it were carvable at will, and makes us

consider every actual form of things, even the form of natural things, in an artificial manner. And thus in the field of speculation it leads to deadlocks and gratuitously creates insoluble problems. According to James, on the other hand, it is only to the extent in which the intellect seeks to lay aside its essentially practical character that it becomes smitten with incapacity and degenerates into a mere logical machine inadequate to grasp the rich and varied content of real being. So far from pointing to a defect, its subordination to practice constitutes rather precisely its strength as an instrument for the pursuit of truth. Truth in our ideas and beliefs means that "ideas (which themselves are but parts of our experience) become true just in so far as they help us to get into satisfactory relations with other parts of our experience." Experience, in short, is never ours simply as it comes to us. What is merely "given" is constantly transformed by our deeds. "The conceiving faculty functions *exclusively for the sake of ends* that do not exist at all in the world of impressions we receive by way of our senses, but are set by our emotional and practical subjectivity altogether. It is a transformer of the world of our impressions into a totally different world—the world of our conception; and the transformation is effected in the interests of our volitional nature, and for no other purpose whatsoever." Man does not merely find, he always co-operates in creating his world, and, since the given order lends itself to his remodelling, since it shows itself plastic to his practical purposes, the circumstance that thought exists for the sake of doing in no way detracts from the efficiency of thought as a means of knowledge. The real world *is* the world which is thus in the process of making, partly through human agency, and our power of volitional response to the nature of things is *ipso facto* a reliable and trustworthy organ of communication with them. What, then, verifies a belief according to James falsifies that belief according to Bergson.

That two contradictory estimates of the worth of conceptual

knowledge should be arrived at from what are virtually the same premisses, that the assumed essentially practical character of intellectual apprehension should be represented as vitiating it in the one case and qualifying it in the other for interpreting the nature of reality, a reality which in both cases is held to be fluent and changing rather than fixed and static, is in itself an interesting fact and may suggest various reflexions. At any rate, it affords, perhaps, sufficient justification for going back upon those premisses and inquiring into the grounds on which they rest. It appears to me that much of what has recently been written with the object of showing the intimate connexion of truth and practice leaves upon the reader the impression of "hanging in the air" for want of a preliminary analysis of what is involved in volition and of what actually takes place in voluntary activity. Instead of that, we meet only with vague, ambiguous, and slippery phrases such as "personal striving," "the self as a force," "the volitional theory of causation," "the thinking activity, as guided by purpose and will," and the like,* from which we can do no more than conjecture the kind of conception that lies at the basis of what is being urged. I wish, then, in this paper to call attention to certain fundamental considerations in the psychology of volition that have important bearing upon the positions, to which I have referred, of James and Bergson.

The inquiry I propose to undertake is beset throughout with difficulties. At the beginning we are confronted with the extremely uncertain and wavering connotation of the term

* In this connexion, it may perhaps be permissible to register a protest against the debasing of the philosophical currency by the coinage of misleading and really meaningless epithets like "intellectualism" and "voluntarism." An intellectualist, says Mr. Russell, "is any one who is not a pragmatist," and that, I suppose, is what it comes to. A study which almost more than any other requires for its profitable pursuit an exact and a precise terminology is in danger of being flooded with a number of loose and barbarous names, that exemplify the violation of every canon which ought to be observed in forming a scientific nomenclature.

"volition" or "voluntary activity." Even so judicious and careful a psychologist as Höffding feels himself constrained to use this term in three quite distinct and different senses. He recognises as one type of willing that rationally controlled action in which there is selection of an end, and awareness on the part of the subject of his own activity as a means—a usage which undoubtedly comes nearest to the ordinary common-sense interpretation. But he also proposes to recognise, as a simpler and more general type of willing, any exercise of activity that has for its antecedent some mode of feeling or of presentation. Not only so. He insists upon likewise denoting by the term "will" an excessively simple and general function of the mental life as a whole—a function hard to describe, but corresponding apparently to the diffused activity which is assumed to be the accompaniment of every change that is brought about in the mental life. Such change, the argument runs, always involves a certain reaction on the part of the subject. The nature of this reaction Höffding does not attempt to define more closely. But he is inclined to connect with it what is undoubtedly a very important feature of the life of mind, namely, the holding together of the different elements that are presented, at one and the same moment, in a single whole. The reaction, he seems to say, is of the nature of an act of synthesis, or combination. Now, from this instance, I think it would be fair to draw the general conclusion that to extend the denotation of the term "will" is likely to introduce confusion, and to obscure the real issue that has got to be faced. Willing, in the ordinary sense of the term, is obviously an exceedingly complex mental process, involving elements which by no possibility can be regarded as among the elementary facts of mind. It may quite well be the case that amongst these factors there is one that is specific and unique and requiring separate recognition, but to that factor, if it exists at all, it would be inappropriate and misleading to apply the title "willing."

With respect to the wider term "conation" most psychologists will, I imagine, agree that the deviating and uncertain significance it bears in current psychological literature is unfortunate and distracting. Mr. Bradley, for instance, would restrict the use of the term to states of mind of a comparatively advanced and developed type. The essential features of conation are, he contends, "the aspect of a 'not-myself' and of a 'myself' hindered by this, together with an idea of a change containing the removal of the hindrance, an idea with which the 'myself' feels itself one." And, he insists, all these aspects must be experienced together and must be felt as one whole. In other words, Mr. Bradley is of opinion that an idea of an end is essential to conation. He explains, it is true, that he does not mean that an "idea" must necessarily be a definite image existing separate, or at least separable, from the object. It would, according to his view, suffice that a perceived existence should be qualified in a way incompatible with itself, whilst yet it cannot simply accept this new qualification and so cease to exist as at first perceived.* No one, of course, would deny the important difference between a state of mind where the idea of a "to be" is present and another state of mind where no such idea is to be found. What, however, is questionable is the advisability of fixing upon this difference as though it constituted a break in the development of mind when, as a matter of fact, the vital thing psychologically is to lay stress upon the continuity of the former state with the latter. Mr. Bradley requests those who think that this difference is not essential to conation to furnish the name of that state to which it really is essential. I should reply that he has himself shown us how to meet such a demand. So far as I can discover, he employs the term "desire" as virtually synonymous with "conation" according to the above definition of it, and I can see no advantage in retaining the two names for the same

* *Mind*, N.S., X, 1901, p. 437 *sqq.*

thing. Now, we want the term "conation" as a collective heading for the group of mental processes roughly classified as impulses, appetites, wants, inclinations, wishes, desires, and volitions, and its consistent employment in this broad sense would be distinctly helpful in psychological work. At the same time, I fully admit the assignment to "conation" of so extensive a denotation has its dangers. It is apt to suggest a special view of the nature of the processes which are thus grouped together. When, for example, conation is defined as "the theoretical active element of consciousness, showing itself in tendencies, impulses, desires, and acts of volition,"* it is difficult to conceive how the phrase "theoretical active element" could be explained without pre-supposing a highly debateable interpretation of the factor which is taken to differentiate conative from other mental states. Whether there is any one distinguishing characteristic of all states that would thus be described as conative, and, if so, what it is, is, no doubt, a question of a particularly hard and unyielding kind. But, certainly, it would be harder still to find a sense of the term "active" in which it could be fairly said to indicate that feature. If conation gives "a suggestion of activity and nothing but activity,"† then its inappropriateness for supplying the want I have mentioned must be conceded. But I do not know why it should be supposed necessarily to carry that suggestion. Surely, it is possible to recognise that certain phases of mind stand genetically in close relation to one another, and hence are legitimately grouped together as conative, without assuming that there must needs be an unique conation-element which by analysis can be detected in all of them, and which forms the bond of union between them. I am not, at present, arguing against the assumption; I think it not improbable that in the varied mental conditions referred to, there may be a common

* *Dictionary of Philosophy and Psychology*, Vol. 1, p. 206.
† Croom Robertson, *Elements of Psychology*, p. 220.

element, although to single it out for accurate description is certainly more than psychologists are yet in a position to do. I am pleading here, however, for keeping the term conation free from any implication that would prevent its employment by those who are not pledged to a particular theory.*

## I.

A curious circumstance is noticeable with respect to much recent argument bearing on the relation between knowledge and practice. Many of those who are at present insisting most strenuously upon the primacy, in the life of consciousness, of volition, and who regard the other functions of mind as dependent upon it, seem to be pre-supposing a conception of the Will which was originally framed from the point of view of a complete disparateness between the cognitive and conative aspects of mind. The Cartesian tradition has lingered stubbornly and persistently even in quarters where one would least expect to find it.

Descartes, it need hardly be said, rested a considerable superstructure upon the distinction between *intellectus* and *voluntas*. But it is only in the writings of Malebranche that a serious attempt is made to work out a theory of the Will according to Cartesian principles. Proceeding on the lines laid down by Descartes, Malebranche describes matter as a simple substance, having for its essence extension, and mind as another simple substance, having for its essence thought. Matter, or extendedness, evinces, so he conceives, two properties or capacities. On the one hand, it is capable of assuming this or that figure, and on the other hand it is capable of being moved. Correspondingly, mind evinces two faculties or capacities. On the one hand, it is capable of receiving this or that idea, and, on the other hand, it is capable of being influenced by inclinations or desires. A sort of parallelism,

* In this paper I shall use the term in the wide sense I have indicated.

that is to say, subsists between (*a*) Figure and Understanding (Understanding being conceived as the sum of the mind's ideas), and (*b*) Motion and Will. As regards the first, just as the facility of matter for being shaped and figured is entirely passive, so also is the understanding, or the faculty of receiving ideas and modifications, entirely passive. To say that the mind apprehends an object and to say that the mind receives the idea which represents that object are two ways of saying the same thing. As regards the second, just as motion is not the essence of matter but a property extraneously added to it, so will is not the essence of mind but a contingent and secondary factor. There might have been matter without motion, and there might also have been mind without will. In that case, the differentiating principle both of the outer and of the inner world would have been wanting. There would have been no distinction among corporeal things, and there would have been no diversity among mental beings. For motion is the *principium individuationis* of matter, whilst what alone gives a personal, subjective tinge or colouring to the faculty of understanding is volition or will. Yet this last consideration serves in no way to bridge the gulf between what is essential or fundamental and what is accidental or subsidiary. The contrast, as thus drawn, between understanding and will would seem then to be sufficiently radical and thoroughgoing. Malebranche has, however, another doctrine in reserve by the aid of which he is enabled, in some measure, to bring the antithetical factors into conjunction. It is, he contends, characteristic of understanding that there is involved in it, throughout its various modes of expression, the idea of being-in-general, of being without limit or restriction. At the root of the perceptive experience of every particular object lies the idea of infinite being, often, it is true, vaguely apprehended, although in it and by it alone all particular existences are perceived. Similarly, and just as the understanding may be said to have one supreme object, being-in-general, so the will

may be said to be the tendency of the soul towards one supreme end, good-in-general. On the side of the understanding it is by the help of feeling or sentience that the mind recognises particular existences; on the side of practice, it is through the specific pleasures which are connected with the apprehension of particular existences that there spring up movements or impulses towards particular goods. But will in general, the active faculty of mind, is the striving or effort of the soul towards goodness as such, or infinite perfection, and this movement, never ceasing, necessarily keeps the mind in a continual state of agitation or unrest. Further, Malebranche retains the familiar doctrine of Descartes, that the will is the faculty of judgment, as distinct from mere apprehension; it is the will which selects, chooses, decides, in respect to the material presented to it by the understanding, and hence arises the possibility of error. But Malebranche sees, with much greater clearness than Descartes, that he is confronted with the perplexing problem of accounting for the way in which this indeterminate tendency towards the good-in-general comes to be specialised. He does, however, no more than cut the knot by declaring the sole necessity to be that the understanding should be supplied with ideas and conceptions; to choose a particular good, or to determine a particular notion we must know it.*

In dealing with a highly controversial subject, there is an advantage in having the view, which stands in marked antithesis to the position one is trying to develop, definitely set forth in its most extreme form and the implications it involves unambiguously stated. I make no excuse, therefore, for the above brief account of an interpretation of volition which is fundamentally opposed to the interpretation I shall attempt here to justify. The latter will, I hope, become the clearer through the contrast it offers to the former.

* *Recherche de la Vérité*, i, 1 and 2; iii, Part i, 1 and 2; iii, Part ii, 8; iv, 1 and 2.

I had better lay down at once the main principle upon which I propose to proceed, and to which, in contradistinction to that lying at the basis of the theory I have summarised, all the relevant psychological facts seem to me to point. It may perhaps be expressed in some such terms as the following. There is in the inner life no unique, simple unanalysable component that can fairly be indicated by a perfectly general phrase such as "I will." There is no process of willing-in-general. Whenever I will, I will something—something specific, concrete, particular. No one can in truth *merely* will, no one can will without willing a *this* or *that*. Willing as simply bare activity is a notion of our abstracting thought, one of the false and mischievous abstractions into which, by a strange fatality, those who protest most vehemently against the abstract procedure of formal logic are peculiarly liable to fall. Although, then, we may legitimately enough employ the term "will" as we employ other general terms, to signify, namely, the features that are exemplified in concrete acts of willing, we are not entitled to speak of "the will" as though it were a permanent entity to be met with even at moments when there is no actual volition. Locke's remarks in this reference still retain their force. "If," he wrote, "it be reasonable to suppose and talk of faculties as distinct beings that can act (as we do, when we say the will orders, and the will is free), it is fit that we should make a speaking faculty, and a walking faculty, and a dancing faculty, by which these actions are produced, which are but modes of motion; as well as we make the will and understanding to be faculties, by which the actions of choosing and perceiving are produced, which are but several modes of thinking. And we may as well properly say that it is the singing faculty sings, and the dancing faculty dances, as that the will chooses, or that the understanding conceives; or, as is usual, that the will directs the understanding, or the understanding obeys or obeys not the will: it being altogether as proper and intelligible to say that the power of speaking directs

the power of singing, or the power of singing obeys or disobeys the power of speaking."* In short, as Aristotle expressed it (*De An.* 433, b. 27), there can be no volition without definite content; ὀρεκτικὸν δὲ οὐκ ἄνεν φαντασίας. I must be allowed merely to assert this principle at present, and to refer to the rest of this paper for its justification.

## II.

I pass now to the task of showing grounds for holding to be true a proposition which is constantly ignored in discussions concerning the nature of volition. Such phrases as "the will exciting the muscles to contract," "the will causing the movements of the body," are of frequent occurrence, and, metaphorical though they may be, they often carry with them implications of a thoroughly crude and mischievous kind. The proposition I wish to emphasise may be expressed briefly thus:—Whatever be the relation between body and mind, the mechanism of bodily movement is not worked by the conscious subject after the fashion in which an individual agent may set in motion or stop a machine, the parts of which lie before him at his disposal. There is nothing, so far as can be discovered, in the relation between the conscious subject and what are called his bodily movements comparable to the relation between an operator and the movements of the parts of the mechanical contrivance he may be directing.

The considerations to be advanced in support of this contention are not peculiar to the practical side of conscious experience. Mechanical and physiological changes, for the most part of an extremely complicated character, go along with all psychical changes, whether the latter be what are usually described as cognitive, or affective, or conative. But of these mechanical and physiological changes there is no immediate awareness on the part of the experiencing subject. They do

* *Essay*, Book ii, chap. xxi, 17.

not form part of what in and through their instrumentality is cognised, or felt, or willed.

Take, for example, the perception of light or colour. On the occasion of the perception of (say) a blue object, an elaborate series of events has run its course in the apparatus that subserves the function of visual apprehension. Ether waves have impinged upon the eye, come to a point within the crystalline lens, produced chemical changes in the cones of the retina, in virtue of which an influence of some sort has been conveyed along the appropriate nerves and has set up a process (which is the immediate precursor of a mental state) in the occipital lobes of the cortex. But of all this the experiencing subject has no direct awareness. In and through the mental state which ensues he is conscious neither of the brain and its changes, nor of the optic nerve and the disturbance passing along it, nor of the retina and its image; he is conscious of an external object, having the mark or characteristic of blueness. And it is scarcely a hazardous conjecture that cognition of the object would be imperilled were cognition of the complex details just mentioned to supervene.

The situation is strictly similar with respect to the execution or the carrying out of voluntary actions. The conscious subject has no direct awareness of the position, size, or mode of contraction of the muscles; none either of the existence, function, or condition of the motor nerves; none of the way in which the motor nerves are connected with the muscles. Even the physiologist is at a loss to explain what precisely it is which the nerve-fibres are the means of transmitting, whilst as to the relation between the mental state and the innervating current he is completely in the dark. "However manifest it may appear to us," says Lotze, in what has always seemed to me one of the greatest chapters of the *Medicinische Psychologie*, "that in none of our bodily activities are we consciously so thoroughly at home as in regard to our own

movements, however readily we may believe that we are self-acting, even down to the smallest details of such movements, yet in all this we are the victims of illusion, which it needs but a little reflexion to dispel. Reflexion shows us that, whilst we can will, we are not ourselves able to carry into effect; that, on the contrary, an arrangement of nature, wholly independent of our will, has, according to mechanical necessity, conjoined with our volitional and other mental states certain changes of our body, in which must ensue, without our co-operation, movements of the limbs in specific amounts and directions. We, for our part, have nothing further to do than to produce in ourselves those psychical states which serve as points of departure for the physical processes, and, according to laws and through means that entirely escape our consciousness, the physical processes unfold themselves in harmony with our ends."* If one has regard to the extensive network of intricate adjustments that intervene between a resolution and its external realisation, if one remembers that the number of different movements possible for each single limb, by means of a thousand minute modifications of combination and direction, is indefinitely large, and for the whole body well-nigh incalculable, the importance of what I am urging becomes manifest. In so ordinary a performance as lifting the arm, or rising from a chair, there has been involved a process of what perhaps may be called mechanical selection, of such delicacy that, had each item to be devised by the conscious subject, it is probable that the latter would never attain to the experience of carrying a resolve into effect at all. The conscious subject would, in other words, be foiled and baffled by the complexity of a problem which is solved with extraordinary promptitude by the mechanism of nature. So far, therefore, from being comparable to an operator, to whom the various details of his apparatus are familiar, the

* *Medicinische Psychologie*, p. 288.

position of the conscious subject might, so Lotze remarks, more appropriately be likened to that of a subordinate labourer, who to the working of the machine, the inner structure of which he has neither seen nor comprehends, contributes merely the external appliances necessary to set it going, or supplies the raw material, according to rules, the reason for which he has never understood, that now this and now that desired result may be attained.

Seeing, then, that for the realisation of a resolve or a purpose the conscious subject is at the mercy of an extraordinarily intricate conjunction of factors lying beyond the range of his inner life, seeing that the mechanism by means of which volition finds expression in the external world is completely hidden from him, the conclusion seems forced upon us that what specifically characterises volition as a fact of mind must be, to a large extent, at least, independent of the execution which is normally its consequent. The scope of willing, the content of the inner state which we call an act of will, would doubtless be enormously affected if execution habitually happened in a way other than that in which, as a matter of fact, it does happen, but the peculiar characteristic of willing as a state of mind might still be the same as it is now. A further conclusion, I think, also follows. If, looked at from the standpoint of the individual conscious subject, the relation between willing and the mechanism of carrying out what is willed be thus contingent and arbitrary, it is exceedingly improbable that in the primitive stages of conation there could have been in any way pre-figured or foreshadowed in a specific conative act the results which would ensue from that act. There could scarcely have been in any way antecedently represented in the rudimentary consciousness the bodily movements or the objective change or the experience in the form of motor and other presentations, which would supervene upon a state of impulse or striving. Anything, therefore, of the nature of an idea of end or purpose must,

in that case, be absent from the early phases of the life of consciousness; and without giving to the idea of "end" what I cannot but regard as an illegitimate, and in the long run unintelligible, extension, I do not see how a contrary contention can be sustained. Even in the mature mental life what is absolutely new and novel cannot be willed; the conscious subject can only deliberately will an act with the nature of which he is to some extent acquainted. It is no doubt true that almost all acts of will issue in consequences, some of which are unforeseen, and it may be altogether novel. Yet what is actually willed in such cases is something of which the subject has acquired previous knowledge. A man with suicidal intent may, for example, will to do that which will bring about his death, and of death he certainly has had no personal experience. But he is familiar with the actual details that make up the content of his act of will (*e.g.*, swallowing a dose, or pointing a pistol), and, were he not, the act of will would be for him impossible. The consequences of such an act are doubtless novel; that, however, which is directly willed is not. And, on this account alone, one is entitled, I think, to insist that willing or volition, in any appropriate sense of the word, is a derivative or secondary mental product, and not an original or primary mode of psychical activity.

The conclusion just reached may be supported on more specific and definite grounds. Psychologists would, I imagine, agree that the conditions involved in the early stages of voluntary activity are very largely movements of the body, or rather the experiences which are connected with movements of the body. Those experiences are of more than one kind. On the one hand, there are sense experiences connected with the initiation and execution of bodily movement, and, on the other hand, the executed movement itself becomes matter of apprehension, a fact of which the subject, in and through presentations of different kinds, becomes aware. Now, not until the experiences which precede and accompany the

execution of movement have been already connected with presentations—themselves far from simple—which have as their content executed movements, could there be formed in consciousness the total state, awareness of movement as executed by the individual agent. Only through experience, so far as I can see, could the individual come to discriminate between occurrences that simply happen and occurrences that take place as consequences of a representation of his own. Only through experience could there possibly be formed in consciousness the representation of that which would yield satisfaction to the subject. Only through experience could such a representation have become welded together in consciousness with the specific bodily movements that secure its realisation. Both the control and the voluntary execution of movement depend, therefore, upon the establishment of empirical connexions between certain phases of the inner life and certain modes of the bodily organism.

It would appear, then, that the emergence of even the most elementary kinds of consciously regulated action was preceded by a stage in which the distinctive peculiarity of purposive conduct would be wholly absent from the process of executing movements. Before there could have been established any normal or ordinary correlation of the state (say) of desiring and the way of realising what is desired there must have preceded a long series of executed movements, more or less chaotic and inchoate in character, and only gradually would there have come about lines of definite connexion between states of the inner life and modes of bodily movement. Herein lies, I believe, the truth concerning what in Bain's analysis of volition is designated "spontaneous activity." The name is not, indeed, happily chosen. What appears to be meant is that the bodily organism, or, more specially, the conjoined muscular and motor system, is to be regarded as the seat of activities not entirely dependent for their discharge on stimulation from without. Bain cites as instances the activity

displayed by the involuntary muscles in the maintenance of respiration, the circulation of blood, etc., the initial movements of infancy, and the activity of young animals in general, the activity of excitement; the occurrence of temperaments of great activity with comparatively low sensibility. And he accounts for what he calls "spontaneity" by regarding it as the response of the organic system to nutrition, as an effusion of energy of which the food is the condition. It is, I take it, more than doubtful whether all or any of these activities can be said to be so independent of external stimuli as Bain supposed. According to the more recent theory of "tropism" no movements of animals are exclusively determined by internal conditions, and the characteristic reactions of living organisms to the influences of the environment, such as changes of temperature, light, colour, the touch of a solid object, may be described in terms of certain purely physical and chemical processes. The turning of a plant to the light, the flying of a moth into the flame, or the running away of a centipede from it, are reactions typical of the responsiveness of organic matter generally, and do not necessarily indicate the presence of mental factors. The question as to the exact nature of the physical or chemical conditions that are taken to determine organic reactions, we can here pass over. Through whatsoever causes, the whole organism in the case of most rudimentary forms of life is excessively mobile, and the slightest change in the environment tends to result in bodily activity. And in the higher animals, the junction between the sensory and motor mechanism is so close and intimate that hardly any stimulation of the one fails to find a response of some sort in the other. In truth, even the most elementary act of sense-perception is never in its real concrete character a mere act of cognitive apprehension, but a change, also, in the state of feeling and, as apparently resulting from both these circumstances, a certain mode of experience that is the correlative of bodily movement. The total fact is, therefore, a very complex one, and the

complexity is certainly partially due to the dependence of the process of sense-perception upon physiological conditions.

In insisting that voluntary action, in the strict sense, is dependent upon a complicated bodily mechanism and presupposes genetically a long prior stage of mental development, I may appear to be running counter to the view, for which Professor Ward has always contended, that the movements we call reflex or automatic were originally accompanied by consciousness. And as that view is sometimes stated it would, no doubt, be irreconcilable with what I have been urging. For instance, when it is said that "we are compelled by a sound method to regard sensori-motor actions as degraded or mechanical forms of voluntary actions, instead of regarding voluntary actions as gradually differentiated out of something physical," a fair rejoinder seems to be that these alternatives are not exhaustive. Sensori-motor actions may be occasioned by circumstances that have no counterpart in the inner life and be, indeed, necessary conditions for the appearance of voluntary actions, without the latter having been differentiated out of them. Or, it may be that sensori-motor actions were originally accompanied by psychical factors, and that the subsequent disappearance of the psychical accompaniments is capable of explanation somewhat after the analogy of that which occurs in the case of our acquired dexterities. The quite general consideration that the movements in question are exhibited only in the life of an animated organism,—only, that is to say, in a structure such as experience fairly entitles us to assert is capable of serving as the basis for some phase of conscious being,—lends unquestionable support to this last supposition. But the analogy may be pressed much too far if it is taken to imply that volition, or something resembling it, was once, either in the experience of the individual or of his ancestors, the antecedent of actions which have gradually become automatic. Professor Ward himself takes it to be obvious that "the

simplest *definitely purposive* movement must have been preceded by some movement simpler still" because "any distinct movement purposely made presupposes the ideal presentation before the actual realisation of the movement." And since "such ideal presentation, being a re-presentation, equally presupposes a previous actual movement of which it is the so-called mental residuum," he concludes that there is but one way left, namely, "to regard those movements which are immediately expressive of pleasure or pain as primordial, and to regard the so-called voluntary movements as elaborated out of these."* The considerations upon which Dr. Ward here lays stress are, it seems to me, fundamental, and they point, surely, to the conclusion that the consciousness which may have accompanied the antecedents of the actions we call automatic or reflex must, in any case, have been so crude and rudimentary as to preclude anything of the nature to which the epithet "voluntary" could fairly be applied. Moreover, as Lotze pointed out, the apparently purposive character of reflexes may easily be exaggerated. No doubt the movement of a decapitated frog that brings its foot to the place on the skin which is touched possesses a certain "purposiveness," but it is not purposiveness of the kind which one would attribute to the mental life. The undamaged animal would rather have sought safety in flight, and have tried thus to escape from the danger indicated by the stimulation.

So far as the other modes of corporeal movement, which, together with the variety called reflex, may be said to form the natural basis necessary for the development of rationally regulated action, are concerned, the presence of psychical factors can scarcely be disputed, but still they yield no evidence of having had as their antecedents ideal representations of the changes to which they give rise. For instance, in imitative movements, and in movements expressive of emotions, what

* *Encyclopædia Britannica*, XIth Ed., vol. xxii, p. 553.

happens is not, so far as can be detected, the outcome of any contemplated end or purpose, nor does it lie, to any considerable extent, within the power of the conscious subject to control such movements. The conscious subject can give no reason why laughing should be conjoined with pleasure and crying with pain rather than the reverse, nor can he without difficulty restrain involuntary yawns and sighs. Here, again, the general principle is exemplified that every change in conscious experience, particularly change in sense experience, has as concomitants, on the one hand, a phase of feeling, and on the other hand, bodily movement, and this general principle throws, in itself, a good deal of light upon the movements referred to. Finally, habitual actions—aptly described by Hartley as "secondarily automatic"—illustrate once more how delicately balanced an instrument stands at the disposal of the subject when he reaches the stage of deliberately choosing and resolving. In the human agent, the series of movements making up the complete action in these cases usually at one time followed from a series of distinct volitions, but they have come to supervene so readily and immediately upon some psychical state that the individual refers them in no definite way to himself as the agent. By the constant establishment of links of connexion between presentations or representations, feelings and a train of bodily movements, it has become possible for a single presentation or representation to fulfil the function of a liberator of the activities requisite for the execution of the movements in question. As James puts it, the subject is aware of nothing between the idea and the execution. He pictures the act and it is done, and that is the whole story which introspection has to tell us. And James points out that this, instead of being a curiosity of our mental life, is in truth the normal process. Habitual actions exhibit, that is to say, in complicated fashion, what takes place throughout the development of the facility, on the part of the individual, of regulating and controlling his movements. To this consideration I shall return later.

## III.

The term "will," I have been insisting, indicates no separate or unique faculty or power of mind to which the varied manifestations of voluntary activity are to be assigned. It stands rather for a process of a highly complex and complicated character,—a process the nature and conditions of which it is impossible to determine without taking into account the multiplicity of simpler mental factors that enter into and are involved in it. These simpler factors have all had their history, and it is only, it seems to me, from the genetic point of view that the psychologist can hope to deal successfully with the problems that here confront him. I have referred in the preceding section to certain modes of activity that may reasonably be regarded as having prepared the way for the appearance of volition in the strict sense, but I have referred to them mainly in objective fashion, as they present themselves, namely, to an external observer. I wish now to look at willing, as it occurs in the mature mental life, and to look at it rather from the inner than from the outer side,—from the standpoint, that is to say, of the experiencing subject. I shall try to distinguish the components which analysis seems to show are essential to an act of will, and in the absence of any of which we should be entitled to say we have not got will in the legitimate sense of that word.

In an extremely interesting and methodical article Mr. Shand has endeavoured to differentiate a plurality of types of will,* and maintains that a study of these types is an indispensable basis to a scientific theory of volition. In addition to the more ordinarily recognised types, will, he finds, may be negative, or imperative, or hypothetical, or disjunctive, and the more these typical forms are studied, the more, he thinks, will the difficulty be appreciated of embracing them in any one supreme type.

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* *Mind*, N.S., vi, 1897, p. 289 *sqq.*

I do not know whether Mr. Shand wishes to suggest that each of these types is in the end "irreducible and ultimate," or that they will not conform to *any* general account of the will which may be given. It is true that in a previous article,* he had contended that will itself has a unique quality which cannot be analysed into others, or constituted out of them, that it is as much a specific differentiation of conation as the various class-sensations are specific differentiations of a common sensibility. And I suppose, by similarity of reasoning, it might be urged that each of the different types just mentioned is a specific differentiation of will, having a distinctive quality incapable of further analysis or description. In this sense, however, it might be said, it seems to me, not only that every kind of mental process, but that each particular mental process, is unique and ultimate. For, as an actual fact of mind, every mental process is a unified whole, which cannot be reconstituted by combination of its elements. But uniqueness of this sort militates in no way against the possibility of psychological analysis, nor does it necessarily point to a simple component, ultimate and specific in character, the like of which is to be met in no other state of the mental life. So far as I can see, the main difference between the various types of will singled out by Mr. Shand lies in the diversity of what is willed in the several cases, and no more interferes with the attempt to determine the characteristic features of willing than the varying contents of (say) visual apprehension interfere with the attempt to determine the characteristic features of that process. What, I think, does render the undertaking in question difficult is the fact that willing is a continually altering, a continually developing, state or attitude of the conscious subject, which in the course of mental history passes through a great variety of stages, beginning with the relatively indeterminate and indefinite and advancing to what is relatively determinate and definite. One

* *Mind*, N.S., iv, 1895, p. 450 *sqq.*

can but select a particular stage and qualify what one has to say about the factors that result from the analysis by reference to the less and the more advanced stages one takes to be involved in the history of the whole process. I proceed, then, to note the principal constituents which psychological analysis enables us, I believe, to detect in an act of will.

(*a*) In the first place, there is involved distinct recognition on the part of the subject willing of himself. Only in so far as the conscious subject is capable of being aware of self, not merely as the abstract centre of reference for all that forms part of his experience, but as a concrete individual personality, are we justified in speaking of him as a voluntary agent. The fact of willing can only be formulated by means of the expression "*I* will." I do not mean that the *momentary consciousness* of himself as the agent in respect to the action to be performed is an essential ingredient in every act that is to be called voluntary. But as Kant said of the "I think" in reference to presentations, so we can say of the "I will"—it must, in so far as I am acting voluntarily, "alle meine Bestimmungen begleiten *können*." Consciousness of self has by no means the same contents in all stages of its development. In its crudest form, it is largely made up of what it never entirely loses—the mass of vague presentations and feelings connected with the vital processes of the body. But at the stage with which we are now concerned, it carries with it reflective separation of self from the relatively independent not-self, and the possibility of assimilating (or "identifying," as is usually said) a specific line of conduct with the idea of self. This phrase "idea of self" is, it is true, woefully ambiguous, and it is easy to raise difficulties as to what exactly is to be understood by the so-called "identification with self." Such difficulties will be insurmountable so long as two fundamental considerations are ignored. On the one hand, we are not justified in speaking of desires, motives, impulses, etc., as though they were isolated entities, standing over against the subject as so many matters

of experience. They are, in truth, themselves ways through which the self-consciousness of the individual develops, and since the self can never, in truth, be severed from these, its modes of expression, the union between the two cannot be of the nature of mere mechanical juxtaposition. On the other hand, in self-consciousness there is always involved a division of the total self. When I contemplate myself, the *I* and *myself* are never identical.* The former, which is an element in all our experience, is never an object of experience, and we may proceed in an endless series of attempts to inspect, as an object, the *act of relating* the end in view with the idea of the self. We may make of this a problem if we please, but we have no ground for discerning in the said act any unique or distinctive quality, or for giving to it alone the name of volition. The outcome of such act of relating is, as Professor Stout says, definite enough. "When I judge that in so far as in me lies I shall realise a certain end, the endeavour to realise that end becomes *ipso facto* an integral part of the idea of myself. Failure to realise it is regarded as *my* failure, *my* defeat."†

(*b*) In the second place, there is to be detected in the fact of Willing, and as a necessary component, the presence of representations or ideas, together with the recognition of the immediate momentary reality with which these representations or ideas stand in contrast. As Mr. Bradley is wont to state it, we have an existing not-self, together with the idea of its change. The not-self comes before me, first of all, as a perceived object, which *is* independently, which is other than the experiencing self. So much is common to the theoretical and practical attitudes of mind. But in the latter attitude there is added a further feature. The perceived not-self appears

* Compare Mr. Bradley's distinction between the felt self which is so far never an object, and the felt self, so far as it becomes an object (*e.g.*, *Mind*, N.S., xii, 1903, p. 161).

† *Mind*, N.S., v, 1896, p. 358.

not only as an other, but as an opposite. I am aware of myself as something contrary to the object, and as struggling to change it. I am aware of myself as one with the idea or representation in a sense in which I am not one with the object which opposes it, and accordingly in and through this idea or representation I am conscious of myself as in collision with that object, and the latter has thus become alien to me in a manner in which it was not alien in the mere act of perceiving. In view of Professor Alexander's recent article,* it is worth while perhaps to press this point. Whereas in the purely cognitive attitude the existent object serves or may serve to expand and enrich the self, in the conative attitude it tends rather to thwart and hinder the self. And in view of the claim to regard volition as a primordial attitude of mind, it is worth while insisting upon the consideration that unless the primitive subject is to be supposed already capable of appreciating the difference between ideas or representations of its own and the reality of what is immediately apprehended, the claim in question calls for unqualified rejection.

(*c*) In the third place, it is to be noted that the ideas or representations just referred to involve as part of their content change or alteration of that which is the immediately apprehended reality,—a change or alteration to be brought about by the subject himself. Or, again using Mr. Bradley's terminology, I am aware of the not-self as something to be changed, and in willing, therefore, I must represent to myself in idea the change which I conceive myself capable of realising. In other words, in however vague and ill-defined a form, I possess the notion of an end, the idea of a "to be," of that towards which the change or alteration I am contemplating is to be directed. I conceive of the change or alteration as a way by which the representations I form of a possible state of things will attain the fullness, the vividness, the completeness of real existence.

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* *British Journal of Psychology*, iv, p. 239.

(*d*) In the fourth place, there is involved in the state of willing, and as an indispensable concomitant, the element of affective tone or feeling. It is to be noted that the element of feeling makes its appearance here in more forms than one. On the one hand, associated with the apprehension of the actually present existing not-self, which is hindering or impeding the self, will be a feeling more or less unpleasant or painful in character. On the other hand, the representation of the end is the representation of that which would yield satisfaction to the self, and since the representation of what is pleasurable has always a pleasurable tone, there will be in the state we are considering a foretaste, so to speak, in a weaker form, of the pleasure of realisation. The presence together of these two incompatible modes of feeling-tone partly accounts, I take it, for that experience of tension or uneasiness that characterises the process in the preliminary part of its course.

(*e*) In the fifth place, we may distinguish in the total state what meanwhile I will describe by the vague term, consciousness or experience of activity exercised by the subject, the element which raises the whole state to that which it is customary to denote as one of active tendency. For the present I simply note the presence of this factor, and the fact that in the mature mind it manifests itself in a great variety of degrees. It can scarcely be questioned that our ordinary consciousness of activity is the result of repeated experiences, and that it has acquired a definiteness and appearance of simplicity which may conceal from us its true character.

So far, I have been enumerating factors which are common to will and other conative complexes, especially the state of desiring. The total state of desiring contains not only the representation of an end, but likewise what may be described as the adoption of that end by the desiring subject as capable of satisfying him. But in willing there is further involved a decision that the realisation of such end is possible

on the part of the subject. The subject is in the position of giving practical effect to his state of mind. What Aristotle called deliberation (*βούλευσις*) and choice (*προαίρεσις*) are clearly to be found in both states of mind, and have in fact been implied in the factors already specified. It is true Aristotle confined *βούλευσις* to a consideration of means. "Having," he says, "some particular end in view, we consider by what means this end can be attained." But obviously a critical comparison and weighing of circumstances is as familiar in regard to ends as in regard to means, although no doubt it is prominently exemplified when the problem is as to the possibility of bringing into connexion with self-consciousness the impulses and ideas on the occasion of which action is mechanically brought about. And *προαίρεσις* is virtually synonymous with what has been described as the identification of an idea with the self.

(*f*) In willing there is doubtless to be found an element which is not present in desire. There is unquestionably a distinction, and an important distinction, between the bare representation of a certain series of changes as capable of being produced by the activity of the conscious subject and the determination to realise these changes. I believe, however, it is an error to make use of an apparently simple but in truth highly ambiguous term, such as resolution, to indicate the ground of that distinction. Lotze, for example, tries to constitute an absolute difference between what is indicated by the phrase "I will" and all other states of the mental life. "We have to do with an act of will," he says, "only when the impulses tending to action being clearly apprehended, the decision whether they shall be followed out or not remains over, and is left, not to the constraining force of these impelling motives, but to the mind that is independent of them."* The will, he urges, does nothing but will; all possible content of volition is supplied through the involuntary train

* *Microcosmos*, Book II, ch. 5, s. 5.

of thoughts and feelings. It seems to me unpsychological thus to transform a perfectly intelligible distinction in the processes of the inner life into a breach of continuity and to postulate the separate existence of a unique inexplicable power coming up *per saltum* from the depths of our being. That there is involved in will an ultimate fact—a fact which does not come before us after the manner of an occurrence in the inner life—seems to me certainly true. But *this* fact is not peculiar to willing. It is no other than the fact of self-consciousness, which, when a certain stage of development is reached, is involved no less in knowing and in feeling than in volition, and which, in the words of Kant, enables a man to distinguish himself from all else in his experience. What, however, we are here concerned with is not that general fact, but a specific difference such as ought to be discoverable by psychological analysis. Professor Stout has, I think, correctly described this element as a certain kind of judgment or belief. "A volition is a desire qualified and defined by the judgment that, so far as in us lies, we shall bring about the attainment of the desired end. Mere longing may be defined in the floating idea of an end. Mere desire is defined in this idea together with the problematic judgment that we may or may not attempt to realise it. A volition, on the other hand, is a desire defined in the judgment that we are going to realise an end, if possible."*

Professor Stout guards himself against being taken to mean that a volition is *merely* a judgment. According to his view it is the cognitive side of our nature which gives determinate character to the conative, and that conation which finds its cognitive definition in the judgment, "I shall attempt to attain this or that," is a volition. But, whilst he does not discern any peculiar or inexplicable factor in a volition as distinguished from a desire, Professor Stout holds neverthe-

* *Mind*, N.S., v, 1896, p. 356.

less that a unique and unanalysable element *is* characteristic of conative complexes as distinguished from merely cognitive complexes. I need only recall his well-known contention that in every conative complex the element from which the whole derives its distinctively conative character is that which may be called "felt tendency."* This element, it is maintained, is immediately experienced in the same sense as pleasure or pain while they are being felt, and it does not admit of further analysis. There are, it seems to me, difficulties in Dr. Stout's view which here I can only briefly indicate. For one thing, I do not understand why *this* particular ingredient in the complex should be spoken of as though it alone were immediately experienced, when obviously, according to the theory, the whole complex is immediately experienced. Again, although it is admitted that the element of "felt tendency" never actually appears in isolation at the level of conscious experience with which we are familiar, yet it does seem to be implied that as we descend the scale of mental existence, we should approximate towards such an isolation. And I cannot but regard this supposition as contrary to what we have every reason for saying has been the course of psychical evolution,—namely, that isolation, or differentiation, of one kind of mental process from another is an outcome of the development of consciousness and not a characteristic of consciousness at the beginning. But the chief difficulty evinces itself when this theory is taken in conjunction with Dr. Stout's general view of the nature of the inner life. Conation and cognition, he has been in the habit of teaching us, are but different aspects of one and the same process. "Cognition gives the process its determinate character: without conation there would be no process at all to have a character." In other words, all mental processes as processes are conative, and, accordingly, "felt tendency" should be a distinctive characteristic of *every*

* *British Journal of Psychology*, ii, 1906, p. 1 *sqq.*

mental state. How, then, is it possible to fix upon it as furnishing a means of differentiating certain attitudes of mind from others?

This leads me to the factor in volition which was described in the analysis offered above as consciousness of activity exerted by the subject. Mental activity exists, Dr. Stout has argued, in being felt. "The stream of consciousness feels its own current." I raise not now any question as to the legitimacy of the conception of mental process feeling itself. I press only the consideration that such immediate experience of mental process, even though it be admitted, will not enable us to account for the activity we are aware of in the attitude of willing. For *ex hypothesi* all mental processes are active—the process of perceiving, for example, no less than the process of desiring or resolving—and there is so far, therefore, no reason why the stream of consciousness should feel its own current more pronouncedly in the one case than in the other. And, as has been more than once pointed out, Dr. Stout offers no explanation of the circumstance that we ever are conscious of ourselves as passive. In the two experiences which we describe as the "consciousness of effort" and the "consciousness of ease," the content or object of which there is consciousness is different, but consciousness surely may be as active in the one case as in the other. In listening to a symphony or in reflecting upon a philosophical problem there may be little consciousness of effort, yet the mind may be intensely active, whilst in attending to a trivial conversation when one is fatigued the consciousness of effort may be great whilst the activity of the mind is at a minimum. Strain or effort, as experienced, is no less a content or object of consciousness than a red colour, as experienced, is a content or object of consciousness, and whoever recognises the distinction between the red colour and the act of apprehending it is bound in consistency likewise to recognise the distinction between the strain or effort and the act of apprehending it. There can be little doubt that

sense-presentations are involved in both experiences,—visual presentations in the one, kinæsthetic presentations in the other,*—and he who questions the legitimacy of describing the red colour as a mental fact is equally entitled to question the legitimacy of describing the effort or strain as a mental fact. I do not, indeed, suppose that the awareness of strain or effort, as it comes forward in the mature mental life, can be resolved into the awareness of muscular and motor factors alone. Just as the perception of an external object implies much else than the directly apprehended sense-qualities, so the experience of strain or effort implies, in addition to the actual sense-data of the moment, a multiplicity of other ingredients the presence of which can only be rendered explicable by having regard to the way in which mental life develops. The awareness, on our part, of strain or effort evinces itself as, from a psychological point of view, the result of a long repetition of experiences, and the appearance of simplicity which that awareness comes to exhibit ought not to be allowed to disguise from us its psychologically complicated character. If looked at in the light of the conditions that give rise to the consciousness of self, it is not difficult to understand how such strain or effort comes to wear the aspect of self-activity, comes to appear as the putting forth of power or energy on the part of the self. The experiences that ensue from movements of the body and its limbs are comparatively regular and uniform in character as contrasted with the indefinite variety of presentations that come about in consequence of such movement, and thus provide one basis at least for the gradual recognition by the subject of a distinction between his own inner life and what is other than, or extraneous to, that life. So again, and for a similar reason, the intra-organic muscular presentations come to form part of the trains of feelings, ideas and impulses, constituting the content of our

* See, for example, the interesting experiments of which Dewey gives an account in his article on "The Psychology of Effort," *Phil. R.*, vi, 1897, p. 43 *sqq.*

awareness of self, and, as the invariable precursors of bodily movement, they naturally tend to awaken memory-images of such movement,—a circumstance of primary importance in this particular reference. Consider, for example, the familiar experience that is ours on the occasion (say) of lifting a heavy weight. Presentations of tension or strain come to us, then, from all parts of the body, not merely from the muscles that are directly concerned. But we apprehend them as one complex mass, and this complex mass seems to have a single and independent existence of its own and to be the cause of the bodily movement instead of being, as it actually is, the concomitant and consequent of such movement. No one, I imagine, would argue that, in this case, the experienced tension or strain is identical with the mental activity involved in being aware of it. But is there any more reason for supposing that the effort or strain experienced in an act of will, because it likewise appears to be self-activity, is veritably identical with the mental activity of willing? I venture to maintain that such an identification is without justification and leads to a wholly false conception of the nature of the activity properly described as mental.

I revert now to the power possessed by a self-conscious subject of controlling or regulating his actions. We can, to an extent however that is limited, control our bodily movements, and, in like manner, our trains of thought and feeling. In neither case is it easy to determine how the result, which is familiar enough, is brought about. One thing, at any rate, has already been made sufficiently obvious. Whether we are carrying out or controlling bodily movements, we are, as experiencing subjects, in total ignorance of the mechanism by which the actual movement is effected. Bodily movements come about as natural facts according to strictly natural laws, and we become aware of them as we become aware of all other natural facts,—through means, namely, of groups of presentations and feelings. These groups connect themselves with

presentations and re-presentations which are not presentations and re-presentations of bodily movements. The kind of connexion which is involved in the execution of a movement is, therefore, that of correspondence or correlation, and the correspondence or correlation has limits the conditions of which lie beyond the cognisance of the individual conscious subject.

The nature of the empirical connexions in question can probably best be discovered by observation of the manner in which movements are acquired by learning, a matter concerning which much careful experimental research has lately been reported. Take, for instance, the simple experiment of inclosing an animal, a cat or a dog, in a box, fitted with a door closed by an easy device, and noticing the methods by which the animal attempts to release itself. At first, its movements will be altogether indefinite and misdirected. The animal will bite here, there, and everywhere, indiscriminately, scratch at each crevice and projecting part at random, until in the end by some one of the movements it happens to succeed in opening the door. If, now, the experiment be repeated, a similar series of random movements will be gone through, until again the successful movement is by chance performed. With frequent repetition, the time required will gradually decrease, and finally the necessary movement will be executed at once without the preliminary of the random trials. Or, take the case of the acquisition of skill in certain human accomplishments, such as learning to ride a bicycle. The human subject brings to the task a mind already inured to voluntary actions, but in his first attempts at orientation on wheels he will probably go to work very much after the manner of the animal in the box. He will begin with a number of haphazard movements that will end unsatisfactorily, until he hits by chance upon the movement he has been informed will prevent the machine from falling. And the likelihood is that when at length he does get accustomed to the right adjustments, he will have no clear idea of how he came to make them. "They came to me," will be his account of

the matter, "all at once." Ordinarily he will have to repeat the requisite movements a large number of times accidentally before he recognises exactly how to do them again, or is able to succeed at the first trial, whilst ultimately the machine will become to him almost as part of his body, and be worked by him in a like habitual way. Or, take the interesting investigation undertaken by Bair of the conditions involved in getting voluntary control of the muscle behind the ear, the so-called retrahens, the contraction of which causes the ear to move.* Most people have no control over this muscle, and twelve of those experimented upon had no idea of the movement and could not produce it. The muscle, however, is adequately supplied with both motor and sensory nerves and there is no reason to doubt that control over it is acquired in a manner similar to that in which control is acquired over any other muscle. The attempt was first made to teach those experimented upon the use of the muscle by artificially contracting it through means of an electric current. But although a definite kinæsthetic presentation of the movement was given again and again by the artificial contraction, the movement could not be reproduced when the current was withdrawn. Not until the subjects succeeded in associating the movement with that of other muscles, such as those of the brow and jaw, over which control was already acquired, did the movement take place voluntarily. Then, by keeping attention fixed on the required movement, and neglecting the others, it was possible to single it out of the group and get independent control over it. After such isolation, at first both ears moved, and one muscle could not be contracted alone. But by a similar process of attending to the one and neglecting the other, the facility was finally acquired of moving either ear alone at will.

I need not multiply illustrations. The conclusion they

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* "The Development of Voluntary Control," by J. H. Bair, *Psychological Review*, vol. viii, 1901, p. 474.

confirm can hardly be doubtful. Bodily movements are, at first, even more vague and chaotic in character than the vague and indefined presentations and re-presentations which precede them. But in their own way, they follow a line of advance closely resembling that followed in presentations and re-presentations. The latter come by degrees to exhibit a richer variety of content, a larger number of elements are distinguished in and through what appears to be one mental act, and a single re-presentation may come to serve as a sign of, or as a substitute for, a train of connected images and memories. So, in like manner, movements become gradually more specific and precise, fall into regular groups and series, and these are readily associated with the one prominent re-presentation or idea that is in connexion with them. We exercise voluntary control over such movements by dwelling on the one prominent re-presentation or idea, and more or less on the trains of revived motor presentations that have come to be associated with it. Mr. Bradley protests that there is no room at this point to intrude with a faculty of Apperception or Attention, and, if the emphasis be on "faculty," I agree. But it is primarily and essentially attention, not as a faculty but as the process of retaining the content of an idea or re-presentation for a longer time than would otherwise be the case in consciousness and of increasing, by completer discrimination, the clearness and distinctness of its apprehension, that, from all the instances referred to, one would conclude to lie at the root of the voluntary control to which we attain over our bodily movements, as also over our trains of thought.* Attention would, therefore, appear to be the central fact on the side of our practical no less than on the side of our intellectual life.

* Bair, for example, emphasises in the strongest manner the fundamental importance of attention in acquiring control over the movement he was investigating. *Cf.* my article on "The Nature and Development of Attention" in *British Journal of Psychology*, vol. vi, p. 1.

Voluntary control over our movements is acquired in that way, but the execution of the movements which we thus control is another matter. I have been contending that such execution depends upon a correlation of mental and bodily processes of which the subject has no knowledge and with which he cannot interfere. If that contention be sound, it compels us, I think, to reject the definition of will as "the self-realisation of an idea." Mr. Bradley urges that "the idea must itself alter the existence to its own nature, or, in other words, the idea must itself carry itself out into the changed existence."* If by "idea" be meant, as I gather evidently is meant, the content apprehended, then the considerations we have had before us seem sufficient to warrant the contrary assertion that the idea neither alters the existence to its own nature nor in any way itself carries itself out. In other words, it is not itself an existing agency by which any change in the realm of existing fact could be accomplished. Mr. Bradley, it is true, recognises that the idea is not the whole complex cause which goes before and issues in the effect; but, he insists, it enters into the causal sequence so as to make the difference by which the effect is produced. I raise not now any question as to the propriety of this mode of expression; it is sufficient, for my purpose, to submit that in any case what enters into the causal series is not the idea or content willed but can only be the *process or act of willing*. It is, I conceive, the process or act which is the mental occurrence, and of the mental process or act as such we have, so far as I can discover, no more direct knowledge than we have of the bodily processes. Undoubtedly between the mental process of willing and the bodily processes involved in the execution of movement there subsists a relation peculiarly close and intimate, whatever precise kind of relation it may be. It was largely in view of this consideration that I was

* *Mind*, N.S., xi, 1902, p. 441.

led, in a former paper,* to maintain that there must be an internal qualitative difference between mental acts or processes, other than the difference which consists merely in the fact that one mental act is directed upon one entity and another mental act upon a different entity. If the latter be conceived as the only difference, I am at a loss to understand how a correlation between specific acts of mind and specific bodily processes can be rendered in any measure intelligible.

Our inquiry terminates on the threshold of a large metaphysical problem. Whilst contending that the idea is, in part, the cause of the result in which its content is realised, Mr. Bradley allows, as I have said, that it is not the sole cause. There still remains, in his view, to be explained how it is that *this* idea, in distinction from that other idea, is able to realise its own special existence. In order to account for the passing, in any given case, of a particular idea to its own particular realisation, there is necessary, he thinks, some machinery of a certain definite kind. The machinery consists, so he argues, on the one hand, in a variety of special "dispositions," and, on the other hand, in the presence of some suggested idea, which idea serves, at the same time, to start some one special disposition. The passage in volition from idea to fact is made by a bridge. And the bridge is a disposition the latter element of which has, through experience, become qualified in idea by its starting point. Dispositions may, he tells us, be merely physical as at first, or may later become so, and they may be physical wholly or merely in some part of their subordinate detail. But, to serve in volition proper as a means of transition, a disposition must, in all cases, possess a psychical aspect. Psychologically, a disposition is a standing tendency—the tendency for one of two connected elements, physical or psychical, to appear in consequence of the other being given.† I have no desire to quarrel with the notion of special dispositions—a notion which,

* Cf. *Proceedings*, vol. x, 1910, p. 277.

† *Mind*, N.S., xiii, 1904, p. 22 *sqq.*

in one form or another, is widely current in modern psychological theory. But in endeavouring to solve the perplexing problem that here confronts us by calling in the notion of special dispositions, we are doing little more than giving a name to a highly complicated set of conditions, concerning the nature of which we have little or no definite knowledge. And I suspect that too often the notion does but serve the familiar device of providing a *tertium quid* between two modes of being that seem otherwise to resist the attempt to think of them as intelligibly connected. One thing certainly can be said to stand out clearly from the line of reflexion I have been following. We need radically to change our ordinary conception of the body and its operations if we are to understand the way in which it serves the function of an organ of mind. Dr. Bosanquet puts the matter not a bit too strongly when he says that "finite consciousness and the finite self come late, on the top of immense stores of unconscious mechanism and adaptation, which are, to all appearance, its precondition."*

I can safely leave those who have followed the course of the argument to draw from it the moral with respect to the issue I alluded to in introducing the subject. I will add only some observations of quite general import. In the first place, if the analysis of will yields the factors which I have tried to show it does yield, it is obvious that to speak of the will as involved in thinking, or of thought as involved in willing, is to employ psychologically inaccurate modes of expression. What is really meant is that both willing and thinking are exceedingly complex states of mind which possess many features in common besides features which are specific to each. In the second place, mental activity cannot legitimately be identified with conation. Even if we were warranted in saying that every

* *The Principle of Individuality and Value*, p. 219. Perhaps I may mention that the first part of my paper was written before reading Dr. Bosanquet's book. I am gratified to find how largely it is in accord with Dr. Bosanquet's powerful chapter on Body and Mind.

mental act must of necessity contain the element of impulse or striving, yet it is assuredly not impulse or striving which constitutes the essential characteristic of the activity of consciousness as contrasted with the consciousness of activity. Mental activity consists not in the bare fact that, in each of its phases, the mind is *directed* upon an object, but consists rather in what is intrinsically the nature of a state of mind as the awareness of something. The *awareness* is the activity, and the awareness is active because there is implied in it always the function of discriminating and comparing—a function which is fundamental in a mental act whether it be an act of thought or of volition. In the third place, it is manifestly the case that when the consciousness of self has been reached and an individual subject has become capable of thinking and willing in the strict sense, the notions and conceptions he will first make use of are of the kind which may be called, fairly enough, practical. The relation between the individual and the changes in his environment which ensue in consequence of his own volitions are so constant that naturally such relation must largely influence his reflective consideration of things. The primitive subject's modes of thought, in other words, will be anthropomorphic in character. He will frame, for instance, his idea of the causal connexion of things after the model supplied by the initiation of bodily movement through means of muscular effort. But the psychological analysis of volition enables us to be on our guard against any sweeping generalisation from this fact. For, it shows, on the one hand, that conduct, in order to be *practical*, must be based upon experience of real fact, and cannot, therefore, wholly misrepresent it, and, on the other hand, that there is nothing in the nature of volition which can permanently stand in the way of a rational and philosophical interpretation of the universe of reality.

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## III.—PURPOSE AND EVOLUTION.

*By* Arthur Lynch.

Buffon declared: *There is only one animal*, thus signifying in the epigrammatic French style the truth which formed the basis of Darwin's work, and for which Herbert Spencer sought to offer the interpretation in his theory of Evolution. Similarly it was said, I believe, by Kirchoff: There is only one science.* And again, in the realm of Psychology the central problem has seemed to me to be that of determining the basic mental operations by combinations of which the whole world of our knowledge may be built. These fundamental operations merge into instincts and automatic processes, so that here again we are brought to the contemplation of one continuous texture of development.

But if in ways thus indicated we gain at length some clear and connected views of the gradual progress of science and of civilisation, there is yet borne in a question deeper and more insistent than all the others which have excited our spirit. That is the question of Purpose, in which is wrapped up that of Ideals. It is related in a biographical note on Darwin that a friend once asked him whether he saw evidence of a mind behind all the phenomena which he had studied. A strange earnest expression came over Darwin's face; the question had evidently recalled intense preoccupations of old,

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* Mechanics.

I had this in conversation many years ago in Germany from a friend of Kirchoff. Idealists would protest against the doctrine, but it is they who are more especially committed to it, for "objective" sciences but represent, in their view, the relations of ideas.

but he does not appear either on this occasion or on any other to have given utterance to any decided opinion. I once put the same question to one of the most distinguished of Darwin's disciples, who after reflexion answered: I believe the world to be *necessary*—a remark which contains more than immediately appears.

I have entitled my paper Purpose and Evolution, in order to suggest something of such inquietudes; for many followers of Herbert Spencer and Darwin seem to conclude that, though these great thinkers have not entirely satisfied our minds, yet they have at least exhausted the question as far as we are capable of comprehending it. Issuing, however, from the school of Darwin and Spencer myself I have gradually become more and more critical in regard to their philosophies, and long before beginning the present paper I had freed myself from submission to their mere authority. Some years ago I wrote: "The doctrine of Evolution has come to be accepted among thinking men as one of the commonplaces, as incontestable as the theory of gravitation, or the theory of the circulation of the blood. It will yet be one of the principles invariably assumed even in the diffusion of knowledge amongst common people . . . Spencer will then become a name as Pythagoras, Zeno, Archimedes, Galileo, are names: but his influence, as theirs, will persist, and it will have been his merit to have added to civilisation one of the sources of its perpetual enlightenment."

I am still able to subscribe to these words as applied to the drift of the Synthetic Philosophy, but with regard to what is often called the law of Evolution I will say: It is not a law, it is not even a well enunciated theory; it is at best a principle of classification, and it fails to furnish even a good system of classification. Let us consider the matter more closely. Spencer's own definition reads:

Evolution is an integration of matter and concomitant dissipation of motion; during which the matter passes from an indefinite, incoherent homogeneity to a definite, coherent

heterogeneity; and during which the retained motion undergoes a parallel transformation.*

How did Spencer arrive at this formulation? A question of the sort is always of interest in regard to the works of an author of power and originality, for no matter how closely we may study his theories and test his arguments we will find the veritable clue only when we have come upon the germinating idea from which the work has sprung. In the case of Herbert Spencer it is true that the Synthetic Philosophy, in the whole of its elaborate and frequently overcumbered structure, becomes illuminated by this light from the source.

Briefly, I conjecture—and a passage in the *Principles of Psychology* seems to confirm the opinion—that Spencer, taking the amœba as at one end of the animal scale and man at the other, sought to trace out the changes by which the lowest of these organisations might ascend to the highest, and to express the results in terms of the utmost generality. Had the matter been merely represented thus, it is improbable that the principle of Evolution would have received the almost universal acceptance which it has gained; but the argument was thence conducted in application to various provinces of life and of thought, with great bulk of exposition and in prodigious detail. But again for purpose of criticism it is necessary for us to reverse the process, to strip from the exposition of the principle all that occurs adventitiously or even by way of exemplification, and demand the demonstration of some causal operation.

It will, I think, be eventually recognised that no Law is here expressed, for, waiving the point, so important, of the absence of quantitative terms, there does not arise from the principle any method of predetermining, or of predicting, results. That there is no universal onward progress according

* From *First Principles*, II, XVII, § 145 (1875). Spencer has several other definitions, corresponding in meaning. He also sought, in various passages, to implicate with Evolution the notion of increasing definiteness with regard to time and space.

to the principles of Evolution has been noted by the Spencerians themselves; for finding instances in Nature which signify the inverse of Evolution they speak of degeneration. This is vague, but if we had a term more precise we would still be paying ourselves only with words.*

It is not difficult to indicate lines of criticism, each one of which might be profitably pursued in detail. In the first place Spencer seems to have considered the amœba a much more rudimentary being than it really is. It was formerly the custom to speak of these creatures as structureless, and various microbes are still so designated. Such words define less the animal's nature than the limits of our own observation. The more the powers of the microscope are increased, and the more these organisations are studied, the higher they seem to rise in the scale of development. Those who devote to them a prolonged and intelligent study are often inclined to attribute to them an active psychic life.†

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* I am reminded of a surgeon who, operating for appendicitis and finding the appendix the only healthy organ in sight, recovered from his surprise and entitled the case, pseudo-appendicitis.

† Haeckel established the kingdom of Protistæ for organisms, neither animal nor vegetable. It is, however, now agreed that the Protistæ possess nuclei with complex structure. When we reach a nucleus we are already dealing with creatures far from simple. Dr. E. A. Minchin at the last meeting of the British Association said that though most biologists considered cytoplasm to represent the true living substance, there were many reasons for believing that the chromatin substance, invariably present in the nucleus, or occurring as grains, chromidia, scattered in the cytoplasm, represented the primary and essential living matter.

Sir Ray Lankester speaks of the complicated structure of diatoms possessing delicate, wonderfully sculptured coats of glass-like silica. Every free living unicell has a complete organisation—mouth, pharynx, renal organ, locomotive organ. G. C. Bourne in his Herbert Spencer Lecture (1910) points out that Spencer's assumptions were wrong with respect to the degree of heterogeneity in the germ cell.

Aikin, whose work with Hodge on unicells is admirable, was inclined to credit these with something analogous to rudimentary intelligence. Hering's theory of memory is based also on the supposition of psychic impressions in single cells. Amongst others who have considered the

Life of any degree must imply metabolism; therefore, the apprehension and the transformation, as by digestion, of food, and the elimination of the waste. There must be movement, whether in regard to the organism as a whole or of its parts as between themselves; and since these processes correspond to a certain form and ordered activity of organisation there must be response to stimulus; there must be control of the consequent adjustments; and, therefore, there must be co-ordination.

We are already far from a homogeneous amœba, and I feel assured that it is only the limitations of our own vision that prevent us from recognising a creature of marvellous complexity.

If we press the problem still more fundamentally we may inquire, for instance, how the change from one geometrical figure to another may be expressed in terms of Evolution. It would only be by some ingenuity of language that a change from one conic section to another, as from a circle to a parabola, or an hyperbola to an ellipse, could be indicated by variations of heterogeneity, co-ordinations, or by more definite relations of space and time. Similarly with regard to the changes of solid figures.

Furthermore the enunciation of the principle of Evolution takes no account of the question of mass; but when attention has been directed to this factor it will be recognised as always influencing our conception of development.

These are not merely abstract speculations, for all variations

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psychic element in unicells may be mentioned Métalnikow (*Archives de zoologie experimentale*, vol. xlix, p. 373 (1912)); Prof. A. J. Stewart (*On the Physics and Physiology of Protoplasmic Straining in Plants*); Prof. W. B. Hardy ("The Physical Basis of Life," *Science Progress* (1906)); Prof. Gary N. C. Calkins (*Protozoa*, p. 301); Dr. G. Bohn (*La Naissance de l'Intelligence*, p. 103); Prof. H. S. Jennings (*The Behaviour of Lower Organisms*, p. 8); M. F. Washburn (*The Animal Mind*); A. Binet (*The Psychical Life of Micro-organisms*, p. 51); G. C. Crampton "On Paramæcia" (*Archiv für Protistenkunde*, 27th vol. (1912). *Cf.* also Prof. F. Darwin's Presidential Address to the British Association, 1908.

of size and shape, and hence all determinations of morphology depend ultimately on variations of mass and of geometric forms as implied in the relative positions of the components.* If then Evolution were a universal principle its operation would be found in these fundamental variations which underlie all visible changes.†

Let us consider a problem at the other end of the scale. We wish to ascertain, according to the principle of Evolution, the relative places in a scale of development of the intellect of John Stuart Mill and of Gram, the discoverer of the stain that bears his name; of Brougham, with his prodigious mental energy, and Dollond, the optician who produced the achromatic

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* In fact a conception of this sort lies at the base of Naegeli's theory of development.

† That it is right to apply the test of Evolution at the most fundamental base has been recognised by none better than by Herbert Spencer himself. He says in *First Principles:* "The formation of molecules more and more heterogeneous during terrestrial evolution has been accompanied by increasing heterogeneity in the aggregate compounds of each kind, as well as an increasing number of kinds; and this increasing heterogeneity is exemplified in the compounds, non-nitrogenous and nitrogenous, out of which organisms are built."

It is in accordance with this expression that Mr. Raphael Meldola has written learnedly on the "Evolution of the carbon compounds."

But even here we are not at the lowest accessible level, and if the principle of Evolution were a law of Nature we should discover at the base the principle in operation in such a manner as to enable us to predict phenomena. The whole tendency of modern chemistry from the days of Lavoisier downwards through Dalton, Mendelejeff and Ramsay, has been towards a simplification of the composition of matter. The differences in compounds are eventually functions of the positions of the atoms. So that we are thus reduced to demand the demonstration of a law of Evolution in regard to geometrical figures as expressive of dynamic relations; and the law should be more clearly in evidence than at the juncture of any subsequent complications. Thus, for example, there are two compounds having the same formula, $C_4H_{10}$. These isomeric paraffins, butane and isobutane, owe their differences to different ways of arranging four carbon atoms. The qualities of the compounds do not change with change of position of the compound as a whole; but we feel we are entering into a secret of Nature when we discover the effect of change of position of the atoms.

microscope; of John Hunter, with his vast erudition and technical skill, and Corti, who defined the structure of the organ of hearing.

In each case the specialist, the man of more limited outlook, accomplished something essential that lay in the direction of the progress of science; but it would be difficult on that ground alone to place his mind higher in the scale of development. It has been seen that we must also take into account the compass and range, or what by analogy we might speak of as the *mass* of a man's work.

I have discussed the matter elsewhere,* and I will not now delay further than to point out that the difficulty arises from the want of determination of the terms of Evolution. Of two bodies that which has the less heterogeneity might have the better co-ordination and functions more readily adaptable to the exigencies of time and place; and there might be numerous intermediate grades produced by suitable variations of these factors.

What even is the definition of specialism? Let us consider a specialised region of a special subject such as the infinitesimal calculus; Boole, devoting himself to the study of differential equations, produces a useful text-book; Sophus Lie, taking a wider range, illuminates the whole subject in more masterly style; Riemann, deriving inspiration from considerations of physical science, covers a vast field of thought, and eventually brings to bear on the theory of numbers, for example, an apparatus quite beyond the power of a narrow specialist in that domain. To test the value of specialism requires a standard comparable to that of "work" in mechanics. In forming an estimation of any form of development it is necessary to refer to results. This may be thought to be implied, even if not expressed, in the principle of Evolution; it is, however, necessary to set it in clear relief.

The question of degeneration must not be lightly cast aside.

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* In *Psychology: A New System* (1912).

Suppose, for example, that a philosopher, having observed a vast movement of people Eastward to the City, formulated a law which expressed that condition of things as prevailing throughout London. If then his attention were called to the fact of a vast movement in the contrary direction, he might content himself by saying these represented the inverse of the law. But if there were no means of ascertaining what individuals were likely to obey the law or to run counter to it, nor even what relative proportion existed, nor what cause or system of causes produced either one or the other effect, then the law would not be very helpful. But if, further, the greater proportion of citizens seemed to be moving not directly Eastward nor Westward, but in directions neither definite nor constant, then the value of the "law" would be *nil*, and great care would be necessary in order to derive from the formulation any service whatever.*

What has been said indicates the lines on which we should test the rigour of the demonstrations of Evolution. We find that the doctrine fails, and the reason may be expressed in general terms by saying that it presents us with a system of variables, which are not defined quantitatively, nor expressed in regard to mutual relations, nor determined in regard to the direction of activity. It is no more possible to formulate a law on such a basis than it is to offer the solution of a problem in algebra in which the unknowns are in greater number than the equations.†

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* The conception of degeneration must be distinguished from that of simple inversion of the process of Evolution. This has been shown by a distinguished Belgian savant, M. Dollo, in his study of cephalopods. *Cf.* an article on the subject, "L'irréversibilité de l'Evolution," by Robert Douvillé in a recent number of the *Revue Scientifique*.

† The principle of Evolution has not even in zoology afforded any well-defined system of classification. The main lines of the orthodox classifications were laid down by Cuvier, who was not an evolutionist. Alfred Giard mentions three other important systems: that of Lacaze-Duthiers (based on the morphology of the adult); that of C. Semper (anatomo-embryogenic); that of Huxley (purely objective). He was not

The doctrine of Evolution has been closely associated with the spread of Darwin's ideas, but the connection is not inevitable. The theory of Natural Selection is generally supposed to indicate the causal processes by which organisms are conducted along the path of Evolution, and this theory is held by most biologists to be adequate even in the sense of excluding other factors.

The principles of the struggle for existence, and of the survival of the fittest, are so manifestly in evidence on every side that these phrases have become the common-places of speech. Neither is free from objection. It is a strain of language to speak of as arising from struggle, the power of beauty, the charm of a sweet voice, or the witchery of the feats of genius; and it is the more needful to emphasise this point because a school of writers of the present day have acquired celebrity on this misconception. Keats struck the mark, as so often in the wonderful flashes of his intuition, for example, in the phrase, "Gentlier-mightiest."*

Again with regard to the survival of the fittest; when fitness may depend on cunning, or adaptibility of conscience, or the ability to sleep five in a bed, or base egotism in time of danger; then we reach the conclusion, that often the fittest survive only because the survivors may be deemed the most fit.

In studies of Darwinism two questions seem to loom up with especial importance. An animal's mode of life is determined by its functions and its environment. Thus under certain conditions the ant-eater may flourish. But the possession of a rudimentary organ must generally be of detriment to the animal. Our problem is therefore to trace up, through the ages, the gradual development of an organ

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satisfied with any of these and proposed the principle of embryogenic superposition. Giard was a Darwinist who recognised fully, as Darwin himself did, the value of the contributions of Lamarck.

* *Endymion*, Book III, near the beginning.

which step by step must be favoured by the environment, while at the same time conditions within the range of the environment permit the existence of the original type and of innumerable diverse types which have also developed from it. It may be possible to solve this problem, but not I think by the explanations hitherto advanced.

Another point is that which I heard expressed by one of the greatest of living biologists, M. Yves Delage, whose results in experimental parthenogenesis have become famous. He said that variation was like the movement of a ball suspended by innumerable little elastic strings. It is easy to cause a slight change of position, but beyond a certain limit it becomes more and more difficult to increase the deviation.*

Just as we may hold the doctrines of Evolution and of Natural Selection as distinct, so we may regard the phylogenetic theory† as not necessarily bound up with either. The evidence of phylogenetic development derived from a study of the embryo, so far from supporting Natural Selection as a sufficient cause, should prompt us rather to challenge this doctrine to make manifest its veritable service. Natural Selection plays its part here, but it is only a surface gloss over profound, determinate processes of growth and development.

Even the word Evolution has been used in senses which are at length synonymous merely with change.‡ So that, although

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* It is this weakness of the doctrine of development, as originally conceived, that has given impulse to the theory of mutations. Prof. M. E. Castle (*Science*, 1905) says: "Mutations are permanent, variations transitory." And we find mutationists like Bateson dealing with variations in such a way as to scandalise old Darwinians, such as Poulton. But the mutation theory is not all satisfying.

† That of descent from the same origin.

‡ We have M. Houllevigue's "Evolution of the Sciences," which may be acceptable. But, for example, in regard to chemistry Glaser (1670) wrote: "Chemistry is the art of opening compounds by operations consisting in cutting, bruising, pulverising, alcoholising, scraping, sawing, precipitating, granulating, laminating, melting, liquefying, digesting,

I criticise the principle with rigour, yet I am sufficient of an Evolutionist to desire to save Spencer from his friends. I am also a Lamarckian though I think that Lamarck and Spencer, and nearly all their disciples, have exaggerated beyond measure the relative importance of the Lamarckian factors. I am a Darwinian, though I think that Darwin over-rated the *rôle* of Natural Selection. I am a Weismannist to the extent of appreciating the control he has exercised on Lamarckism and Darwinism. I am a Hugo de Vriesian in regard to mutation, although I think "spontaneous" mutations absurd.* I am a

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infusing, macerating, etc." If we compare this conception with that of modern chemists we will not find a change from homogeneity to heterogeneity.

It is common to speak of the Evolution of Energy: Brunhes writes on the Degradation of Energy; Matout, with ideas not dissimilar, speaks of the Cycle of Evolution. Again, with another meaning, Lord Balcarres has published a book on the Evolution of Italian Sculpture. We even hear of the Evolution of the golf-ball.

* Both Darwinians and Weismannists have asserted with regard to their doctrines that no other explanation can be conceived. This reminds one of the old fallacious argument of the "sufficient reason." The word "Spontaneous" recalls "idiopathic" diseases, that is to say diseases that sprang up of their own accord. Bacteriological investigation is gradually lessening the number of idiopathic diseases; a clear view of the principles of Conservation of Energy and Conservation of Mass will likewise prove the baselessness of spontaneous phenomena. A famous biologist, Dr. Archdall Reid, discoursing on "Methods of Research" has combined both faulty methods indicated in one sentence. "The hypothesis that variations were normally spontaneous was the only relevant hypothesis which was compatible with the law of Evolution through natural selection" (*cf. British Medical Journal*, October 28th, 1912).

We may here also enter a caveat against the habit of some Darwinians claiming in favour of Natural Selection the operation of causes which may be unknown or undeterminable. An instructive example may be found in the history of researches on the sense of vision. Grant Allen in *The Colour Sense, Its Origin and Development*, puts forward the theory that the taste for bright colours has been derived by man from his frugivorous ancestors, who acquired it by exercise of their sense of vision upon bright-coloured food-stuffs. One may argue quite convincingly on these lines if all the uncertain and undetermined factors be conceded to operate in favour of the theory. But in an excellent little book on *Matter and Energy*, Mr. F. Soddy

Mendelian, though I do not believe that the Mendelians have been able in the restricted scope of their observations to cover the whole field of heredity. I think that each of the great men mentioned has lifted a corner of the veil; I do not think that any of them has seen Nature entire and whole.

I will now leave these questions and enter upon a new order of ideas, though with the intention finally of showing the inter-relation of all. Elsewhere in endeavouring to analyse to the fundamental process of the mind, I was led to ask many questions not merely as to the inner meaning of axioms but also as to the importance for geometrical science of certain simple forms, such as the straight line, the right angle, and the Cartesian co-ordinates. These questions brought me at length to a consideration of the conditions of the body and its relation to the physical world.*

Considering the body anatomically we find that it is in great part built up of a series of levers. The bones are the arms of the levers, the muscles supply the motive power. Yet the muscles are comparatively few in number—less than 450†

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points out that the greatest sensitiveness to colours corresponds to those parts of the spectrum where the light energy is highest. Upon this fact one might build a theory of development distinct from that of Grant Allen, and even more convincing. Hence we should be circumspect about accepting either.

One of the most delightful chapters in the theory of Natural Selection is that relating to the colour of animals, as for instance when it is explained that Arctic animals are white. These arguments seem less ineluctable in view of the studies of A. Guilliermond and others on the mode of formation of pigments in the carrot, for example. They fail to explain moreover why the fur of a cat shut up in a refrigerator becomes white.

* Kindred speculations form an important part of the work of Ernst Mach, and he has shown the dependence of psychic and emotional states on physiological and chemical conditions. A school of ardent thinkers—the Biochemicals—are prosecuting like studies, and the work of Pawlow and the psychic-analysis of Freud are landmarks, however widely separately, on the same route.

† 446 muscles dissectible and describable according to an old anatomist, Keill.

in all—and the co-ordinations likely to be effected by them for the purposes of life may be subserved by a comparatively small portion of brain. This may be shown by various proofs, but the illustration of the great beasts of prey with their splendidly active life and their small brains may suffice. Mere muscular activity is not the end of life. The athlete is not the flower tip of the world.

The nerves to the muscles are but the lines of communication. The afferent nerves are indicators only, although their impressions have a distinct hedonic element. Even a life of sensation, however, would be meagre if confined to the separate impressions of such nerves. The blood, the glands, and the other tissues subserve the economy of the body. Exploring thus we find that, once provided the essentials of existence, man's chief development must be psychic.

The action of the muscles on the bones produces a great part of the visible external life of the man: that is to say, of the varied forms of his locomotion. Yet on the whole man is inferior to many of the beasts in locomotive power. The elephant is larger, the greyhound runs faster, the flea relative to its size is a greater jumper. The completeness of man's muscular equipment hinders its development in the form of simple but powerful locomotion. Therefore even in the muscular system his chief development lies in the variety of co-ordinations. Thus man becomes the tool-using animal. The use of tools brings him into contact with the varied conditions for their best use, and already man by that fact is launched on the road which leads at last to science. He has begun to subdue to his use the forces of Nature.

To burn the stages I will now say—for I have discussed it elsewhere—that the course of civilisation could be illustrated by tracing out those forms of acquisition which in its modern aspect we call positive science. A criterion of man's development is his control over natural forces.

Another domain of thought links on to this. Once on a

time travelling to Marseilles and beholding the beauty of a starlight night I fell to speculating on the distance of the stars.* My senses reeled in that abyss of thought. I turned then to think of the world of the molecules, and again my senses refused their office. I could use symbols, I could conceive neither of these worlds intuitively. Then I asked, why did these distances seem so great, or so small, even beyond the bounds of the conceivable. Humboldt speaks of the narrow limits of the solar system; and on the other hand we employ our microscopes to study the "giant" cells of Betz. Greatness or smallness have only relative† meanings, and that is relative also to the growth of our individual powers. I could imagine myself translated in a thought to the moon. If, as in fabled stories, we could be bodily transported there at once with no sensation intervening, then space would seem in that case to be annihilated.‡

We find arising from the foregoing discussion certain indications of criteria of development in man. We see that it is necessary to consider not merely the type of complexity

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* Professor Hinks of Cambridge University found that fewer than twenty stars subtend at the opposite end of the earth's orbit (298,000,000 kilometres) an angle greater than one-eighteen thousandth of a degree.

† Herbert Spencer has an interesting passage on this matter in the *Principles of Psychology*.

‡ From these extreme speculations we may refer to an example which is so striking in our actual time—the flying machine. It seems to me possible to arrive at a development in regard to these machines which will mark as great advances as that of Atlantic steamers compared with the sailing boats with which man first navigated the coasts. We will then regard the world itself differently; we will assert our power over it more freely and more determinedly; our moral nature will in that respect become fortified, our intellectual regard more daring, comprehensive, deeper than now.

The question of the relativity of time opens up interesting speculations in allied domains, as, for example, in the study of physical problems by Lorentz. Some psychologists, notably Czolbe, have suggested that time is a fourth division of space. However, in a luminous article in *Mind*, 1876, "The Origin and Meaning of Geometrical Axioms," Helmholtz argues that it is not possible for us to form a conception of a fourth dimension.

but also the analogues of force and mass, as represented in the energy of the individual at the height of his output. We must not only know the intellectual voltage but also the strength of the current in order to measure the power. We estimate the result in regard to the control over the forces of nature.

This model may be thought to be based too exclusively on science, and it may be asked in what way are, not merely the fine physical excellences,* but also the arts—music, painting, sculpture, poetry, to be appraised? I would explain that here I have been trying to come to the framework of civilisation, the schema of its formation. In this regard the thinkers have been the artisans of our human progress, and greater than those of Kings, Powers, Principalities, and Dominions across the ages come the names of Thales, Pythagoras, Empedocles, Plato, Aristotle, Archimedes, Eratosthenes, Apollonius, Hipparchus; that wonderful pleiade of the Greek philosophers who once in the history of the world gave proof of the highest ethical devotion to truth.

But what of Homer, of Æschylus, Sophocles, Euripides, of Theocritus, and Moschus; of Phidias, Praxiteles, Apelles? These men gave to life its embellishment, its rounded fullness more? Yes something of its inspiration and reward. But the thinkers in their slow explicative toils, their flashes of illumination, were forming the fabric on which is built the progress of man.

Yet something still is wanting to give soul to that conception:

> ". . . . At the tip-top
> There hangs by unseen film an orbed drop
> Of light . . . ."

That is the Ideal; that is the guiding star of Purpose.

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* Amongst the criteria of development should be included beauty. At the height of physical accomplishment strength and beauty unite. At the summit of mental achievement there is harmony in the movement of thoughts. So profound and vital seems to me this truth, that it may well be the goal of our searching. The problem coalesces with that of Purpose.

Is Purpose to be found in human life? In dealing with a question so fundamental and yet so vital I do not know that the answer may not be given with as much assurance from one of the great inspirational poets—Sophocles, Keats—as from the most comprehensive of savants. But in regard to the poets the language of interpretation is less tangible, and values are more difficult to assess. Why, for instance, do I think especially of Sophocles and Keats?*

Can we take any steps towards demonstrating Purpose? Some of the attempts of theologians have been unfortunate, and the care of Providence in causing the rivers to run through the cities has remained to illustrate this mode of thinking.

I am not, however, afraid to take up anew the argument of design, though without committing myself to adherence to the views of those who have previously used it. Recently I read Bell on *The Hand*, an interesting book wherein one of the greatest of the physiologists endeavours to find evidence of design in the fine adaptation of its anatomical parts.

Possibly still more striking examples might be found—as for instance by Bell himself in comments on Paley—in other regions of anatomy; and one that particularly filled me with delight in my own experience was that of the little pulley in which the obliquus superior works in order to gain the necessary change of direction of its pull. It is as if a problem had been offered to a master artisan to obtain by the use of tensions only the movements of a universal joint, and as if the artisan not relying upon a general plan had pleased himself in this particular in the exercise of ingenuity. The hip joint, and the knee joint—"That wonder of the knee joint," as a distinguished neurologist once said to me—exhibit the problem of obtaining both rigidity and freedom of movement by

* Of Sophocles as the idealist of the wonderful Greeks, that race to whose records I look back with ever-increasing admiration; of Keats, as being in regard to the broad trend of things a great thinker, and the most divinely inspired of the poets of the world.

adjustments of tensions. Bell shows how in the production of the voice various functions separately developed must be co-ordinated. Sir Ray Lankester has explained two quite diverse modes of development of the organ of vision which have terminated in similar results.*

Bergson has pointed out the concordance necessary of two lines of development in the eye, one by which the outer structure is prepared to allow the rays of light to pass, and the other by which a process from the central nervous system is adapted to receive the impressions conveyed.†

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* The development of vision in molluscs and vertebrates diverged long before the complete evolution of the eye, yet the process, though by adaptation of different structures, culminated in similar results. *Cf.* also Saint-Saëns on the snail's eye, which though a rudimentary organ of vision seems to be used in feeling. (Note in *Revue Scientifique*, 1912.)

† This kind of co-ordination has been in operation not only in regard to what one may call the main plan of development in the case cited, but also in regard to successive modifications. Dr. Mott has dealt with the matter in an article in the *Archives of Neurology*: "The Progressive Evolution of the Structure and Functions of the Visual Cortex in Mammalia." In Felidæ Dr. Mott notes a specialisation of the fore limbs for prehension of their prey which would be less effective for the purpose without stereoscopic vision. In the case of the chameleon, the great Spanish histologist, Ramon y Cajal, has found that in the central area of the retina the cones become more delicate, and each cone is connected with a separate tripolar cell, and this again with a separate ganglion cell giving off an optic fibre. Dr. Wilfrid Harris has pointed out that this development is correlated with a special motor adaptation which is of service in seizing prey. M. Rochin-Duvigneaud, summarising the results of Ramon y Cajal's researches, says that Darwinism is inadequate to their explanation. Dr. Mott and Professor Sherrington, however, meet with no difficulty in solving the problem on Darwinian lines. The reason of these discrepancies is to be found—as has been already shown—in the lack of definition of the principle itself.

Recently (1912) Professor A. C. Geddes, speaking of certain theories of bone formation advanced by Ranvier and Müller end more recently by Retterer and Sir W. Macewen, said: If this idea of the osteoblast ultimately be proved correct it will be necessary for us to revise almost our whole conception of the course of organic evolution, of all histories and cell lineages.

Yet the establishment of some one or other theory, we may be assured, will be accepted with equanimity by Evolutionists, for there has grown up in regard to this a manner comparable to that of the old teleology.

The eyes have been developed in such a manner that the best conditions of vision correspond to the greatest energy of the rays from the sun. No doubt the principle of Natural Selection may operate here, but what is it that has given the impulse to variations in that direction, and what is it that, with this mobility of variation, keeps our spectrum so well defined in its narrow range?

Galen of old said, "Take three eggs, one of an eagle, another of a goose, and a third of a viper . . . . The eagle will soar to the highest regions of the air, the goose will betake itself to the marshy pool, and the viper will bury itself in the ground." Evidently then there are factors to be taken into account which are enormously more important in their determination than those of environment.

When various organisms submitted to the influences of the same environment develop each in its characteristic form there is in operation not merely a natural selection of favoured organisms by the environment but also, and more markedly, a purposive selection by the organism from the environment of the favouring forces and material. An oyster and a whale, for example, are placed in the same environment, but there is a wide difference in their adaptation of that environment, as evidenced not only in the greater mobility of the whale but also, curiously, in regard to the means of securing food. The principle is capable of the most extensive application; as wide in fact as that of Natural Selection. Thus a knight, living at a time when his power depended greatly on his ability to use the lance, would find it convenient to protect himself with armour. But if, whether due to the invention of gunpowder or to the establishment of a period of peace, armour became obsolete, the development of the man would become modified in accordance with the modification of his mode of life; but this change would be due not to the reaction of the environment upon him, but on his purposive modification of the environment itself.

Or again a child is born blind. It adapts itself to a certain

environment. Subsequently the child acquires vision. Here there is not merely a change in the child, there is a change in the environment which impresses its life. There are present surrounding us myriad forces of the environment represented by undulations of the ether, or of the air, of which we know nothing. We hang up in space a few vibrating chords, as in the eye or in the ear, and we gain some scanty rustlings which in some way not understood become transformed and "tremble into thought." And when the powers of the organism increase, and the first dim perception of light becomes developed into the keen vision of the eagle, the change has been progressively that of utilising forces that have been offered at every stage.

In considering the action of the environment, therefore, we should avoid the error of supposing that the organism is to the environment as the clay to the hands of the potter. The *rôle* of the environment, if less mandatory, is more resourceful and diverse. To fix the matter by an image we could say, the environment is not a drill-serjeant but a commissariat officer.

The most rigid upholders of the sufficiency of Natural Selection may agree with all this, and they may well claim that all is in accordance with Darwinism, for since the environment is a universal condition and Natural Selection has been defined only by results, any result whatever may be explained in these terms. I think, however, something may have been gained by pointing out the reciprocal influence of organism on the environment with regard to the availability of its forces.

Consider now the explanations of Natural Selection in the case of immunity from certain diseases: Those most susceptible to diseases succumb and leave us eventually with a stock better fitted to resist. I do not think, however, that this explanation, elaborated as it may be or adorned with statistics, goes to the root of the matter. The study of the mechanism of immunity is only at its beginnings but already highly interesting phenomena have been observed. Diseases are

mainly due to microbes, and one aspect of the process of immunisation, is the production in the blood of substances* which give the phagocytes an advantage in their fight with the microbes.

The ultimate origin of these substances is to be found in certain of the cells of the body. But there are many diseases which seem to be fairly recent in the history of our race, and there are others which are new to some secluded peoples. How is it that the cells have the power of reacting so as to eliminate these diseases which have been foreign to the whole long development of the race? The answer may be obtained from the study of the conditions of life of the simplest cells, and the mode of their incorporation in the human frame; and at the lowest level the principle of Natural Selection will again be found in operation.

Yes, but now to compress the argument, such examples as we have seen of developments long prepared, which would have no meaning or use unless co-ordinated with other developments prepared in quite different modes; conditions of effective life, such as immunity, produced from a deep base in view of contingencies in higher forms of life; and finally, as in the development of the embryo, the determined shaping to a destined end, not submitting to the impress of the environment but drawing with appropriate selection upon its resources; all this seems to me to point to the fulfilment of a determinate scheme of things, and to be fitly summarised by the term—Purpose.

With regard to such processes as the development of the apparatus of vision the advocates of Natural Selection may reply that amongst the variations to which the organism was liable Nature had conserved that which had been so advantageous in enabling the creature to orient itself in the world, and that the sense had been progressively improved. Apply

* As, for example, the opsonins of Sir Almroth Wright.

this style of reasoning to the discovery of the Mont Cenis tunnel by a denizen of the moon. Here we would have the "sport" of two sub-montane hollow processes, which having happened to meet midway were found to be adapted to the laying of rails and the use of rolling stock.

The rejoinder may be that there is no comparison between a local work undertaken by conscient agents and the objective processes of Nature. The actual visible artisan, however, may have no more knowledge of the engineer's plan or of its inspiration than has the cell of the cause that links it to a ganglion.

But the argument should be carried deeper. No process of fabrication is the result of a mechanical inevitable adjustment. Even in the realm of thought each step of reasoning is the outcome of tentative suggestions, followed by the acceptance of those which seem advantageous. Further, at the base of our intellectual life the factors of reasoning, or the elements of which these are composed,* are beyond our control; they arise, I will not say spontaneously, but necessarily, when the conditions are present. Natural Selection here becomes merged into the constitution of the world—its materials and what we call its laws. But this does not prevent us speaking of conscious and deliberate acts. And if, for example, the process of weaving cloth may thus be shown to be ultimately dependent on a selection of tentatives offered by forces whose modes elude us, yet we hold this process as a model of design, and its product as the fulfilment of a purpose.

The development of all organs requires the correspondence of development of separate parts: the harelips, the cleft palates, the colobomas, and various other defects that we meet with, show imperfections of the process which, however, as in these instances, may be not incompatible with life.

The argument from design does not lose even in cases where weakness is shown; as, for instance, in the lack of anastomosis

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* I have called these the Fundamental Processes.

of the arterial branches in the brain and kidney; or in regard to the eye itself, of which Helmholtz said that it showed bad workmanship. The problem in animal creation has been broadly: Given certain materials, tissues of all kinds, limited in resistance, to form viable creatures capable of developing in their environment, and capable also of modifying the environment to their advantage. This problem has been solved throughout a wide gamut of existence, and with amazing abundance of illustration.*

Yes, says the Darwinist, but all that is explained by Evolution, and the forces are those arising in the chance play of Nature. Here we come to the pith of the matter. We have seen that there is no law of Evolution, no valid theory even; as to chances of Nature, how did Nature happen to have these chances, and whence came Nature?

All growth, whether determined by purpose or not, is yet brought about by a regular concordance of myriad forces whose operations do not occur by hazard.

If chances permitted these things, whence do the correspondences arise? From selection out of the infinity of chances? No. We are presented with problems that demand the concurrence of infinities of infinities of the regular ordering of things.

The amœba we find to be a complex creature. Consider it in relation to its ultimate atoms, and their unceasing interplay of influences; it becomes myriadly complex. The chances of development within the environment by accretions and co-ordinations become infinite. How is it that man has developed, even through unlimited ages, to his present form?

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* Linnæus estimated the number of species at not more than 4,000. Each generation of savants has multiplied the number. Prof. Pratt (*Science*, 1912) accounts for 522,400 species, and the actual number of animals therefore may well be 1,000 billions. It is a fact of deep significance that three-fourths of these are insects, and only a very small percentage mammals.

By continual determination at every stage of his fitness to the environment. Yes, but out of the numberless possibilities why did he assume his special form? And now that the stability of his type is attained, why do the mere chances sustain him? Why does it happen that after pulling an infinity of winning tickets, as he must, from Nature's lottery, one bad ticket at any step does not arrive to destroy the up-building of countless ages?

The doctrine of chances should be regarded not as the banner of a school of science but as the most helpless of all ineffective hypotheses, the most wretched of the superstitions.

I have shown that our fundamental processes are automatic, instinctive, and that we adopt the favourable happenings. But when we come to ordered chances, selected chances, determined chances, and chances utilised, we arrive at method; and method, if we suppose any meaning whatever in our life, any fundamental reality in existence, so that we may not find

"This world a fretful child's unreal dream,"

—then method implies Purpose.

Yet, even so, the Darwinist replies: Divest all this of the old theological spirit, the teleological bias, reduce it to a mode of progression, and you will then find that we expound the mechanism of the movement. And the sceptical psychologist, still more subtly remarks: Your very laws but imply the limitation of your faculties, they are but the modes by which you seek to catalogue phenomena; the world in itself lies beyond that, vast and void, inscrutable, an eternal sphinx, of which we know only that it smiles and smites:

No. This is not all. Conceiving our world in the most objective manner we find that in our groping towards knowledge we have discovered laws that express objective realities; but when we have discovered the mode of falling of heavy bodies we are not content to regard Nature as a world of bodies falling at hazard. The experiments of Galileo lead us

to the clear conceptions of Kepler, and these receive their explanation in the analysis of Newton; but we still demand to know what is the meaning of this Gravity of which one aspect has been revealed. In the early days of modern electrical science Euler applied his mathematics with the same facility as Evolutionists apply their principle in the biological world; but the greatest discoveries of all were still in reserve, and the researches of Oersted, Ampère, Faraday, Maxwell, and Hertz, have tended both to simplify our conceptions and vastly to widen the scope of their applications. In chemistry the names of Scheele, Lavoisier, Dalton, Mendelejeff, and Ramsay testify to a similar tendency.

And—impressive as Kant's view of the starry Heavens—this principle appears with deepening range more insistent and more inspiring; the discovery of reality is heralded by the feeling of a wondrous harmony of things.*

Here it may be said that in this mood of contemplation, and even in the conception of law itself, the subjective factor enters and throws its enchantment on the sight. That is true, and that is properly true, for we thus attain closer to the essential truth. Science is faulty, for it deprives the world of its meaning, when it restricts itself to its formulæ, its schemes, its diagrams, its forms of things, without recognising that however necessary these be to research and explication, they satisfy no more as the be-all and end-all than the dissection of the larynx gives to us the golden notes of the singer.

I have now led the way to the conclusion. In touching briefly upon the fields of research one cannot do more than indicate lines of thought. And in this manner passing in review the work of Lamarck, of Darwin, of Spencer, of Weismann, of Mendel, of de Vries, it seems to me that each has brought a

* Even in a science so tentative, and at first sight so arid, as Political Economy a philosophic mind may discover entrancing vistas. I have found few descriptions in literature so inspiring as certain inspired passages in Bastiat's *Harmonies*.

valuable contribution to the sum of our knowledge, that no one has offered a satisfactory solution of problems covered by the vague term Evolution. That, adapting the term of biologists, just as some principle of growth presides over ontogeny, so some profound design must explain phylogeny; that the clear recognition of this is already the beginning of a new wisdom; and though in all investigation we must bring a rigorous test to every link of our argument, yet we will find inspiration, and even guidance of method, in the search for wider harmonies, and in the belief of an all-pervading Purpose.

*Summary.*

Spencer is the only philosopher who has offered a fair tentative definition of Evolution. His definition is faulty in that it refers to the variation of different factors without indicating any method of estimating their relative dependence or importance.

The principle of Evolution apart from the difficulty of expressing it quantitatively lacks essentials necessary for a law. It may be regarded as a principle of classification, but it is imperfect even for that purpose.

Other philosophers have used the word almost at hazard, the only notion in common being that of change. Lamarck, Spencer, Darwin, Weismann, Mendel, de Vries, have all revealed processes of Nature seen from special standpoints; no one has given a clear, comprehensive, and convincing account of the development, physical and psychical, of the animate world.

One reason may be found in the tendency of savants to restrict their view not only to their department of science, but to the schematic forms by which they guide their arguments.

A step towards new paths of science will be found in the recognition, however vague, of a determinate Purpose expressing itself in the various forms of which our "laws of Nature" are partial indications.

Guiding lines are: broader generalisations with ampler

scope of applications, simplification of plan through greater complexities of examples; reconciliation of all wider harmonies of Nature; illumination which infuses with new meanings the position already gained, and shows correlations between remote facts.

The means include: Independence of authority; impatience of the principle of the "sufficient reason"; severe criticism of argument; the play of imagination forerunning the formal establishment of laws; experiment, whenever possible to gain new data or decide between disputed opinions; clear interpretation of the results of experiment.

In a more specialised sense with regard to seeking development and precision of Spencer's principle, due importance must be given to:

(1) The expression of psychic energy, and, though ancillary, of physical energy.

(2) The factors that favour increase of comprehensive intelligence, that is to say, the accord of the psychic energy with physical conditions.

(3) The estimation of these by reference to control over Nature.

(4) The value of "mass" and energy, considered in connection with complexity of type.

(5) The principle of continuous development; that is to say, that the stage attained must admit of the most facile adaptation to a higher.

(6) Beauty as a sign of higher development. This includes the principle of recognition of all harmonies. The basis lies partly in the operation of the fundamental process which I have called the hedonic principle, partly also in the application at a deep level of the principle of economy of means and effort.

(7) The outcome in our actual world, expressible in the form of the development of civilisation on a framework of science.

(8) In all this the intimation of, and the search for, a meaning, a goal, a Purpose.

## IV.—A NEW LOGIC.

*By* E. E. Constance Jones.

> " And custom lie upon thee with a weight
> Heavy as frost and deep almost as life."
> Wordsworth.

In this paper I am considering only Dr. Mercier, as the exponent of "New" Logic.* I had intended to refer to some other writers as well, but owing to want of leisure during the past few weeks I have not been able to enlarge the scope of my paper beyond this one book. Dr. Mercier shows great ability, great independence of thought, and great courage, and his book is fresh and interesting. It has flashes of insight and keen criticism, and abounds in excellent illustration, and the style is clear and vigorous. The author's sense of humour, however, seems occasionally to run away with him, and the freedom of some of his animadversions is perhaps excessive.

The book is one of many indications at the present time that Logic cannot confine itself to a narrowly limited scope, and a merely cloistered virtue, but that its connection with Mathematics, with Conduct, with Science, Psychological and Physical, is being more and more recognised, and its importance for all Knowledge and Practice more and more realised.

Logic is being called upon to come out into the open, and explain itself, to take up the burden of universal application, to put forth its strength and meet all needs, testing, sharpening, adding to its weapons, throwing away all antiquated lumber,

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* *A New Logic.* By Charles Mercier, M.D., F.R.C.P., F.R.C.S. William Heinemann, 1912.

clearing out inconsistencies and confusions. The great commotion that is going on round Logic is very far indeed from showing that it is "moribund"—the Science of the Structure of Knowledge must have a life as long as Knowledge itself. But Logic *eo nomine*, like Ethics or Metaphysics *eo nomine*, receives little general recognition, and as far as most people are concerned, might never have taken shape at all. And this is no wonder, in England at any rate, because here the number of young people who learn Logic even for a trivial preliminary examination is almost infinitesimal—and English youth do not flock in their thousands to the study of a subject outside the already exacting curriculum of school and college. Logic is not, like Latin and Greek (which Heaven preserve), compulsory on every mortal man who aspires to a degree at Cambridge or Oxford, and hence entitled to respect, and a subject not to know which is rather derogatory. So the great majority of educated and cultivated people think it no shame to know nothing whatever of Logic. The wonder is that in the circumstances the number interested is not even less. But spite of all, men want it, and use it, by whatever name they call it, and every now and then someone with a strong logical bent wakes up to its interest and indispensability, makes an impassioned study of whatever logic books he happens to come across, and finds them wanting, and then proceeds to write a sweeping indictment of "Logic," to which he attributes everything that is wrong in the world of thought. Logic nowadays is like the British Government—it is often inadequate to the demands made upon it, it is subject to the most unremitting abuse, sometimes the Conservatives are in power and sometimes the party of Progress, but it is there all the time, and is our "guide of Life." It is also improvable, and benefits by honest criticism.

Dr. Mercier's book is described on the cover as "An unsparing onslaught upon the doctrines and methods of Traditional Logic, which is accused of irrational and stultifying

limitations, of inconsistency, antinomy, puerility and absurdity, and is held up to derision and contempt. Upon the ruins of the demolished Logic is erected a New Logic, which supplies the defects and corrects the errors of the old. The proposition is subjected to a new analysis, which discovers innumerable features hitherto unsuspected. Besides Induction and Deduction, which are for the first time clearly distinguished, and whose true nature is for the first time elucidated, a third mode of reasoning, hitherto unknown to logicians, is described; and many new fallacies are discovered and explained. Couched in untechnical language, the issue raised in the book can be as well decided by the man in the street as by the professor of Logic."

What is of most interest to us is the constructive part of the work, and such alleged defects of the traditional scheme as have given occasion for these. I propose, therefore, to examine in as much detail as space will allow some of those "new" doctrines which the author regards as most important.

Dr. Mercier explains his account of Logic as being both Science and Art by reference to the "two fundamental, original and consuming desires" which he regards as the "root and motive of all human endeavour, the desire to know and the desire to do," and the interdependence and continual interaction of these two principles in all human pursuits.

"The proposition," he says, "is the verbal expression of the formation or establishment of a mental relation." I observe in passing that by defining proposition as the expression of a *mental* relation, Dr. Mercier gets into difficulties about Reality from which I cannot see that he ever emerges. Leaving this point aside, however, we will pass to the analysis of propositions.

Since, it is said, the proposition expresses a relation, it must consist of three constituents—the two Terms which are related and the Copula which relates them; or, as Dr. Mercier decides to call it, the Ratio—a name which I cannot but think is not very happily chosen. "Propositions," we are told, "may be

analysed in three ways, of which the way of Traditional Logic is incomparably the worst." This way is that of the Schoolmen, "a mode that has endured to the present day and is taught in every text-book of Logic although it is manifestly radically and incurably vicious."

Aristotle analyses the proposition into Subject and Predicate, thus; Man—is mortal, A—is unequal to B. The Traditional fashion is: Man—is—mortal, A—is—unequal to B. For these Dr. Mercier would substitute A—is unequal to—B, where A is "Subject," B is "Object" and —is unequal to— is "Ratio." For Man is mortal (S is P), there is plainly nothing alternative to the Aristotelian and Traditional analyses, but Dr. Mercier does not raise the question: How should Non-Relative Categoricals be analysed? which, if we are to have a *Science* of Logic, a *general* account of Categoricals, is very essential.

It will be seen that on this "new" scheme, anything like a satisfactory classification of Propositions becomes a chimæra, since the number of different Ratios is quite incalculable; interpreted in this way propositions would be as difficult to arrange and work with, as fractions which have not a Common Denominator.

It is true no doubt that if we include (as we certainly ought to include) *all* sorts of propositions—*e.g.*, Philip is father of Alexander; A is unequal to B; as well as, *e.g.*, Man is mortal; Tommy is cold; This rose is fragrant; This is the boy that set the rick on fire; That is the lamb that fell into the pond—*Formal* Logic cannot deal with them exhaustively except by means of very cumbrous and unnatural expressions. Dr. Mercier's doctrine of Ratio, which draws attention to the structure of so-called "Relative" propositions, is designed to meet this difficulty, but I cannot see that it affords a satisfactory solution. What seems wanted in the first place is a broad distinction between (1) propositions of the form *S is P* (the only form which can be universally applied to affirmative categoricals) where we have intensional diversity in a denotational

unit, *i.e.*, an *intensional* "system" (S-ness and P-ness) in a denotational whole (SP) (*e.g.*, this rose is red), and (2) all those Relative propositions that express the relation to each other of two objects (denotationally distinct) which are elements in a *denotational system—e.g.*, Philip is father of Alexander (P) (A), C is to the left of D (C) (D).

*S is P* gives us the simplest and most fundamental of all "systems," the minimum that is required for assertion.

In Relative Propositions what is asserted of the Subject is *its relation to another thing or object*, and we are able to take that other object and assert of it its relation to the first object; thus *C is to the left of D* ∴ *D is to the right of C.* (Dr. Mercier observes that no book deals with these Immediate Inferences of Relative Propositions, but they are treated briefly in, *e.g.*, my *Primer of Logic*, pp. 38, 39.) Relative Propositions are all of the general form *A is related to B* (A) (B) (where A *is not* B), and express a positive relationship between two things —One and an Other—which are primarily distinguished as not denotationally identical. Thus Relatives are of the form *A is not B.* Before I can regard Philip as the father of Alexander I must leave discriminated Philip and Alexander as *two* individuals. What the Traditional Logic professes to deal with and develop is the *S is P* form of proposition (and Relatives only in so far as amenable to this form) and the corresponding *S is not P*, taken in its purely negative aspect. The basis of the treatment of Relative Propositions is to be found in the "system" to which such propositions respectively belong. Such "systems" furnish both starting-point and justification in all dealings with them as Relative. (Compare the use of "Identity" and "Ground" in Dr. Bosanquet's view.)

A similar starting-point is needed, but has not hitherto been

supplied, for Non-Relative *S is P* propositions. I suggest that it is to be found in the simple intensional "system" of S P propositions, and that the analysis of this into intensional diversity in denotational unity furnishes a Law of Significant Assertion for the Logic of Categoricals, including Relatives *in as far as* they are capable (which all of them are to some extent) of furnishing Immediate Inferences of the "Formal" type. The *is* of the copula should have the same force everywhere. I cannot agree with Dr. Mercier that it signifies "Existence." Consider, *e.g.*, A chimæra is non-existent, The Welsh Church is existent, A round-square is impossible.

A broad line of demarcation between Non-Relative and Relative Categoricals would doubtless have been clearly drawn long ago, if logicians could have so far emancipated themselves from the domination of the "Law of Identity" as to perceive that an analysis of the *S is P* form of proposition was indispensable as the starting-point of the Traditional scheme. It would then have appeared that for "Relative" Propositions a supplementary analysis *differing for each "System"* is imperatively necessary.

When we turn to Dr. Mercier's treatment of Negation (Chapters XI and XII) it does not seem very satisfying. The denial of *S is P* must, it would seem, be the denial of the relation (or Ratio) asserted in *S is P*—but what relation is this? On Dr. Mercier's principles what relation can we say is denied in *S is not P?* He does not seem to tell us, but discusses such matters as Negative Terms, the Privative Negative, Denial of the Singular Quantity, Ingraduate Quantities, etc. We hear a great deal about different sorts of denial, but not what denial fundamentally is. I think it will be found, if the examples of arguments on, *e.g.*, pp. 94, 99, 103, 106, etc., are examined, that unless the Ratio is taken to be the ordinary despised Copula *is* (*are*, etc.), it will be very difficult to treat these examples as symmetrical and coherent arguments. On p. 99, *e.g.*, unless we read:

Vegetarianism—is—Adopted by Some Men,
Vegetarianism—is—a Faulty Diet,

how are we to arrive at the Conclusion:

A Faulty Diet—is—Adopted by Some Men?

And, quite clearly, but for identity of denotation of both Terms in each Premiss, thus 

, no conclusion could be obtained.

"The fundamental relation of Logic," Dr. Mercier tells us on p. 56, "the relation on which all reasoning depends, and out of which all reasoning develops, is the primary relation of Likeness, which with its complement Unlikeness is the foundation of all thought . . . . thus the several Kinds of relations that may subsist between terms, and are predicable of them, are Likeness and Unlikeness, Existence and Change, Attribution and Non-Attribution, Action, Passion, and Causation, Temporal and Spatial Relations, Class-inclusion and Class-exclusion. Of these . . . . Logic recognises four only, viz.:—Attribution, Class-inclusion and their negatives." On this I would remark that, however indispensable for Classing, for the formation of General Notions and General Names, for the attainment of General propositions from experience, Likeness and Unlikeness may be, they have no direct importance for Assertion, either for Propositions of the *S is P* type or for Relative Assertions. The category of *S is P* propositions is Identity of denotation in diversity of Intension, that of *S is not P* is denial of such denotational Identity between the terms, though the things which the terms denote may be as *like* each other as possible—*e.g.*: *This* new shilling is not *that* new shilling; and in the case of Relatives, we may indeed assert Likeness and Unlikeness between the constituents of a system, but we may also assert thousands of other relations—

Likeness and Unlikeness from the point of view of Assertion have no pre-eminence.

When Dr. Mercier says (pp. 71, 72) that "there is no proposition in which the predicate does not refer to the whole of the subject," he says what is most true, but (I think) incompatible with any analysis of affirmative propositions of form S is P except the identity-in-diversity one, which has been already more than once referred to.

And again, when he says that "Hamilton's quantification merely carries to its logical conclusion that quantification of the predicate, which all logicians admit and proclaim, in their doctrine of distribution. It merely states explicitly that which they assert is implicit in the proposition," what he says seems indisputable.

But this is not the place to enter into a detailed discussion of Hamilton's doctrine, which, however, appears to me to have been designed to secure effectively the result that "in no circumstances whatever does the predicate of a proposition refer to part only of the subject of that proposition."* For, admittedly, Hamilton's quantified Scheme reduces all Conversion to Simple Conversion, in which (in affirmation) the Predicate refers to *all* the Subject, and the Subject to *all* the Predicate (denotationally of course).

When Dr. Mercier passes from Propositions to a consideration of Reasoning, the difference between his treatment and that of Traditional Logic appears very striking indeed. He divides Reasoning into Induction (Empirical Reasoning), Inference or Deduction (The Method of Explication), and Analogy in the Aristotelian sense as Comparison of Ratios.

To Induction Dr. Mercier does not allow the designation of Inference, and he would endorse the view that "We have not got Inference unless the Conclusion is necessary from the premisses." According to him Immediate Inference is the

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* *New Logic*, p. 72.

Explication of what is implied in Simple Propositions, and Mediate Inference is the Explication of what is implied in Compound Propositions. The Combined or Compound Proposition is "one in which two or more propositions, having a common element, are combined and expressed as one, *e.g.*, A and B are both C, A is B and B is C."

In Dr. Mercier's view "Induction is based on propositions that are materially true," while "Deduction is nothing more than inference from postulates whose truth or falsity is immaterial to the argument." It is probably the case that this characteristic of Deductive Reasoning has not been sufficiently recognised and insisted on, but it seems clearly implied in the view of Inference which I have referred to above, and it is, I think, emphasised by Dr. McColl, and some modern exponents of Mathematical Logic; and in Formal Logic in which we deal largely with non-significant symbols (S, M, P,—A, B, C,—X, Y, Z), which may stand for and be replaced by all sorts of significant terms, it is certainly implied that for the purposes of valid inference it does not matter whether the propositions from which we infer are true, false, or doubtful. I am far, however, from denying that it is better that the very important point here in question should be clearly and definitely stated.

Dr. Mercier's account of "Induction," *i.e.* "Empirical Reasoning," bristles with difficulties. "The radical difference between Deductive Logic and Inductive Logic," he says, "is that the one appeals to experience and the other does not." "The function of Induction is to solve problems." "To Induction the material truth of its premiss is vital. Induction admits only those premisses that are consistent with experience—that are *or are believed to be** true, in fact. A premiss which is at variance with experience has no place

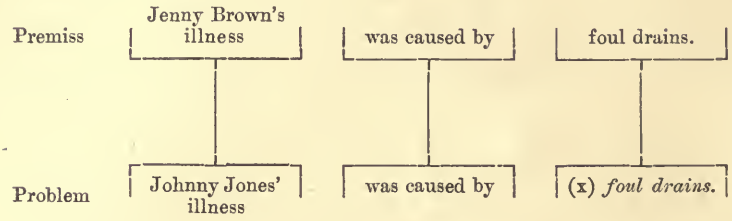
* If this alternative is admitted, the proviso that Induction must deal with true propositions seems to fall through.

in Induction . . . . Induction is the discovery of truth of fact" (p. 204).

Induction as a method of reaching truth involves, it is said, an indirect appeal to experience and should be called Mediate Induction. "The direct appeal to experience—Immediate Induction as we may call it—is not a mode of reasoning as reasoning is understood in Logic." "The function of Induction is to solve problems; and the problems that confront us, and demand solution by appeal to experience, are by no means limited to causation." "The solution of a problem is not in the problem. It must be sought from an extraneous source and that source is experience . . . . Induction is material proof." A problem is an incomplete proposition. It is a proposition in which one of the three elements [Object-term, Subject-term, and Ratio] is wanting; and is temporarily replaced by a dummy, and the problem is solved by supplying the missing element. What is the cause of the child's illness? In this case the problem is, "The cause of the illness is $x$: find $x$."* "The doctor is asked, what was the cause of Johnny Jones' illness? He puts it to himself—'The problem is, Johnny Jones' illness is caused by $x$. I am to find $x$. I must search experience for a similar case—for a case as like this as possible. I must find a case in which a similar illness was traced to a cause, and I may be sure that if the illnesses are really similar in material respects, and if the true cause of the one illness was discovered, the cause of the other will be the same or will be similar in material respects.' He searches experience and finds what he wants. He remembers Jenny Brown's illness, which was in material respects similar to Johnny's; he remembers that Jenny Brown's illness was traced without doubt to foul drains . . . ." He goes on to conclude that

* It may be suggested that the attitude of Inductive Logic as here indicated is exactly that of every seeker, learner, or hearer. See *Mind*, Jan., 1911, p. 42, note 2, and *e.g.*, Sigwart's *Logic*, Engl. Transl., I, 25, 26.

Johnny's illness was due to the same cause as Jenny's, and the reasoning is set out thus :—




That this represents the "actual process of reasoning" in such a case no one, Dr. Mercier thinks, can have any doubt.*

He goes on to enumerate six respects in which an "Induction" of this sort differs from syllogism. I will not linger over these, but will examine some points in the above account of a case of "Inductive" reasoning.

In the first place, it is very likely that it represents what often takes place in the mind of a person to whom such a Problem is proposed. But though it may be what actually *takes place* often (or even always), this does not guarantee its being a valid mode of procedure. A physician who has experience, sagacity, and resource, may very likely reach the true answer to his Problem in this way. But as a method of getting at the truth it is not trustworthy. People have often enough failed to get the true answer to their question by such means. An observed or imagined similarity may be very misleading. Suppose, however, we amend the statement, and say that the Subject of the Problem is like the Subject of the Premiss *in all material respects* (p. 208). Then the question arises—How are we to know what are the material (*i.e.*, relevant and important) respects? To ascertain what *are* the "material" respects is often the chief problem.

* Compare p. 292, when in criticising the syllogism Dr. Mercier says: "That the syllogism represents the mental process actually performed I should deny." Compare also the reference (p. 293) in a similar connexion to "what passes in my mind as well as I can trace it."

Then again as to *truth*. In order to be sure that our premiss is "true" must we not have and apply a criterion of truth? Constancy in experience—that is, *Inductio per enumerationem simplicem, ubi non reperitur instantia contradictoria*—is suggested as sufficient to remove our doubts. Dr. Mercier believes that "it is the ground of every one of our most certain convictions" and that "every one of the truths that we hold as most certain rests upon the accumulation of instances without exception."

In the instance about Johnny Jones' illness, it may be objected that the conclusion is drawn from a premiss stating a single instance only. But "lurking in the background of the mind is another premiss, which is not explicitly mentioned in the argument, but which is in the argument and is essential to the argument . . . . It would be impossible to argue from one case of causation to another, unless it were assumed that in experience causation is constant" (p. 211). If there is a premiss which is essential lurking in the background, by all means let it come forward so that we may be enabled to judge of the whole force of the argument.

Dr. Mercier thinks that "constancy in Experience" is all-sufficient, but we are forced to ask: What exactly does Constancy in Experience mean? Does it mean Constancy that has been Experienced, or Constancy that is "assumed" and that covers future as well as past?

If it is "assumed" that there is Constancy in Experience, and in Induction we argue from this assumption, then Induction is assimilated to Deduction as expounded by Dr. Mercier. If we do *not* "assume" constancy, if we depend only on *Experienced* Constancy, then we cannot reach the solution of any problem.

And again, we are driven to ask: *From what* does our Constant Experience result? Why should our Experience be constant unless Nature were (so far) constant?

Dr. Mercier does not understand, he says, why people should prefer to "rest the validity of argument on an

imaginary and non-existent Uniformity of Nature, which they infer from uninterrupted experience, rather than on the uninterrupted experience itself." Well, the answer to this seems to be, that it is only if uninterrupted past experience is based on and guarantees uniformity, that it can give us any assurance about an (as yet) unexperienced case. This Dr. Mercier himself seems to allow when he says (p. 211) that we have to *assume* "that in experience causation is constant." On the whole, I am not able to see that Dr. Mercier's account of Induction is better than, *e.g.*, Mill's, or fundamentally very different from it, and I think he unduly restricts the scope of "Induction" by limiting it to "true" propositions.

I think our "problems" may belong to many regions of "unreality" (as, on the other hand, Deduction or Immediate Inference may deal with what is true, or taken to be true). Dr. Mercier does not, of course, admit this, but in Chapter XXIII he points out that, while in his view Induction, Deduction, and Analogy are distinct and separate, we seldom "pursue an argument through more than a very few stages without employing every process of reasoning, and alternating them repeatedly." This would seem to make the process of argument exceedingly complicated and bewildering, and the ascertainment of Truth more difficult even than it has been taken to be—especially when we consider that true propositions, as well as those that are false or doubtful, may be taken as postulates of Deductive Reasoning. Either, it would seem, we must drop Dr. Mercier's distinction when we are engaged in any investigation, or we must be continually having our attention distracted from the argument by stopping to consider whether it is Inductive Truth, or merely Deductive Explication, that we are pursuing.

Dr. Mercier insists that in "Inference or Explication" we are dealing primarily with Postulates and what they imply—with what can be validly deduced from premisses, no matter

whether they are true or false, or doubtful. Truth, and validity of Inference, it is impressed upon us, are not the same thing. Quite so, but, in order that a valid inference may be drawn in any case whatever, the Inferend must be "supposed" true.

The function and use of Immediate Inference is stated excellently by Dr. Mercier. "It enables us," he says, "to put our arguments in telling form. It shows us what is implied in a proposition; enables us to extract from a proposition all its implications; guards us against error in the process, and teaches us to keep in view, in every argument, the purpose for which the argument is undertaken" (p. 249).

Here, and in other passages (*e.g.*, p. 405) he insists impressively on the importance of taking account of the particular Purpose of any particular argument. In "Formal" Logic, of course, which is concerned only with what is most general, Purpose is equally general.

I draw attention here to the curious meaning which Dr. Mercier gives to *Formal*. "In my view," he says (p. 261), "Deductive Logic is purely formal on this ground and in this sense—that it consists solely in casting the matter of the postulate into different forms. The postulate gives us the matter in one form, and the task—the sole task—of Deduction is to convert the postulate, or part of it, into another form, and to ensure that the two forms are consistent with each other." Surely *Formal* means just *general*—a Formal Logic is a Logic which applies to *all* material—it can therefore abstract from *any* (though not from *all*) material, and it is in the *form* which is common to various material, that its character and importance are to be found. Is not this characteristic shared (more or less) by all Science?

I agree in Dr. Mercier's criticism of the restricted scope of the Syllogism, and I hold no brief for the *Dictum de omni et nullo*, but I think that the Class-Syllogism results from an earnest and most skilful effort to apply to Class-propositions

the conditions of Mediate Inference. A Canon of Mediate Inference as applied to all *S is P, S is not P* propositions, and therefore not restricted to Class-propositions, would be easy to formulate—*e.g.* :—

If the application of any two Terms is identical (or distinct) any third Term which has a different Term-name and is identical in application with the whole (or part) of one of those two, is also (in whole or part) identical with the other (or distinct from it).

But we can perhaps not get a more precise Canon of Relative Mediate Inferences than the following:—

If two objects, A and B, are related to each other, and B is related to a third object, C; then C is related to A in accordance with the laws of the system to which A and B and C belong.

Many of the cases which Dr. Mercier instances as not amenable to treatment by the Class-Syllogism are cases in which the suggested "Conclusion" is a repetition in some form of words, of one premiss, or the re-assertion of both premisses, or is reached by help of Immediate Inferences, or is got by means of a variety of statements or principles that were "lurking in the background" (see p. 211) like the "assumed" Constancy of causation on which Dr. Mercier relies in Induction.*

There is an argument on p. 312 of which he declares that it "baffles all the resources of Traditional Logic to attain" the Conclusion.

It is as follows:—

The Persians worship the sun.
The sun is a thing insensible.

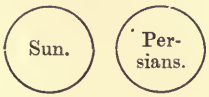
∴ the Persians worship an insensible thing.

But if we observe that this is a proposition containing

* *E.g.*, pp. 325, 326, 327, 328, 329, 375, 477.

a "Relative" Premiss, it becomes very easy to tackle it, thus:—

The sun is worshipped by the Persians
The sun is a thing insensible




∴ a thing insensible is worshipped by the Persians.

Traditional Logic does not forbid us to substitute, *e.g.*, *B is less than A* for *A is greater than B*. Nor, generally, by an exercise of intelligence to ascertain the meaning of propositions with which we have to deal, and put them into the most appropriate shape.

I am somewhat surprised to see that Dr. Mercier refers to Jevons' Substitution of Similars (pp. 277, 278, 279, etc.), with approval, and adopts it as one of his Minor Canons of Explication. Jevons' statement runs as follows: "The one supreme rule of inference consists . . . in the direction to affirm of anything whatever is known of its like, equal, or equivalent. The Substitution of Similars is a phrase which seems aptly to express the capacity of mutual replacement existing in any *two objects* which are like or equivalent [?] to a sufficient [?] degree." *

That the substitution here referred to is, in fact, substitution of *terms having identical application* is obvious on the most cursory examination, and is apparent at first sight from Jevons' own examples in illustration, *e.g.*,

(*a*) Snowdon.
Highest mountain in England or Wales.
(Something) 3,590 feet in height.

(*b*) The Lord Chancellor.
The Speaker of the House of Lords.

(*c*) God's image.
Man.
Some reasonable creature.

* *Principles of Science*, p. 17, 3rd edit.

Dr. Mercier proposes as Canons of Inference or Deduction the following :—

(1) Every Inference is deduced from a postulate;

(2) For the purpose of argument we may postulate what we please, saving only self-contradictions;

(3) A postulate once granted must not be withdrawn nor ignored in the course of the argument;

(4) Nothing may be assumed that is not in the postulate;

(5) When a postulate is granted all its implications are granted.

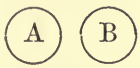
That these Canons are valid and assumed in all explicative reasoning, does not seem open to dispute (unless we object that the *in* of (4) is ambiguous). But it would be useful to have in addition some more restricted Canon for reasonings of the *S is P*, *S is not P* form, and an explicit recognition that for Relative reasonings, where we deal with propositions of the *A is related to B* type, *each* "system" has its own special conditions of relatedness and valid inference. In dealing with any of them, no inference can be drawn except by a person who knows the "system." On the other hand, no knowledge is needed of the Objects referred to, except knowledge of their place in the system, and this knowledge is in many cases co-extensive with ordinary intelligence. Consider, for instance, the relations of magnitude, of positions of objects in space, the relation of successive parts in time, of family connexions, of number (see my *Primer of Logic*).

This brings me again to what I feel is the core and basis of Dr. Mercier's book. All his criticisms, all his suggestions, seem to me to have essentially the same origin and the same aim, and to start from a conviction of the unexplained and unjustified narrowness and exclusiveness of the Traditional Logic. Traditional Logic does not trouble itself with Relative Propositions—propositions of the form *A is related to B*




, and yet a large part of knowledge is expressed

in this form. So Dr. Mercier replaces the traditional analysis into S—is—P, by one more appropriate to the expression of relation between members of a "system," *e.g.*, A—is equal to—B




(where Copula, or Ratio, is "convertible").

Even in dealing with *S is P* propositions, the Traditional Logic restricts itself, *e.g.*, in the doctrine of Syllogism, to Class-propositions with no quantifications of the Subject except *Some* and *All*. So Dr. Mercier here again takes exception to logical Custom, and points out that endless propositions and arguments, which are useful, valid, necessary, are excluded by the narrowness of the traditional scheme, and insists that those which have been left out in the cold have as much claim to be recognised by Logic as any which it expressly includes. His contention is of immense force—it is also of immense scope. Yet great as that scope is, it ought, I believe, to be even greater—a Logic which is as wide as Logic ought to be can hardly leave aside "Symbolic" Logic. Further, it does not seem open to Dr. Mercier (any more than to some other modern logicians) to omit detailed consideration of the Criteria of Truth.

## V.—INTUITIONAL THINKING.

*By* Frank Granger.

The attempt to re-establish Reid's theory of sense-perception is one of the most striking events in the recent history of English philosophy. Mr. Joseph's articles in *Mind** on the perception of external objects, demonstrate some of the inconsistencies involved in the belief that "ideas" or "presentations" —as something distinct from things and merely in the mind— are that of which we are primarily aware. Mr. Joseph traces back this error through Mr. Bradley, Professor Stout, and T. H. Green, by way of Kant, Hume, Locke, Descartes, and St. Thomas to Aristotle. Leaving on one side every thinker here mentioned except Aristotle, we shall find, I think, that in this one case at least Mr. Joseph has not been just.†

But before we can even begin the discussion we must settle what we mean by intuition. I do not suggest that in intuition the idea of existence is conjoined with other ideas. It is not the idea of existence that is conjoined with the other constituents of a percept or a concept. It is the attribute of existence that is conjoined with the other attributes of the object of sensible or intellectual intuition. And when I say attribute of existence I should like to be allowed to understand that the object in question is a part of the narrative order. The meaning of this will be clear later on. It is not simply a question, therefore, of existence as one of the ideas implied in a

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* *New Series*, 75, 76.

† I have intentionally avoided the numerous side issues which offer themselves. Hence the use which is made of the classical expositions of Aristotle, who anticipates some of the problems of the present.

concept, but of existence as one of the attributes of a *real* object. Before we proceed to intuitional thinking as distinguished from sensible intuition it will be helpful to consider the latter.

*Sensible Intuition according to Aristotle.**—When Aristotle says that sense—"awareness" (αἴσθησις) is that which is receptive of sensible (αἰσθητά) forms without their matter, he certainly holds that we are "primarily aware" of the forms (εἴδη) of different things. The soul becomes what it is aware of; it is the dwelling place of the "forms" (τόπος τῶν εἰδῶν).

We must be careful, therefore, that we do not confuse or even assimilate the Aristotelian theory of "forms" with the modern theories of "ideas." For while the modern understands by "idea" a state of mind, by εἶδος or form Aristotle would have us understand something which exists potentially in external objects, and appears in its full reality in the soul. But in so far as the form is more important than matter, the apprehension of the object of sense through the senses conveys to us the more important part of reality. We may paraphrase the distinction between form and matter for our own use in the following way. Form consists of those aspects of reality which have a bearing upon our present purpose. Matter consists of those remaining aspects which are not important for this purpose. Hence our various kinds of "awareness" (αἴσθησις) select out of the various activities of the real, just those which correspond to them.

Let us try to make the matter clearer. The relation of "awareness" to its objects, according to Aristotle, is not to be understood quite in the same way as nowadays we understand the relation of sense-perception to its object. By sensation (αἴσθησις) Aristotle understands each particular sense-process, such as sight; by sensible object (αἰσθητόν), he understands the corresponding object, such as light or colour. This—the light or the colour—is the characteristic object of sight. It is

incidentally that the object, in this case the object of vision, is become aware of as an individual, as, for example, if yonder white* is the white of Mr. Smith's shirt front. Mr. Joseph is justified in pointing to the universal character of the perception of white; but Aristotle also affirms that sense-awareness incidentally brings to light the particular object.

Perhaps we shall understand Aristotle better if we contrast his theory with that of the atomist thinkers, according to whom images (εἴδωλα) come to the soul from without; they treat the soul and reason as composed of primary and most minute bodies, and when the images fall upon these bodies, sensation and cognition (νόησις) take place.

In opposition to them, Aristotle discards the material element in the object of sense, and represents the mind as receiving only the formal element. But he does not, any more than the atomists, and their follower Epicurus, deny the material element. In retaining the formal then, he retains all that is essential in the direct apprehension of the sense-object. It is important to bear this distinction in mind. It is not so certain, as some would have us think,† that Aristotle was retrograde in turning on one side from the Pythagorean tradition. For while the object of sense may be capable of mathematical treatment, it does not follow that the sense-process is capable of similar treatment.

Aristotle regards the external world as a complex object of sense. His attitude to it may be compared to that of a painter of landscape or of portraits. The painter is occupied with light values and colour values, and his eye selects just those elements in the whole light and colour scheme that fall in with his purpose. As the English temperament is naturally incompetent, if left to itself, to understand what should be the

* As against Mr. Russell, in *Problems of Philosophy*, 154, I must maintain that "white" is in our mind, but not Mr. Smith's shirt front.

† Aristotle is more concerned with continua, than any mathematical school has ever been.

attitude of an observer to a picture, I will quote some words of the great artist, Whistler, of whom I had some glimpses when the whole world of London rejoiced in his temporary ruin.

"The notion that I paint flesh lower in tone than it is in Nature, is entirely based upon the popular superstition as to what flesh really is—when seen on canvas; for people never look at Nature with any sense of its pictorial appearance—for which reason, by the way, they also never look at a picture with any sense of Nature, but unconsciously, from habit, with reference to what they have seen in other pictures. Now in the usual 'pictures of the year' there is but one flesh, that shall do service under all circumstances, whether the person painted be in the soft light of the room or out in the glare of the open."* With the help of Whistler we can understand a difficult passage of Aristotle. "An object of sense is so called incidentally,† as for example if yonder white object were the son of Diares." Primarily our sense "awareness," like Whistler, is concerned with the colour, only incidentally with the full being of the object to which the colour belongs.

If therefore we wish to understand Aristotle, we must regard the world as a panorama in order to distinguish it from a collection of atomic objects. But there are other aspects of this panorama—this coloured and audible and odorous complex—which each sense perceives along with its proper object: rest, motion, extension, unity. There is a striking likeness between these attributes of the object and Plato's categories in the *Sophistes*.‡

But Aristotle has not worked out for us entirely the unity of sense-perception. He leaves us doubtful sometimes whether to call in "common sense" or reason. But he has done this:

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* *Catalogue of International Exhibition*, 1899.

† *De Anima*, 418*a*, 20. Mr. Hicks' translation "indirectly" for "incidentally" is less reconcilable with the Greek.

‡ 250*b*.

he has distinguished two aspects of the real. I think something is to be gained by treating the real as not yet distinguished into various objects, before we go on to consider the individual object of sensible intuition. And further we can accept provisionally the separation of intuition into sensible and rational.

*The Intuition of the Individual Sense-Object.*—How do we come to perceive individual objects as such? Provisionally we may reply in the terms of Aristotle. There is some process common to all senses by which we recognise the co-existence of different qualities in the same object. This "sensus communis" is called in by Aristotle to objectify the objects of the several senses taken separately.

*How are we to explain Rational Intuition?* Professor Bergson in a manner which is familiar to us all has employed the analogy of the cinematograph,* only, however, to overthrow some of our oldest and most respectable traditions. But in spite of its temporary popularity, I do not think that the cinematograph is permanently launched as an instrument of abstract thought. There is, however, a philosophic toy—the stereoscope—which may, perhaps, enable us to understand some of the difficulties which meet us. Incidentally with the help of the stereoscope I expect to show that the cinematographic tendencies of the reason have possibly been exaggerated.

Reid, in a passage which is worth recalling,† distinguishes between "logical" .and "analogous" illustrations of mental process. I prefer the stereoscope to the cinematograph because the formula for the stereoscope is relatively simple. It may be set forth as "the fusion of elements into one whole in which they are nevertheless distinguished."‡ On the other hand, in

* *Évolution Créatrice*, c. IV.

† *Inquiry*, conclusion.

‡ The element of conflict which appears in the stereoscopic view aids the apprehension of a "real" outside us. The irreversibility of the serial order has the same effect.

the cinematograph the pictures are not perfectly presented. For myself I am conscious of a painful flicker in the appearance of the objects presented. They do not blend in the same way as pictures received through the two eyes blend together.

Hence the stereoscope shall serve us, first, in order to illustrate the fusion of sense elements in a sensible intuition, and then we will use it to illustrate rational intuition. The fusion of elements in a sensible intuition must include also the direct apprehension of the thing. We are *incidentally*, yet "*primarily* aware" of the existence of the object. The synthesis of qualities of which Aristotle speaks is therefore a synthesis of "real" qualities. Only secondarily do we become conscious of the attributes of the object, considered as mental states. Only secondarily are we conscious of the fact that we have sense perception. That is to say, introspection is a secondary process.

But I do not intend to maintain that the stereoscopic apprehension of overlapping qualities is an adequate account of our intuition of the thing. In speaking of the fusion of sense qualities into one whole in which they are not entirely lost, we have not exhausted the fruitfulness of the analogy which the stereoscope offers. The stereoscope will suggest also the continuous existence of the object. What is present and future in one intuition the succeeding intuition takes up as past and present.

Without breaking up the unity of the state or process of consciousness, we can synthesise a *moderate* number of correlated elements. For example the definition of a triangle as "a figure bounded by three lines and containing three angles," can be so combined into one process of apprehension that something like a stereoscopic effect arises. Such a process I will take leave to call a conceptual intuition. It does not involve the reality of the object except for thought. The process of which this is an example Bergson characterises as

cinematographic. If there were only this one form of rational intuition, Professor Bergson's criticisms of the intelligence would be unanswerable. Even an infinite series of such aperçus would be inadequate to the real object.

But with the help of the stereoscopic analogy, I propose to show that through the combination of the present with past and future, we have an intuition of the real as in time. This we may call serial intuition. As distinguished from conceptual intuition, of which one character is reversibility, the order of serial intuition is irreversible. There is therefore a genuine correspondence of serial intuition with the current of actual events; a correspondence which, if not complete, is at least the most complete of which we can form any idea.

*Conceptual Intuition and an Instantaneous Present.*—If with Descartes we fix ourselves upon the act of perception without taking account of subject or object, if we say *cogito ergo sum* instead of saying *ego cogito aliquid*, we leave ourselves with something for which there is a name, *cogito*, but to which there answers no process of intuition.

But there is something implied in *cogito* beyond the *ego* and the *aliquid*. There is continuous time. If therefore there is continuous time implied in the process of intuition, in the form under which we shall contemplate it, the cinematographic element on which such stress is laid disappears from reason, except in so far as language through which reason partly expresses itself is of necessity cinematographic.

This we shall now discuss. Augustine* draws attention to the difficulties with which we have to deal. "Who denies that the present lacks magnitude, because it passes in an instant?" (*Et quis negat præsens tempus carere spatio, quia in puncto præterit?*) The present thus appears as the dividing line without breadth which comes between the past and the future. Hence if we are thinking in the serial order, no accumulation

* *Conf.* XI, 28.

of present moments will furnish us with the continuum of which we are in search.

There is doubtless a fallacy here. It consists in this, that we apply an abstract theory of time. This necessarily breaks down when the external experience is present to us in all its fullness. There is nothing, so far as I can find, in the inner experience, which corresponds to the infinitesimal dividing line between present and past or between future and past.

But this fiction of an instantaneous present is necessary for certain purposes of conceptual thought.* And this fiction is especially necessary in order that the order of conceptual thought may be regarded as reversible. For if the act of thought by which such a conceptual content were apprehended occupied any assignable interval of time, then the order of the conceptual content could no longer be regarded as reversible; because in any time interval, however small, there would usually have been some change. Hence the value of logical and mathematical symbols. They conceal the difficulties which arise if we suppose that the order of any real subject-matter is reversible or completely interchangeable.

*Serial Intuition and Scope of Attention.*—It is on these lines that I should defend against Professor Bergson† the service to thought performed by the Eleatic school. The real cannot be inserted without qualification into the scheme of a concept regarded as apprehended in an instant. Indeed, the description which Bergson gives of the Ideas formulates precisely the functions which these logical expedients fulfil by enriching the comprehensiveness of what is here described as "serial intuition." The forms, therefore, which the mind isolates and stores up in concepts are only views taken of the changing

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* Cf. *Problems of Philosophy*, 156. "The world of universals" is subordinate to the serial world. Hence the Ideas of Plato, and the Hegelian Dialectic fall into their places.

† *Op. cit.*, p. 339.

reality.* This expression, however, fails to do entire justice to the office which is actually performed by the Platonic ideas. Owing to the limited scope of the apprehension—a topic which is scarcely regarded enough—only a few elements can be presented simultaneously. Hence a complex idea can never be fully presented. A great part must remain entirely in the background (whatever sense we are to attach to this word), or else it must be represented by symbol. It is a source of serious confusion that the Platonic "Forms" should also be called "Ideas." We are unconsciously led to think that the few ideal elements which at any moment may be admitted to the focus of consciousness coincide with the entire explication of a Platonic idea. There can be no question, therefore, of the equation of ideas to the fullness of reality. But, for all that, the ideas enable us, in Professor Alexander's phrase, to contemplate reality, if not to enjoy it. We must surrender the belief that the contents, even of the most disciplined mind, unfold themselves in the same systematic way as the pages of a good text-book. For, perhaps, the pages of a text-book, say, like Euclid's *Geometry*, may afford to intellectual intuition an illustration of the manner in which language "naturally gives thought an outward form."

Now the processes of thought become increasingly symbolical or rather *parsimonious*. I prefer the term parsimonious because it is being suggested in this paper that the intuitive character of thought is always present even when the symbolical accompaniments seem to overpower it. And by a marvellous economy, or parsimony, as though thought were too valuable to be wasted—a few vivid elements come to represent vast objects.

How is this parsimonious character to be reconciled with the richness of thought? We have just seen, in the first place, that serial intuitions are enriched by concepts.

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* *Op. cit.*, p. 343.

In the second place, there is a predominance, on the average, of the permanent over the changing elements in our experience. Hence the pressure upon the focus of consciousness is lessened from time to time, even if it is not relieved entirely.

In the third place, this parsimonious character is rendered far more available through the continuity which is made possible by the stereoscopic method of thought. For example, the system *a b c d* is successively realised as *a–b*, *b–c*, *c–d*. Through practice we gain the power of running rapidly through such a series of experiences until we gain the power of blending the three stages *a–b*, *b–c*, *c–d*, into one act.

The cinematograph over-emphasises to a considerable degree the *extent* of our successive intuitions. But if we duly recognise the limitations of our successive intuitions, we shall do them more justice as successive moments in a process. In a word, we can, by abstraction, regard the three aspects of intuition—backward looking, present, forward looking—as if they could be separated. But in truth an intuition is, so to speak, *three-dimensional in time*. To quote Augustine again,* "The mind both expects and attends and remembers, so that what it expects, passes over into that which it remembers, through that to which it attends."† The continuity of the future through the present with the past is a dim formula of the progressive evolution which proceeds towards some prefixed ends.

*The Three Dimensions of Serial Intuition.*—Now if I may repeat myself this last statement is incomprehensible if we suppose that the act of perception takes place in an infinitesimal moment of time. If this were the case, then it would require an infinite number of acts of perception to fill any given interval, say five minutes, which is

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* *Conf.* XI, 28.

† Lodge, *Modern Problems*, c. 11.

absurd. Even the cinematograph is based on the supposition that we view as continuous changes which occur more frequently than one-eighth of a second. It is now, therefore, generally agreed that we cannot perceive moving bodies by a series of separate perceptions. Our perception must be unbroken, as the movement is unbroken. We perceive the moving body as passing continuously out of one position into another. It is only by the photograph which seizes the indivisible moment of time, that we can fix the appearance of the moving object at a given instant. But this appearance usually differs considerably from what we perceive. For example, the horse galloping at full speed is entirely unlike, at any given instant, to the picture which we form of it to ourselves. Hence the application of the notion of the present as an infinitely small moment of time, is inapplicable to our mind. And if our mind does not act in this way, it follows that it is continually reaching out from the past through the present into the future, so that it is possible in a single act of mind to have a relation to the three kinds of time. Hence we must consider the mind as some thing which answers to the course of events amid which it lives, because events are in one direction only, and our distinction of past and future emphasises this fact. As a confirmation of the theory which is here advanced we may note that the present tense is often regarded as continued. What do we mean when we say: I am thinking? We mean something continuing unbroken. The difficulty of the momentary present arises in this way: that we try to seize upon something moving and treat it as if it were fixed. The painter who paints a galloping horse, treats it as if it were standing still to be painted. Yet he succeeds in deluding us into the belief that it is moving through the canvas. The photographer, who is really more true to the actual occurrence, is often less successful than the painter.

*Course of Events as Irreversible.*—Part of the great difficulty

which arises when we try to understand time, is due to the fact that narrative moves in one direction only, whereas when we arrange things in a conceptual scheme, we can move backwards and forwards. An interesting example of this is furnished by chemistry. The chemist can either analyse the same quantity of water into its constituents oxygen and hydrogen, or he can take the same oxygen and hydrogen and synthesise them into water. But it is doubtful whether even here we have a genuine reversal of the original order. For it would be necessary that the same particles of oxygen and hydrogen should, in each particular case, reconstitute the same particle of water. But this is impossible. It is only when we are dealing with purely abstract subjects, that is to say, matters which are not part of the sequence of events, that we can pass backwards and forwards in this way. A convenient illustration is furnished by arithmetic. It is just as true that we can make sixty-three by multiplying seven by nine, as that we can split it up into sevens, if we divide by nine. Here the order is indifferent. At the same time if we take sixty-three real objects, say, sixty-three apples, the case is not quite the same. Even in the small interval needed to perform these two arithmetical operations, the apples will have slightly changed.

Now let us apply this to the mind. The order of our experiences can never be reversed. They are always moving, as Augustine said, from expectation to immediate apprehension and then to memory. So to speak, we meet our experiences as they come. When, therefore, Augustine uses the word expect, we had better translate it by the word await. Now no one can really understand any operation of the mind if he treats it as being capable of reversal. There is, so to speak, one edge turned towards the past and another turned towards the future. Hence every event which we perceive comes to us first in what I am going to call a stereoscopic manner.

*Intuition as Stereoscopic.*—The intuition therefore of things

implies that we gather into one three aspects: that which has just passed; that which is contemporary with the process of perception at its moment of greatest vividness; and that which we await or expect. I will again repeat that the stereoscopic attitude of intuition is applicable to other aspects of reality, as well as to time.

If I were to take this piece of paper and hold it before you, it would be possible to mark off these three time aspects. You see it now. But you do not feel that it has been thrust upon you. It has come from the past. You expect it to go on to exist.

Or, again, take a piece of music. You do not treat each chord as complete in itself without relation to the past and the future; the chord has its place in a musical phrase.

Or, lastly, when you perceive persons you do not perceive them in an infinitesimal moment of time. You grasp your memory, your present contemplation, your anticipation, into one product, the intuition of the person. Only in this way can we explain how it is that we do not regard our fellow creatures as automata, machines. Descartes, indeed, held that all animals other than man were machines. It is possible therefore that such a conception that other men are machines should be formed in the mind. And, indeed, there are systems of philosophy which leave us unable to infer with certainty that we are not automata of a physical character. The determinism of ancient astrology was not more rigid than modern scientific determinism.

*Application of our Results to Formal Logic.*—We have considered intuition as sensible or intellectual, as concerned with conceptual or serial objects, as limited in scope or continuous, as three-dimensional in time. We shall now consider some of the objects of intellectual intuition. We shall watch the apprehension of concepts, of immediate inferences, of syllogistic inferences.

The concept itself usually arises out of the conflict which is

disclosed, when we have several serial orders proceeding side by side. Since the capacity of intuition is limited, it necessarily follows that the number of serial continua which proceed side by side in our apprehension must be limited. Or rather we have never really doubted a fact so obvious. Every one knows, in practice, that one cannot attend to more than one or two concurrent series, but we must also remember that our apprehension of concepts is also limited. By the law of parsimony one or two leading characters from which the others may be deduced, may and do stand for the whole concept.

*Parallel Series.*—Let us suppose, for example, that the Aristotelian panorama is unrolling itself before our senses, and that by the various susceptibilities of our sense-organs we are enabled to single out for successive apprehension, now this, now that, group of successive occurrences. Perhaps we follow the flight of a bird overhead, or the barking of a dog down the street. Along with the sensation itself, there goes the "incidental" intuition of this, or that, object.

This shall serve to illustrate the way in which the whole panorama of experience, including not only the objects of sensible intuition but also those of intelligible intuition, presents itself to us. Now since only one or two elements in each concurrent series can be apprehended at a given moment, it follows that the few presented elements must represent the whole of that particular stage in the given series. Hence it is of importance that the concept which is thus represented should be organised to the best possible efficiency. This is the meaning of the Platonic world of ideas, or to use a modern analogy, of the well organised system which makes up a science as comprehended by an expert.

*The Function of the Simultaneous Order*, i.e., *Concepts.*—If we consult everyday experience we shall find that the larger number of persons are occupied in their thoughts with motives and actions of a few of the human beings in their immediate neighbourhood. It is this habit which renders the novel so

usual and effective means of occupation. There is no doubt that by drawing upon their vivid sense experiences, individuals whose minds have not been worn down by abstract reflections, can represent so vividly to themselves the life and adventures even of imaginary personages that for them such personages seem to become real. Now some one will at once raise the objection: "How can you distinguish between the imaginary person and the real person?" If the act of intuition may sometimes lead us to mistaken results, how can we be sure that it will ever lead us to certain results?

Thus it appears that the narrative or serial intuition taken alone leads us into difficulties. But the very fact that we are sometimes dissatisfied with the narrative method, shows that we have supplemented it with another. In order to say that a thing is false, we must have something to compare it with. In other words we set two series of events side by side and compare them. We take the story, say, of King Arthur and compare it with the series of events that made up the life of King Edward. This is to employ the conceptual method, in order to regulate the serial intuition.

Now a very curious thing happens when we do this. When we come back to the narrative from which we started, whether from King Edward to King Arthur or from King Arthur to King Edward, we find our point of view somewhat altered. Our imaginary King Arthur loses somewhat by our not having to deal with real personages. Our real King Edward loses somewhat also. His life has not the rounded completeness that the poets can give to King Arthur's life. Hence we are dealing with the notion of a king that belongs neither to King Edward nor to King Arthur, and yet in some way also belongs to both. How do we behave towards this notion of a king? Do we apprehend it in the same way as we behave towards a real king? We may think that this is an absurd question to put. We might say at once that of course we do not behave to a mere idea as we should towards the real instance. And

yet Plato, in his famous theory of ideas, maintains that the idea or notion or definition in which all the things of the same class share is more real than the individuals, and that it is better to know the idea or notion than the particular instance. It is doubtful, however, whether this attitude of mind is very common. There are some people, I suppose, who love humanity in the abstract and at the same time feel no affection for their fellow men. But in the religious experience the case is altered. A man who does not love his brother, whom he has seen, cannot love God, whom he has not seen.

*Intuition of Abstract or General Concepts.*—It would follow, then, that we can never behave ourselves towards a purely abstract or general idea in the way in which we behave towards particular persons. Now there is one particular kind of general idea which plays a large part in our experience to-day, the idea of general law. For example, there is the law of gravitation; that material bodies tend to fall together in a certain way. Or if we combine all the particular laws of Nature into one, and speak of the reign of law, we might inquire whether we can ever have a full intuition of such a notion as this. Scarcely anyone, I imagine, ever fell in love with the multiplication table. And yet there is a sense in which the laws of Nature can become the object of emotion. If we regard them as embodied in the material world of Nature, they have cast upon them

*The light that never was on land or sea,*

and may even arouse a kind of affection.

But it is with reluctance that I have fallen back upon what Reid would have called an analogical rather than a logical illustration. Let us try to symbolise what happens when we apply the stereoscopic intuition to general ideas. We have already seen that a system *a b c d* is apprehended rather as a process than as simultaneously presented. Let us suppose that we invert the arrangement of the system: the order of

apprehension will be from *d–c* through *c–b* to *b–a*. Such a threefold arrangement apprehended successively in the single intuition—past, present, and future in one—has a suggestion of that reality which attaches to the irreversible or narrative order. It is the lack of resistance in the concept that prevents our confusing it with the real object of the serial intuition. And in the case of dreams the fluidity of the components explains why on awaking the dream fabric as a rule disappears.

Perhaps we may deduce from these considerations the charm that symmetrical proportions present. Greek public buildings especially display the most elaborate, although partially hidden, harmonies. The eye can wander to and fro over their elevations and thus combine the serial order of our inspection with the reversible order of the symmetrical harmonies. Hence there attaches a suggestion of timelessness to these ancient masterpieces. Since proportion consists in the most abstract of relations, namely, mathematical relations, it is possible that they furnish what one may almost call a logic of beauty. And sensible intuition which apprehends the relations of architectural features, and again the relations of musical notes, easily passes into that rational intuition which apprehends these objects in and for themselves.

*Creative Reason.*—The effort which is involved in apprehending and formulating the relations of things involves a kind of creation. The artist who composes a piece of music, or designs a symmetrical building, works in the same way as a discoverer who brings order into the scattered elements of a science. Hence it is not inappropriate to give the name of creation to many forms of intellectual process. This even applies to the narrative process. The historian who seizes what is essential in the reports of a course of events and constructs a veritable picture is also a creator. After all, the panorama does not work itself out, as is presumed by some theories of induction.

*Formal Logic.*—We can now understand better the processes of formal logic. They are a mechanism for economising the elements of the intuitional series, and so rendering them more adequate to the presentation of reality in its characteristic or narrative form. On the other hand, the logics of the positive sciences have in view mainly the explication of certain concepts; those, namely, which are involved in the intuition of special series of events.

Hence it will appear that the definition of history is entirely unsatisfactory which describes it "as philosophy teaching by example." Such a definition removes history from that real or narrative order which declares by organic stages the meaning of the world. Instead, history is identified with a collection of concepts of which the value mainly consists in interpreting the narrative order. Such a definition of history would be more permissible if we were allowed to understand by example the appearance of those personalities whose careers mainly determine the course of events.

There is another aspect of formal logic to be considered. The processes of formal logic are processes also of thought. But we do not regard them simply as such any more than we regard sensible intuitions simply as processes of consciousness only without reference to their objects. Hence for us the formulæ of the syllogism and of immediate inference must be primarily understood as embodied in real instances.

It will be enough for our purpose, if this paper is brought to a close by considering whether the processes of immediate inference and the syllogism are reversible.

*Are Real Propositions convertible?*—The traditional Aristotelian logic, in many cases, misrepresents and distorts the actual meaning of the original texts. In no case is this more deplorable than in the case of the categorical proposition.* The correct

* The Aristotelian proposition implies the reality of S. It is only in secondary instances that S becomes a "*quale*." Modern criticisms of the syllogism are often beside the mark through failure to take account of

form of stating the proposition is not "S is P," but "P inheres in S." Or, to take an instance already quoted: White pertains to or inheres in the son of Diares. In the panorama, of which mention has been made, various attributes thus are assigned to various objects. The confusion here seems to have arisen from the influence of Plato. Plato, for instance, wants the definition of the just man and he starts with him. Nor is Plato content until he can formulate a proposition in which subject and predicate are interchangeable. For that is demanded by the definition. On the other hand, the Aristotelian proposition is usually inconvertible. Because P inheres in S, it is usually mistaken to suppose that S inheres in all P. Hence, Aristotle treats the identity of S and P as limited. Here we may say that Aristotle is more in harmony with the narrative order of events; Plato is dealing with the conceptual order.

It is impossible at the end of this paper to treat of all the questions which the syllogism suggests. But we may begin by ruling out Jevons' suggestion that reasoning consists in the substitution of similars. Reasoning ultimately deals with continuity in the world-series, and this continuity involves change throughout. Hence the syllogism in its typical form may thus be expressed: P, which inheres in M, therefore inheres in S, for M inheres in S. Or in one phrase PM inheres in S. Unless the process of the syllogism is thus apprehended in a single intuition, it does not enter into the living texture of thought. And this intuition is capable of being used in the stereoscopic process with which we are familiar. It may even happen that the terms of the syllogism are permanent only so far as the argument demands. We catch a glimpse of truths which appear only for a moment. Hence the use of this method in the interpretation of history. For example, William

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Aristotle. Hence the limited assistance which attempts like that of Dr. Mercier can afford.

the Silent was cautious because he was wise. But, under other circumstances, we must say that William the Silent was rash because he was wise. Hence, the syllogism is far more flexible in its application than appears if we confine ourselves to the scholastic method.

Again, we need only state the fourth figure in the Aristotelian manner to see its complete inconsistency with a logic such as that which we are considering. M pertains to P, S pertains to M, therefore P pertains to S. In other words, P, which appears in the premise as an object in which M inheres, appears in the conclusion as an attribute. On the other hand S, which is an attribute in the premise, appears in the conclusion as a subject. This is contrary to the spirit of Aristotelian logic, in accordance with which some subjects, at least, have a real existence.

Deduction which affirms or denies an attribute of groups of objects, *e.g.*, the whole panorama, is not less applicable to reality than induction which begins by affirming or denying attributes of single individuals. To grasp into a single intuition the formula which is stated in the *dictum de omni et nullo* is not beyond that faculty which, as we have already seen, can grasp past, present, and future in one. Moreover, if this formula represents a process of thought embodied in actual objects (and we have seen that this is not impossible), then such a process of thought may become the object of the serial intuition. To carry the application of this a step further, the method of a science may be objectified, as in the case of evolutionary theories such as Mendel's. Strictly speaking, such a method is in one direction only. It is irreversible, and is therefore objectified.

*Is Time Real?*—Certainly, the irreversible direction of change is something which characterises all the real objects which we regard as such. The rate of change in the physical world depends, in many cases, upon the resultant of forces partly or wholly in conflict. But I cannot regard seriously

the attempt made to define reality in terms of time or duration any more than the attempt to define it in other physical terms. The categories at least should guard us against such an error. In the reals with which we have been occupied, their ultimate meaning is found, in so far as they are moments in the process of the world. Hence, although the task at present seems beyond our powers, we must leave it to the philosophy of history to furnish us with standards by which we may measure the different grades of reality, and so enable us also to distinguish the different forms of intuitional thinking.

## VI.—WHAT BERGSON MEANS BY "INTERPENETRATION."

*By* Miss Karin Costelloe.

The most fundamental point in Bergson's philosophy seems to be his notion of *durée*.

To start out by regarding *durée* as some new kind of time only adds to the obscurity as to what Bergson means by this notion. Putting aside all idea of time, therefore, I should say that *durée* is the name which Bergson gives to a process of change at the bottom of which the fundamental notion is interpenetration. The main characteristics of this notion are that it is (1) indivisible and (2) takes place according to a spontaneous law.

The first thing I want to attempt is to explain what I think is meant by these characteristics and to show that this meaning is neither absurd nor self-contradictory.

*Durée* is, according to Bergson, what distinguishes the animate from the inanimate. He thinks we have immediate knowledge of it in our own consciousnesses. By analogy from these he infers that *durée* belongs also to all living things (and is, in fact, the essential characteristic of life). In trying to explain what it means, therefore, I shall illustrate my meaning from the facts of consciousness.

First as regards indivisibility.

When Bergson says that what has *durée* is indivisible he does not mean that we cannot isolate particular parts out of the whole process; what he means is that by isolating them we falsify their nature. The parts of a process which has *durée* depend for their qualitative character on their connexion with

the whole of the rest of the process; all the parts are, in his own words, "interpenetrated."

Take, as an example, the case of a man hearing a piece of music twice over. Imagine, to simplify the example, that all the circumstances are the same for both occasions. Nevertheless, the second experience differs from the first from the very fact that the tune is recognised as having been heard before. The actual notes are the same; a tune can be played over as often as you like and the actual sound heard will be the same. But the whole state of a man hearing it cannot be repeated. Each repetition will be qualitatively altered, if by nothing else, at least by the fact that the tune is more familiar. He feels differently *about* it—beginning perhaps with little interest and some confusion, he may pass from pleased recognition of something increasingly familiar to indifference and finally complete surfeit and boredom. No one would deny, I think, that though the tune remained the same, the repetitions only differing from one another numerically, the man's states on hearing it were qualitatively different every time.

The ordinary way in which psychologists explain such instances is by analysing the man's state into: the same auditory sensations (A) + indifference and confusion, and next time A + slight pleasure and then A + more pleasure . . . . to A + disgust. It is the validity of such analysis that Bergson denies when he says what has *durée* is not divisible.

Because we know the cause to be the same we assume that A is always the same. The bodily act of hearing we may assume roughly to be the same (though here, too, there are doubtless slight modifications each time), but in any case in the perception of the same tune, what is actually perceived each time is not the mere sound alone, but this sound interpreted and coloured by past experience. All this is looked upon as being the object which is perceived. We cannot therefore, according to Bergson, say that what is perceived in the auditory sensations 'A' is ever repeated twice the same

for what we already know colours what we actually perceive, the past and the present are inextricably mixed up in perception.

I think, really, it comes down to this. Bergson maintains that we have really no right to give the same name to two states which appear similar, if they occur in different contexts. This claim is based on the fact (which I do not think anyone will seriously dispute) that the context to which any state belongs modifies it qualitatively.

If this is not disputed the question is whether, in spite of different qualitative modifications due to their different contexts, we have a right to call two states by the same name; to classify them as the same kind.

The whole question of interpenetration is very vital, as a great deal of Bergson's argument turns upon it, and I think this point concerning the indivisibility of interpenetrated wholes is the best way to approach the main problem. The indivisibility of interpenetrated wholes, such as states of consciousness, simply means that, as the character of any part depends upon the rest, to isolate one part from the rest is to falsify it.

From this Bergson would be driven to conclude, in the case of any two interpenetrated wholes (unless these are exactly similar), no part of one can be put in the same class as any part of the other.

The line of reasoning from which this would follow seems to rest on the assumption that classification by similarity involves partial identity, or at least partial exact similarity. On this assumption, if we are to put two parts of two different interpenetrated wholes into the same class, these parts must, on analysis, be found to contain sub-parts identical or exactly similar. But this cannot be; for these sub-parts would themselves have to be parts of the interpenetrated wholes, and on our hypothesis these are different, and from this difference follows the difference of *all* their interpenetrated parts.

In two different interpenetrated wholes, therefore, we need *never* hope to find exactly similar parts. Therefore, no two parts of different interpenetrated wholes can belong to the same class. But this is exactly what we said that Bergson wanted to prove. If similarity depended upon partial identity or exact similarity, I think he would be able to prove it; but I don't think it does. Take all the shades of colour from blue to green. In between these two extremes there will be an infinite number of different shades of blue-green and green-blue, all more or less like one another, and getting more like green and less like blue as they pass from the one extreme to the other, and all *more* like each other than like red or orange. I cannot see that there is any identical common quality between all those shades of colour; they are simply rather, but not quite, like one another.

This kind of argument satisfies me that similarity does not necessarily involve partial identity.

Classification, according to this view, is possible in respect of kinds of similarity. We classify, I think, on two principles: (*a*) intrinsic similarity; (*b*) similarity of relation to something constant. In the instance quoted above of the same tune repeated, there might indeed be very little similarity between the different states produced. I think our classification here probably depends on our knowing the different states to be produced by the same objective cause. The ground of division involved here would belong really only to the external causes and not to the states classified by means of them.

I have attempted so far to explain what Bergson means by his theory of the indivisibility of interpenetrated wholes (interpenetration being the fundamental notion in *durée*) and to show that he is wrong if he supposes that it follows from the nature of such wholes that their parts cannot be classified under general names.

I want next to explain the meaning of obeying a spontaneous law (which is the other main characteristic of *durée*).

By a spontaneous law Bergson means a law which is not fixed and necessary but is created by its own past history.

In talking of the nature of causality it is difficult to steer the middle course between truisms and nonsense.

Everything follows some law, in the sense that, looking back over its history, one can always find *some* order in which the sequence of changes occurred.

But the point of framing laws of causality is *not* simply to give an account of what has happened but to classify events in groups which happen in the same way, *i.e.*, according to the same law.

The point of a general law is to sum up the way in which a number of particular processes of change occur, under one formula which shall be true of all of them (though, of course, it will leave out much of the detail of each particular process). General laws are framed in order to include the particulars within the more general, the more general standing for the respect in which a number of particulars behave alike.

The general assumption on which induction rests is that if particulars appear similar they will probably behave similarly. Now if the fact that two particulars appeared similar were *no* ground for supposing they would behave similarly, we should have nothing to stand on in the attempt to include them under general laws.

If every particular behaved completely differently from every other, they might indeed all be said to be obeying laws, but it would be impossible to frame a general law including any two of them. This is the sort of position Bergson claims for things which have *durée*, and what he denies is the possibility of framing general laws about such things.

In the case of what has *durée* the past creates the present in the sense that any given state is qualitatively modified by the fact of having had that particular set of antecedents which it did have, rather than another. We considered a point similar to this over the question of indivisibility. The fact of

being the hearing of a piece of music heard once before, modified the whole state produced by the second hearing of the tune, and so on. When the tune was heard for the first time, this state would be modified by the fact that the hearer had recently been to the "Sunshine Girl" rather than an Albert Hall Concert, and so on.

I do not think it will be denied that the antecedents of a psychological state modify its quality, and so interpenetrate it. This is what Bergson means by calling the laws of such processes "creative" and "spontaneous," since the whole history of the thing in question makes it what it is.

The question is whether such laws must consequently be each one unique and not capable of being included under more general laws.

This question brings us, I think, to one of Bergson's important errors, viz., his view of the nature of inference from the known to the unknown (which is the practical object in view of which we frame general laws).

Bergson always assumes that we can only make such inferences when the case we are arguing *to* is exactly similar to the one we are arguing *from*, *i.e.*, that we cannot argue by anything but a perfect analogy. But the law on which induction rests is not simply that in every case identical or exactly similar antecedents will produce identical or exactly similar effects (though this certainly would have the highest degree of probability) but something to the effect that the more two cases resemble one another in *known* respects the more likely they are to resemble one another also in those respects which we do *not* know.

If they resemble one another very closely in many respects, it is very likely that they will resemble one another in all; even if they only resemble one another very slightly, however, there is still a chance that we may argue successfully by analogy from one to the other. Therefore, even if we are ready to admit that, in the case of living beings, every state is "an original moment

in a no less original history," this is not in itself enough to show that its progress is unpredictable according to rough general laws.

Many living beings are so like one another that we may (and do) argue by analogy from one to another with a very high degree of success.

What *is* true, however (but Bergson does not bring it out, since he is satisfied with his other argument based on his mistaken view of the fundamental principle of induction), is that, if human beings are spontaneous (in the sense that they do not obey general laws as matter does, but each creates its own laws as it develops), then we shall not argue very successfully by analogy from the determined to the spontaneous, or *vice versâ*; nor, again, from a previous state of a spontaneous being to another apparently similar state in the *same* being, because the law will have altered in the interval; experience will have modified it. Further, in the case of spontaneous beings the apparent similarity of two isolated states will give us hardly any ground for argument by analogy; we cannot rely on anything less than similar periods of their history showing similar series of modifications; we might call it a similar tendency.

Finally, as every spontaneous being will have a tendency at least slightly different from every other, it may quite well be that there are some for which no suitable analogy at all can be found.

Supposing then that we are ready to grant that consciousnesses have these two characteristics, (1) of indivisibility (in the sense that the context of any state or part of a state modifies it qualitatively, so that it cannot be known truly in isolation),* and (2) spontaneity (meaning that the law of their

* When I say "cannot be known truly in isolation," what I mean is that in every new context we really have, not the *same* thing, but always one at least slightly different from any other. The more a thing is interpenetrated with its context, the more different it is from everything else, and so the more rough will become our classification of it as "of the same

change is created by their whole past history in the sense that everything which happens in them is qualitatively modified by being the outcome of just those particular antecedents).

This comes to the same thing as admitting that consciousnesses are interpenetrated wholes, that is, have *durée*.

Now in the course of explaining what is involved in the notions of the two characteristics which make up *durée* I have tried to show that for anything to have *durée* does not involve either that its parts cannot be included under general classifications and treated as things of the same kind as other things, nor again that the law according to which it changes cannot be included under general laws covering more than one particular instance.

But these are the two main characteristics of *durée* which I said Bergson believed himself to be able to establish from the examination of that part of reality which is admitted to have *durée*. Wherever there is similarity, classification and generalization are possible. Bergson, therefore, would be going much too far if he denied them of what has *durée* altogether.

Nevertheless there is an important truth about reality established by the admission that part of it has *durée*. If in the process of the changes of what has *durée* there is constant creation of something even slightly qualitatively different from anything else, this is the creation of something new, even though it be rather like things we already know. The history of what has *durée* might, however, produce something *quite* new: the door is opened to liberty and the future of what has *durée* need not continue within the bounds of what we already know.

To have *durée*, then, means to belong to an interpenetrated whole which is always creating forms at least a little different from any others. Bergson says that, roughly, what lives has *durée*, matter has not. I want to find out now exactly how

kind" as anything else. But beyond a certain point of roughness a classification becomes false. With perfect interpenetration classification would become impossible.

much difference having *durée* makes: whether the fact that what lives has *durée* makes it after all so very different from matter which has not got it. The thing of really fundamental importance in *durée* is interpenetration. Spontaneity really follows from this. In any continuum, the more qualitative difference the nature of all the rest makes to any one of the parts, the more the continuum forms an interpenetrated whole.

In the case of consciousnesses I am satisfied that the nature of the rest makes a very important qualitative difference to any one state or part of a state. In the case of matter, on the other hand, there is much more independence and discontinuity. This then does constitute a real difference between the two. The hearing of a sound is, for a consciousness, vastly modified by the history and the rest of the present state of that consciousness: the sound can be much the same whether it be made now, a year ago, or a year hence, here or in America, by one individual or another of the same kind. Of course, the various differences all do, in fact, make some slight difference even to the nature of the sound itself; that is why Bergson says that even matter "ne va jamais jusqu'au bout."

The time has now come to put quite clearly what Bergson really means when he talks about *durée*. The part of reality which has *durée*, Life, is used throughout merely to illustrate the nature of *durée*; but even life always falls short of perfect *durée*, while, on the other hand, even matter is not wholly without it. There is always some slight interpenetration even in the discontinuity of matter, and similarly, even in the interpenetration of consciousnesses, there are traces of discontinuity: we never really get the same thing twice over in either case, but the interval that has elapsed makes far more difference in the case of consciousnesses than of matter; while on the other hand, even in the case of consciousnesses, we do get repetitions of things decidedly similar in different contexts, though not nearly so similar as the repetitions found

in matter. It is these two contrary tendencies, then—one towards interpenetration, the other towards discreteness and independence—that are at the root of the differences between mind and matter. Neither is ever carried out completely, but the more anything tends towards interpenetration, the more it may be said to have *durée*, the more it tends towards independence, the more it may (to use Bergson's own language) be said to be "spatial."

Consciousness and matter may be found to have much in common, but there can be no doubt that these two tendencies are in wholly contrary directions.

We are now prepared to attack the question, which is a very important part of Bergson's philosophy, as to whether the intellect is capable of dealing with what has *durée*. Bergson claims that it is incapable, and in support of this view points out that, from the fact that having *durée* involves creation of new forms, it follows that the intellect cannot grasp *durée*.

His argument is that the intellect is not, essentially, speculative, but was developed in living beings as a specialised organ of choice.

He explains that the choices which the intellect had to make were all primarily with a view to action upon matter. The organ of choice, in evolving itself, adapted itself to the material (*i.e.*, matter) with which it had to deal. The intellect is, therefore, naturally fitted to deal with matter, *i.e.*, the part of reality whose changes can be regarded as taking place by the rearrangement of old elements in a new order, instead of by the creation of absolutely new wholes.

Becoming speculative later on, it undertakes to deal with both kinds of reality, the living as well as matter, being naturally adapted to deal with only one of them. We might, therefore, expect that the intellect will apply to both kinds of reality the methods which it found successful with that kind to which they were originally adapted. But when the two kinds differ, these methods will only deal adequately with one

of them, and will apply to the other only by a more or less clumsy analogy. This is, in fact, what Bergson claims.

He says thought is only fitted to deal with that in which there is never anything really new, but things apparently new can be resolved into different arrangements of old elements. This, he says, is because the intellect in evolving modelled itself on matter with which it would have primarily to deal.

Whenever there can be an analysis into parts which can be recognised as belonging to classes already known, the intellect is at home and the knowledge it gives true.

But anything *new* in reality, or anything which cannot be analysed up into recognisable parts, baffles thought, which was not made to deal with such things, and cannot grasp them. Therefore the intellect denies that there are any such things, and, failing to think about them (for "thinking about" is done by fitting the given object into known categories), it substitutes instead the nearest equivalent in its own terms, trying to reconstruct the new in terms of the already given, about which it *can* think, and claims that these constructions of its own are actually the reality (and not mere substitutes more or less equivalent for certain purposes), and that what it cannot grasp is not real at all, but mere confusion.

There is not time, even if I were able, to go into and criticise all the arguments which Bergson brings to show that the intellect was really evolved as an organ of choice and modelled to some extent upon the material (matter) with which it would have to deal. His arguments seem to me very convincing, but I have not sufficient knowledge of the subjects involved to criticise them intelligently.

But what I want to do here is to consider whether, supposing we were to grant this view of the origin of the intellect, the conclusions which he draws from it really follow. Supposing the intellect was evolved to deal with matter: to what extent does that really unfit it for dealing with Life?

It is sometimes used as an argument against Bergson that

every attempt to *prove* that there is anything outside the scope of the intellect must involve a *petitio principii*, but this does not seem to me to be true.

Only what we can think about lies within the scope of the intellect. "Thinking about" things consists in analysing them up into the known elements of which they are composed. The better we can do this, the more we know about the thing in question. If it is so completely new that we cannot find any resemblance in it to anything else we have ever known we might be said to be unable to think about it,—it would baffle thought and no amount of trying would make us understand it any better.

Now, if we could only know by thinking about things, then, of course, it would be absurd to say that we could know anything about which we could not think. But the truth is that we only think about things which we already know by some other means. The process of thinking about them consists in supplying, out of the store in our own minds of things we already know, such as may be helpful in explaining the new thing; and this explaining will consist in recognising the respects in which it resembles what we already know, and so can be classified as being of the same kind.

It is, therefore, theoretically perfectly possible that we might *know* something about which we could not *think*, and we are perfectly justified in proving the hypothetical proposition that if we did know anything which was wholly new and unlike anything else we knew, we could not think about it.

We learn new ideas by discovering new similarities, so the intellect is able to follow on behind the process of creation provided there is creation of several somewhat similar kinds of new thing to be recognised by comparison. But if anything quite new and unique were created, I do not see how the intellect could think about it, and I think it has been shown to be possible that in the process of the changes of things which have *durée*, such creation might occur.

Bergson can show therefore that *durée* might create some reality which would baffle the intellect; but if the newness of the creations of *durée* were all that he had to rely upon he would be going much too far in saying that the intellect cannot deal with what has *durée*.

What is really at the bottom of it all, however, is something more serious than the argument I have just quoted.

For the moment I should like to be allowed merely to state, so far as I can, what I believe to be Bergson's position, without complicating it by the addition of proofs. His position is often misunderstood, I think, and a clear grasp to begin with, of what he is trying to prove, is the greatest possible help in trying to do justice to his arguments.

I said above that the fundamental distinction between *durée* and spatiality lay in the two contrary tendencies towards interpenetration and independence.

What Bergson claims is that the intellect can only deal with the latter tendency; it is always baffled by the tendency exhibited in *durée* towards interpenetration.

When I gave as his argument that intellect modelled itself upon matter, I was putting it very roughly to begin with. What really happened, according to Bergson, was that the intellect selected one of the tendencies of reality, the tendency towards discreteness, and concentrated itself upon that, disregarding the other towards interpenetration. Just in so far as there is discreteness the intellect is at home. Any sign of interpenetration it is obliged to ignore, and, if confronted with it, to deny. We saw, however, that in reality even matter is not wholly discrete.

Practical needs, therefore, according to Bergson, demanded that the intellect should not perceive even matter as it really is, but, modelling itself on the most pronounced of its tendencies, the one towards discreteness, should ignore the lesser one, which is nevertheless also present, and leave it out of account.

The intellect, then, carries the characteristic tendency of

matter further than matter itself, to its logical perfection. The logical perfection of the tendency towards discreteness would be completely self-contained units connected by completely external relations which make no difference to the nature of the units.

This, according to Bergson, is the ideal of the intellect, and is realised in pure mathematics. In this perfect creation of the tendency of the intellect we profess to be able to deal with continuity, and the constructions we call continua are composed of an infinite number of discrete self-contained units connected by unique kinds of relations. Such constructions are perfectly self-consistent; the objection to them, according to Bergson, is that, though they are a very valuable substitute where the intellect can be thoroughly at home, they do not in the least represent reality as it is. Whatever is really continuous in reality these intellectual creations are forced to leave out, and to confine themselves to the task of reconstructing as near an equivalent as possible for the continuous out of an infinite number of discontinuities.

The answer of mathematicians is that this is all that we ever really mean by continuity.

If we are challenged to say what else we do mean, we find ourselves unable to do so, the reason probably being that an intellect cannot find any improvements to make on one of the finest of intellectual productions. To ask us to explain what we mean by a continuum if we are not satisfied with the mathematical account of it, is really an unfair retort. All we can reply to it is that we do not wish to try and improve upon the best that the intellect has been able to do with the problem of continuity; perhaps it cannot be improved now that it has been shown to be perfectly self-consistent: nevertheless we have still a right to say that reality is not like that.

There must be thousands of scientific hypotheses in a rather similar case: perfectly self-consistent, only not agreeing with what we know of reality.

Of course, the case of scientific hypotheses is also rather

different in one important respect. If a scientific hypothesis will explain all the facts given, we are content to accept it. When new facts arise which will not fit in with it, we alter it, or give it up for quite a new one. We accept hypotheses, in short, on a purely Pragmatic principle.

The objection offered to the mathematical notion of a continuum, on the other hand, is not so much that it does not *work* as that it misrepresents the nature of reality. It is false as an existential assertion, though it may be perfectly satisfactory as a working hypothesis.

It is the complete discontinuity in pure mathematical constructions which, for Bergson, marks the work of the intellect. His argument to show that such constructions are merely symbolic when applied to reality, rests on the contention that all reality, even matter, is to some extent continuous; the intellect, owing to its practical origin, which accounts for its concentration on the tendency of matter towards discontinuity, can never grasp this continuity but always tries to reconstruct an equivalent for it out of discontinuous parts and then pretends that this represents reality itself.

This Bergson takes to be clearly shown in the mathematical notions of Time and Motion in space. Here continua are represented by an infinite number of discrete points in relations with one another.

For all practical purposes these mathematically constructed continua make a useful substitute for reality. But Bergson maintains that they *are* only substitutes and that interpenetrated wholes are not composed of even an infinite number of discrete units.

But since matter tends so much more than consciousness to discreteness, it is easy to understand how the intellect should be so very much more successful in dealing with it than with Life. Nevertheless even in matter, that some interpenetration is involved is shown by the fact that we never do really get exactly the same thing twice over.

We have arrived so far (if you have at all agreed with what I have been saying) at admitting a tendency in reality towards interpenetration of its parts, tending, the more pronounced it becomes, to destroy the distinction of the parts in favour of the continuity of the whole.*

At the beginning of my paper I considered the indivisibility of *durée* and maintained that Bergson carried this theory too far if he supposed that what had *durée* could not be sufficiently divided to be classified under general names.

We now see more clearly just what is at the bottom of this notion. In virtue of this tendency towards perfect *durée* reality is indivisible ;† in virtue of its tendency towards "spatiality" it is discrete. Actual reality is never wholly one thing or the other. *Quâ durée* it is indivisible and admits of no repetition (and hence is not worth dividing into "parts"), *quâ* "spatial"

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* By "destroying the distinction of the parts in favour of the continuity of the whole," I do not mean that the whole cannot be divided up into parts. We can always take in it any limits we choose, and regard what is cut off between two such limits as a "part" of the whole. What is so cut off will be some of the real continuum, and its nature will not be altered by being cut off. But the stability of such "parts" will have been created by our cutting them off, and will not be true of the continuum ; not even of what we cut off. To say that the continuum is composed of "parts" will therefore be false, because parts are stable and there is no stability in a continuum.

This is true of any continuum, whether it be creative or not, and is what Bergson means by *indivisibility*. But interpenetration further involves *creation* or *spontaneity*. In the case of a creative continuum even if we choose to cut off "parts," what is cut off by any two limits will always be qualitatively different from what is cut off by any other two. The more creative it is, the less will any two "parts" resemble one another.

Any two "parts" which we choose to cut off will always be perfectly "distinct" (and so to say creation destroys the "distinction" was very misleading). But the only point of distinguishing a continuum into "parts" is with a view to classification, and so the more different each "part" is from every other, the less is it worth while to regard the continuum symbolically, as composed of "parts."

† *Quâ continuum*, it is always, in a sense, indivisible, since it is not made up of stable parts.

it can be treated as a repetition of discrete units connected by purely external relations.

I think the same kind of arguing would throw light on the problem of change.

Change, according to Bergson, is a continuous indivisible process. For this reason he says a continuum made up of an infinite number of discrete points does not adequately represent it.

We should expect, therefore, that change would give trouble to mathematical philosophers. In point of fact, they deny the existence of any problem. Change, they say, consists in being one thing *at* one moment of time and another thing *at* another, and an infinite number of different things at an infinite number of different moments in between. They admit that the problem of identity presents difficulties here, but think these can be solved by the relations of this infinite number of different things to some third constant thing.

Motion in the same way is explained as the same thing being *at* one place *at* one moment and at another place at another moment, and at an infinite number of different places at an infinite number of different moments in between.

So they do indeed, as Bergson says, explain change by an infinite number of changeless things, motion by an infinite number of motionless ones. And then they say change and motion *are* nothing else.

This is a proposition about the nature of reality, and we have a right to challenge it on other grounds than those of logical consistency (for this can no longer be denied, though it used to be a very favourite side track).

The way we judge the truth of propositions about the nature of reality is, according to Bergson, by comparing them with an immediate apprehension, or what he calls "intuition" of reality itself. I think he is probably right, only it is so hard to do.

If change, on inspection of our immediate acquaintance with reality, can be found to mean something other than an

infinite number of unchanging states, and if motion can be found to mean something other than an infinite number of motionless ones, this will establish Bergson's claim that these mathematical explanations are merely substitutes for, and not true representations of, reality. Let us examine what we know of the nature of change in reality.

It may be argued against Bergson's theory that change is an indivisible process, that we are constantly breaking changes up into different things and events. He seems therefore to be going altogether too far in calling it indivisible.

I think we have here over again a case just like the one we had to clear up concerning the indivisibility of interpenetrated wholes. They too can be divided up into states, and Bergson seems to have gone too far in his statements about them.

The fact is that the more what changes has *durée* (*i.e.*, the tendency towards interpenetration, in which the nature of what comes after only finds its explanation by reference to what came before) the less does the change admit of being divided up into a succession of *similar* events, *i.e.*, "parts" which can be classified. Only a succession in which events can be classified is worth breaking up into a series of events at all.

Nevertheless we *can* divide any succession up into as many "parts" as we choose. The mathematical series of units in relations represents change when so divided up into "parts." But in so far as the "parts" are regarded as stable they do not constitute the real change. The mathematical representation of change, therefore, is always only a symbolic representation of real change. So far as the "parts" resemble one another they can all be called by the same name. Change, in that case, may be symbolically represented as a rearrangement of known elements, the "elements" being the resembling "parts" into which we have divided the real continuum.

This is the way we represent matter, and it is legitimate because matter tends not to be creative and so to admit of

repetitions. Only in this case is it worth while to divide change up and represent it under the symbolic mathematical scheme. Even creative change, however, *can* be represented in a mathematical series, if each of the "parts" is regarded as unique, *i.e.*, different from every other.

I have tried now to give a fair account of what I take to be the important notions at the bottom of Bergson's philosophy and to show how he works them out into a theory of the nature of reality and its relation to the intellect.

I have not had time to do much more than state what his position is, offering little or no proof. But, at any rate, I think we now have pretty clearly before us what he wants to prove and wherein his difference with intellectualist philosophers lies.

It has all seemed to depend on the notion of interpenetration as opposed to discreteness.

The difficulty might almost be narrowed down to the meaning of this one word.

I defined an interpenetrated process as one in which "the parts depend for their qualitative character upon their connection with the whole of the rest of the process."

A discrete process would be one which was composed of parts wholly self sufficient and related to one another by purely external relations.

The whole problem between Bergson and his opponents (and indeed between opposing schools of philosophy for ages back) seems to me to lie in what we mean by contrasting "parts which are self-sufficient" with "parts which rely for their qualitative character" on something other than themselves. What do either of these phrases mean?

Till now I have avoided discussing *durée* in connexion with the notion of time because I wanted first to get a fair idea of its relation to change in order to show better what kind of thing Bergson means by it.

Now, however, the problem of its relation to the ordinary

scientific notion of time must be examined, and I hope that in the course of this examination the full meaning of *durée* itself will finally emerge.

According to Bergson, the *durée* of consciousnesses is the ultimate synthesising principle in reality.

Synthesis demands that a multiplicity should be grasped all together, as, in some sense, one. Without consciousnesses reality tends, according to Bergson, to fall simply into a number of othernesses, which indeed would not even form a number if there were no one to count them—they would simply be one, and another, and another—etc.

There *is*, in short, no objective sum, or synthetic whole of any kind: there is simply a multiplicity of othernesses (to call it "a" anything is, *ipso facto*, of course, to synthesise it; and this creates an apparent inconsistency of language which is inevitable if we are to talk or think of what is in itself not synthesised at all. The inconsistency is, however, merely apparent). To make the sum of an unsynthesised multiplicity, they must be *grasped together*, and that demands a consciousness.

Units cannot even be added together to make up a sum unless they are in some way all held together as a whole—50 sheep, taken each one separately, will never make up a flock—they have to be grasped together.

This unity necessary in synthesis is, according to Bergson, supplied by consciousness. This is what is meant by saying that the mind creates relations, and even number. Matter, then (or better, whatever has but little *durée* of its own), when grasped by a consciousness will be found to form series of mutually independent juxtaposed units. Such series are typified by the mathematical notions of Time and Space (in fact, Bergson says this notion of Time is only Space reintroduced under a new name). These notions he would admit to be approximately true of matter as it is synthesised in consciousnesses.

But there must be some ultimate synthesis not created merely by being for a consciousness. This ultimate synthesis, Bergson says, is to be found in the nature of consciousnesses themselves.

Consciousnesses, besides creating the possibility of any kind of synthesis in material reality, by grasping it in a unity, also reveal an objective synthesis in the process of their own development.

Bergson expresses this by saying that changes in consciousness involve the preservation of the past in the present.

What we call change in everything else is merely simultaneities juxtaposed. Just what this distinction between these two kinds of change comes to, we will consider later. First, I want to make as clear as I can what is meant by the preservations of the past in the present. It is simply another case of interpenetration.

The illustration Bergson gives of the preservation of the past in the present is the whole psychological effect at the end of hearing a musical phrase.

He would, of course, admit that the objective parts, the notes, could be distinguished from the whole, but what interests us is not the objective parts, but the effect in consciousness.

Here the quality of the whole is *not* the sum of the qualities of the parts. If we distinguish the quality of the parts in the whole, we change the quality of the whole. The quality of the whole is, in fact, not made up of these parts at all.

Objectively we know that the music is created by striking several spatially distinct notes and we know what the quality of the sound produced by each separately is, but the quality of the psychological effect of any piece of music is an indivisible whole in this sense, that it is not composed of the sum of the qualities of the sounds which, we know as an objective fact, go to make it up. The music *as heard* is not made up of the different qualities belonging to the several notes—it is simply a peculiar quality of consciousness which arose when a number of particular modifications of the body occurred.

This quality cannot be analysed into the sum of the qualities of the external causes which produced it—of their result in us of separate bodily sensations. No matter how many of these we received separately, we should never be able to make up the qualitative effect of their successive combination in our consciousness. In this instance of the effect of a musical phrase the quality of the whole demands the preservation of the effect of the earlier notes along with the actuality of that of the latter ones—the quality of the resultant state of consciousness depends on them *taken all together*. This makes a qualitative (Bergson calls it a dynamic) unity.

It is this interpenetration of consciousness then, according to him, which constitutes the fundamental synthesis in succession. All other so-called succession is derived from this.

In the external world there are just events, and others, and others—these alone cannot be said to form a succession; one is, and another is, and another is . . . and that is all there is to it; there is no objective synthesis.*

By the help of memory they get placed serially, one after another. Simultaneity is an objective fact in the sense that it is simply true that, taking any two groups of events, all A, B, C are and D, E, F are not; and, again, D, E, F all are and A, B, C are not.

Succession, however, comes in when there is memory to synthesise the mere brute fact of being and again another being and again another. But memory can only begin doing this by

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* I think, strictly, Bergson's view is that matter, even if we disregard the slight tendency which it manifests towards creation (and so dynamic synthesis), is not really composed of discrete "parts" in relations. He holds it to be a real continuum, but, except that we make an error of fact if we believe it to be actually *composed* of stable "parts" in relations, a non-creative continuum may perfectly well be treated, symbolically, as if it were composed of recognisable "parts" and as if its changes consisted in rearrangements, in new relations, of old (*i.e.*, the same or exactly similar) elements. In discussing Bergson's notion of time I have always so treated it, to avoid extra confusion.

finding the connection of each with some state of the consciousness to which it belongs, and there would be no good in this either, unless the states of consciousness were somehow synthesised among themselves.

Before and after are the external symbolic way of expressing this synthesis. If an event A is simultaneous with a state which interpenetrates another state with which B is simultaneous, in the qualitative synthesis of consciousness, this gives us the means for deciding the so-called temporal relations between A and B. In consciousnesses there is no before or after unless we split them up on analogy with the parts of matter, into discrete states. In their interpenetration, which is their real nature, consciousnesses are not divided into anything that could constitute a numerical sum. They are simply a qualitative synthesis of qualitative differences, the difference itself being constituted by the qualitative nature of all the rest.

This, when used as the point of reference by relation to which external things can be synthesised, gives rise to the relations of before and after. These relations are symbols in our synthesis of external reality, of the dynamic synthesis of *durée*.

There are no such things in reality, however, as events spread out in time, or successive phases in conscious life. Homogeneous Time is a fiction created by the confusion of the fundamental principles in reality, *durée* the synthetic principle which is manifested in perfect interpenetration, and the discrete principle which is shown in the mere discontinuity of events, unsynthesised by consciousness.

This confusion Bergson describes very clearly in *Les Données Immédiates de la Conscience*, p. 83, which I will quote First, recapitulating the argument I have sketched above, he says :—

"Ainsi dans notre moi, il y a succession sans extériorité réciproque ; au dehors du moi, extériorité réciproque sans succession."

He then proceeds to show how a confusion arises between these two principles, from out of which the scientific notion of a discrete time series originates.

"Or, entre cette succession sans extériorité et cette extériorité sans succession une espèce d'échange se produit, assez analogue à ce que les physicians appellent un phénomène d'endosmose. Comme les phases successives de notre vie consciente, qui se pénètrent cependant les unes les autres, correspondant chacune à une oscillation du pendule qui lui est simultanée, comme d'autre part ces oscillations sont nettement distinctes, puisque l'une n'est plus, quand l'autre se produit, nous contractons l'habitude d'établir la même distinction entre les moments successifs du notre vie consciente : les oscillations du balancier les décomposent, par ainsi dire, en parties extérieures les unes aux autres; de là l'idée erronée d'une durée interne homogène, analogue à l'espace, dont les moments identiques se suivent, sans se pénétrer.

"Mais, d'autre part, les oscillations pendulaires, qui ne sont distinctes que parceque l'une s'est évanouie quand l'autre paraît, bénéficient en quelque sorte de l'influence qu'elles ont ainsi exercées sur notre vie consciente. Grâce au souvenir que notre conscience a organisé de leur ensemble, elles se conservent, puis elles s'allignent; bref, nous créons pour elles une quatrième dimension de l'espace, que nous appelons le temps homogène, et qui permet au mouvement pendulaire, quoique se produisant sur place, de se juxtaposer indéfiniment à lui-même. Que si maintenant nous essayons, dans ce processus très complexe, de faire la part exacte du réel et de l'imaginaire, voici ce que nous trouvons. Il y a un espace réel, sans durée, où des phénomènes apparaissent et disparaissent simultanément avec nos états de conscience. Il y a une durée réelle, dont les moments hétérogènes se pénètrent, mais dont chaque moment peut être rapproché d'un état du monde extérieur qui en est contemporain, et se séparer des autres moments par l'effet de ce rapprochement même.

"De la comparaison de ces deux réalités naît une représentation symbolique de la durée, tirée de l'espace."

Whether we can agree that Bergson is justified or not in his condemnation of scientific time as a mere analogy taken straight from space (the typical form of discontinuity) depends on whether he has succeeded in convincing us of the fundamental division of reality into that which tends towards interpenetration and that which tends towards discreteness.

And, further, whether we can accept the rest of the theory as to the symbolic nature of scientific time depends on whether we are ready to admit that this discreteness does not admit of merely objective synthesis by external relations, independently of the intervention of consciousnesses, which amounts to saying that what we are accustomed to call external relations do not constitute the real objective synthesis of reality—that external relations are, in short, fictions of the intellect arising out of a confusion.

But, at any rate, I hope that from this discussion of time a clear idea of the meaning of interpenetration has finally emerged.

This notion, contrasted with the contrary principle of discreteness, is really at the bottom of all Bergson's philosophical thought. Unless its meaning is clear, none of the rest of his thought is really intelligible—once this is firmly grasped, the point of all the rest is revealed.

The notion of interpenetration, in fact, is the vital point involved in *durée* and the key to Bergson's philosophy.

## VII.—THE ANALYSIS OF VOLITION: TREATED AS A STUDY OF PSYCHOLOGICAL PRINCIPLES AND METHODS.

*By* R. F. A. Hoernlé.

### *Introduction.*

It may be held to argue a degree of *naïveté* almost criminal in a professed student of Philosophy to have ever believed that philosophers must mean the same thing when they use the same word. However, I can best explain the standpoint and the purpose of this paper by confessing that I was once young and innocent enough to cherish that belief concerning the term "will." I found "The Will" used in various systems of *Metaphysics* as the key to the riddle of the universe. I found it used in *Ethics* and *Politics* as the key to conduct, individual and social. I found *Psychology* claiming the analysis of the will as one of its chiefest problems, and I found even some systems of Psychology treating will as the fundamental characteristic of mental process. However widely these different theories might diverge in the standpoints from which they treated the Will, I yet believed that in all these contexts the term "will" must ultimately refer to some single fact capable of definite and unambiguous identification and description. Thus, instead of keeping the diverse accounts of the Will in watertight compartments, so to speak, there suggested itself to me the interesting problem of tracing their connexion, of finding, if possible, a standard-conception, as it were, of the Will, which should be firmly based on psychological evidence, which could be carried on and taken for granted in the ethical and political theory of conduct, and

which should supply a test of the adequacy of the conceptions of Will employed in certain metaphysical speculations.

The paper which follows contains the record of this search and of its failure. Its special purpose is, on the one hand, to exhibit clearly, and to press upon the attention of psychologists and philosophers the fact of the utter disagreement of current theories of will, and, on the other hand, to trace the causes to which this disagreement is due.

I deal in this paper only with Psychology, for the root of the whole matter seems to me to lie there. I start with the assumption that willing is, *primâ facie*, an immediate fact of experience (a mode of being conscious of which we are directly, not inferentially, aware), and that, therefore, Psychology, as the science which professedly deals with such facts, is most likely to supply the standard-conception of which I am in search. Hence this paper is devoted to a comparative analysis of some current psychological theories of the nature of will, which are supported by the authority of leading psychologists, and which have found wide acceptance.

The positive outcome—if I may anticipate the result—will not be a new theory of the will or even a decision in favour of one of the current theories. My main conclusion, which I hope to commend to the reader's acceptance, is rather that the disagreement between different psychological theories is not, at bottom, of the kind which can be settled by an appeal to "fact" in the sense of introspective evidence. On the contrary, it is due to differences of *principle*. It arises from conflicting assumptions about the nature and aim of psychological analysis, about the methodological standpoint to be taken up, about the conceptions to be employed. Everywhere, in Psychology, I find theory determined by conscious or unconscious presuppositions. That is the thesis for which the following paper contains the evidence.

And, I would urge, it is no reply to meet the contention at the threshold by saying: Psychology is an empirical science

which begins with "facts," and which invents its methods and its conceptions as it goes along, treating them merely as "hypotheses," and guided by their success in "working." For my answer is: You see the result in the present confusion of theories. To plunge *in medias res* has only one result, viz., to commit you to uncriticised assumptions which determine your results without your knowing it. That may be the inevitable way for a science to begin. It does not follow that it is also the way in which a science must inevitably continue. The only lesson to be drawn, as it seems to me, from the existing conflict of theories is that Psychology must turn back and criticise its own standpoint, and the assumptions or presuppositions which define that standpoint. This examination of the theories of Will, I hope, will show, by illustration from one particular group of problems, how urgent such a comprehensive criticism of fundamental principles is. There comes a time in the development of every science when it must set its house in order by reviewing its own theoretical foundations. This time has come for Psychology, and though the task of criticising its principles has by no means been left unattempted —I need but instance Münsterberg's *Prineiples*, as well as many special articles in journals in this country and abroad—attention still requires to be focussed more universally on the need of it.

So, again, some psychologists will probably object to several of the will-problems which are reviewed in this paper, as lying beyond the scope and province of Psychology, or as being problems with which Psychology is incompetent to deal. But such an objection would but reinforce my point, which is just to ask the question: Why should Psychology stop here rather than there? I want to challenge the justification of the limits—arbitrary limits, as they seem to me—which many psychologists set to their subject. For the setting of limits is always a matter of principle, and principles need to be critically justified, not uncritically assumed. That is just the whole contention.

In fact, I may define the issue by saying that it concerns the *kind and degree of abstraction* which Psychology should practise. No science—short of Metaphysics—can take the whole of reality for its province; every science must abstract. So far, I take it, we are all agreed. The kind and degree of abstraction which a given science practises, depend on its standpoint, *i.e.*, on the fundamental assumptions which it takes for granted, on the conceptions or categories with which it operates. The question is just whether this abstraction should be practised uncritically, without consciousness of its manner, scope, and influence, or whether it should be practised critically on well understood principles. And if the latter, then what ought these principles to be?

One further explanation is due to the reader to prevent misunderstanding. When I spoke above of a disagreement on principles which could not be settled by an appeal to "facts," I had in mind what I may perhaps be allowed to call the "Speculative" Psychology which is represented by the work of, *e.g.*, James, Stout, Münsterberg, Bradley, and, among an older generation, Lotze and Herbart. There has arisen, of recent years, a school of Psychology which, by contrast, may perhaps be called "Empirical," because it employs above all the method of Introspection under Experimental conditions, and claims to reach its results from observation of the facts with a minimum of theoretical presupposition. With the accounts of "will" produced by representatives of this school (*e.g.*, Ach) I am not concerned in this paper. Their examination would require a separate treatment. But of the older "speculative" school it is, I think, true to say that, even where its theories are professedly based on introspection or verified by an appeal to introspection, they are, in fact, determined in a characteristic way by presuppositions of a general kind as to the principles and concepts which Psychology ought to employ. From different standpoints and assumptions result different theories. That is the

situation which is to be exhibited and examined in this paper.

I shall take, then, the problem which, in general terms, may be described as the problem of determining the "nature" or "essence" of "will" or "volition," and show how the different theories which are current differ, not so much because of the resistance which the experience of willing offers to analysis, as because of the influence everywhere of latent or acknowledged assumptions. For the sake of convenience, I shall divide the discussion according to a number of special problems.

With these preliminary remarks on the purpose of this paper, for the better orientation of the reader, I pass now to the first problem.

## I.

### *Is Volition Complex or Simple? Is its Character Derivative or Unique?*

The first of these questions might appear to be simply one for introspective analysis to answer. The second almost inevitably leads on to genetic and comparative Psychology. None the less, these two questions may fitly be treated together, for they constantly tend in practice to pass into one another. And they are suitable questions to begin with, because they meet every student of Psychology at the threshold of the problem of will-analysis, and also because they do not, *primâ facie*, raise any issues with which Psychology might be held to be incompetent to deal.

It will not be disputed, I take it, that some psychologists declare volition to be complex, others simple, and that both schools appeal to introspection in support of their view. On the other hand, the conclusion which I shall try to defend is, that it is not a matter of introspection at all but of methodological principles, and that a volition may very well be complex in one sense and simple in another. It depends on what kind

of complexity or simplicity we are looking for. But that is a matter of principle.

(*a*) First, then, the theories which treat volition as *complex*. Their general standpoint is that mental life—let us, provisionally, adopt the technical term "stream of consciousness"—is given as a complex whole which requires to be mastered by analysis. Their method is: analysis of the complex into its simplest elements. We "explain" the complex by showing how it is composed out of the simple. Here we may note, first, that this principle allies itself most easily with the method of analysis by cross-sections of the stream of consciousness, which gives us "states" and their constituent "elements," but far less easily with the method of analysis by longitudinal sections, which gives us "processes" with their successive "stages." Further, we may note that a great deal depends on how much we include in the complex to be analysed. We may treat the whole* stream of consciousness as a single comprehensive complex with lesser complexes within it—a moving, growing system of complexes, as it were. Or we may treat these lesser complexes as the "wholes" to be analysed. But, either way, there are some troublesome questions which psychologists do not face as often or as clearly as they should. We are familiar, *e.g.*, with the view which in the complex stream of consciousness as a whole, or even in any particular section of it, distinguishes three concurrent "aspects" or even "attitudes," viz., the affective, the cognitive, the conative. Logically carried through, this view ought to treat every psychical fact, large or small, without exception as exhibiting these three "aspects" within it. It would have to explain the popular distinctions of language, "an emotion," "a thought," "an act of will," as emphasizing

* It would, perhaps, be too inconvenient to ask in what sense it is a *whole;* where it begins and where it ends; what it includes and what not.

merely the aspect which happened, in any given fact, to be most striking and dominant. Are, then, these "aspects" or "attitudes" the ultimate simples at which analysis stops? Or are they themselves complex? And, if so, what are the simples into which they in turn must be analysed?

Or, alternatively, we find psychologists breaking up the complex stream into particular feelings, cognitions, conations and treating each of these again as a complex capable of further analysis. It makes, clearly, a great difference whether what we treat as a complex is a "conative character" of all mental processes or itself a particular mental process, a "conation." If we take the latter view, how far must analysis be pushed? Does not, *e.g.*, the familiar theory supported by Ebbinghaus and others, that a volition is a complex of "ideas" and "feelings," stop halfway? Is not the practice of psychologists in all these matters guided by assumptions which have not been sufficiently examined and which, when examined, threaten to turn out merely indefensible makeshifts?

Again, when we turn from the question what complexes Psychology is analysing to the question what simples it tries to reach, we come once more upon a whole nest of problems. It is easy to define the simple as the *terminus ad quem* of analysis, and as that which defies further analysis. But the point at which we *can* go no further is, in Psychology as in other sciences, not easy to determine, and in practice tends to be identical with the point at which we do not *choose* to go further —a very different matter. And, in either case, our procedure is really determined by the conception of the simple and unanalysable with which we start out. We go on analysing until we find the sort of ultimate that we are looking for, that we set out to find. In short, it is a question of assumption and principle. For instance, do we start with a conception of the simple as *qualitatively homogeneous* or as *qualitatively diverse?* In the former case, we shall probably follow those who, like Münsterberg, define the programme of Psychology as

the reduction of all complexes to sensations as ultimate elements, and suggest that even sensations, so far as they are still qualitatively diverse, may prove amenable to further reduction in the direction of yet greater homogeneity. In the latter case, we shall rather tend, like Lipps in some of his later work, to emphasize every shade and nuance of qualitative diversity, so that analysis will lead to an indefinitely large number of unique and ultimate "simples."

Thus this very brief and summary survey of one small corner of the field teaches already the lesson that these problems can not be settled by a naïve appeal to observed "facts." In Psychology, more perhaps than in any other science, our "facts" depend on what we take them to be; from the very start they are theorised by the way we think about them. It makes all the difference whether we talk of "states" or "processes"; of each soul as a single continuous "stream" or as a "bundle" or "sequence" of relatively disconnected processes; of "aspects" or "modes" of experiencing, or of "experiences," of complexes and simples of one kind or of another. Everywhere we come, at bottom, back to problems of method and principle, for the "facts" are elastic, and, with a little enthusiasm, can be squeezed, more or less, into any framework of thought.

But we are not yet at the end even of the problem of the complex and the simple. The search for the simple and unanalysable, the elementary and fundamental, may be conducted from yet other points of view, and the analysis of volition will differ accordingly. Such a fresh standpoint is especially the *genetic* standpoint which treats the complex as *derivative*, as having been formed or developed in the progress of mental life. This is not by any means involved in the mere analysis of the complex into the simple. It does not by any means follow that, because the complex can be shown to consist of simple elements, it has therefore grown or been composed out of these elements. On the contrary, analysis might

lead to elements which are wholly artificial, in the sense of being products of abstraction, incapable of having existed independently prior to the complex in which we distinguished them. But the elements with which genetic theory operates must have actual existence as starting points of the process. We can construe this process in one of two ways, either as forming a "whole" by *composition* out of its "parts," or by *growth* and *differentiation* out of something more primitive. In the former case, we shall be guided largely by the analogy of the conceptions of the *mechanical* sciences, in the latter of the *biological*. The former standpoint is, of course, characteristic of the older "Associationist" Psychology and need not detain us. The latter is the most common standpoint in modern Psychology. We must dwell on it for a moment, for it presents yet another line of search for the simple, and therefore leads to another kind of result. The question of principle is, in fact, whether the simple and ultimate element of which we are in search is to be taken as the last in the order of analysis, or as the first in the order of origin. We cannot answer: Both. The alternatives of this disjunction are mutually exclusive. For whatever we may posit as the first and most primitive type of mental life in the order of origin, *e.g.*, the sensation-mass, is "simple" not in the sense of being unanalysable, but only in the sense of being not yet analysed. Diversity and complexity are "latent" and "implicit" within it. Differences are there, but have not yet been "discriminated." In fact, mental development may be construed as consisting largely in this explicit differentiation, and it might reasonably be argued that out of the merely and wholly simple nothing complex could really develop at all. A psychologist sensitively critical of all his working-assumptions might at this point well be puzzled which of several different conceptions of development he is to work with, how to apportion emphasis between differentiation from within and aggregation from without, between inherited or acquired "structure" and incoming "stimulus." And one of

these days perhaps a disciple of Bergson will rewrite genetic Psychology from the standpoint of *Évolution Créatrice.*

In any case, we cannot fail to recognise that wherever the genetic standpoint is adopted in Psychology these problems are not far away. In the Psychology of Will they lead to that particularly troublesome problem of the *lower limit* of volition. At any rate, for all theories for which will implies "ideas" and, therefore, a level of cognitive development beyond the merely perceptual, it is both urgent and difficult to draw the line between what is and what just fails to be will, and to do this without postulating a break that would destroy the continuity of development. It is one thing to trace the development of volition from simpler to more complex forms; it is another to trace its development out of what is not recognisably volition at all. Yet the principle of continuity will have its revenge in urging us to specify on the pre-volitional level of mental life that process which, if it is not yet volition, at any rate fulfils the same function and supplies the basis on which volition has developed. It is tempting, of course, to treat the Sensation-Reflex and Instinctive Action as these pre-volitional stages, but in future those who do so will first have to settle their account with the Bergsonian view that instinct, so far from being a stage on the evolutionary road to intellect, is an independent, divergent and, in some respects, more important line of evolution.

However that may be, we have a definite issue on the question of the derivative character of volition and the consequences that follow from it. If volition is derivative, it cannot be a fundamental character of mental life, and even the change of terminology to "conation" or "striving" does not really help us to make it more fundamental. And, of course, no "voluntaristic" Psychology is possible. If, on the other hand, we construct a "voluntaristic" Psychology on the basis of "conation" (or whatever we may choose to call it), we run up against the difficulty that we must constantly

extend the meaning of the term far beyond the limits of the processes which we can, in our own consciousness, recognise and identify as possessing volitional character. There tends, in all these theories, to be a decided gap between the direct experience of willing and the facts which the theory forces us to treat as volitional.

At any rate, we have found that from the genetic point of view we must choose between treating volition as having developed out of a preceding and more primitive stage in which there were mental processes not yet volitional but capable of becoming so, and treating it as being itself primitive and present at the first and lowest level of anything that can be called mental life at all. Of course we can, and ought to, argue which of these alternatives it is better to adopt, but in the end we shall come back to a choice of standpoints and methods, viz., whether to begin with the introspective analysis of what we unmistakably experience as volition, or partly by inference from outward behaviour, partly by emphasis on certain features of mental processes, to construct hypothetically a conception of conation.

(*b*) We can deal much more briefly with the theories which treat volition as simple in the sense of unique and therefore unanalysable. About this theory little can be said, for when a thing is unanalysable, all you can do is to say so All statements of this view, therefore, are bound to appear dogmatic; they become eloquent only in criticisms of views of the first type, for the only way of supporting the unanalysability of will is to show that all the attempts at analysis fail, in that what is offered as the result of analysis is something other than what we recognise as will. Whether analysis *does* fail or not, is, of course, itself matter of dispute, but, at any rate, the alleged failure of analysis is the only argument offered in support of the contention that will is unanalysable. That such an argument is precarious needs no pointing out, and at bottom

we come back to an assumption for which certainty is claimed in virtue of an immediate intuition. In fact, this theory of will is generally held by certain modern Neo-Realists who are also Neo-Intuitionists and who proclaim that both "knowing" (or "thinking") and willing are unanalysable. Thinking is thinking, willing is willing—and that is really all there is to say about it.

(*c*) But it remains to notice a view which may be regarded as a compromise between taking volition as complex and as simple. I refer to Dr. Stout's paper on Volition in the *British Journal of Psychology*, where volition is treated as a complex mental process which owes its will-character to the presence of some special element—a "felt tendency"—over and above all other elements and all complexity of structure. On this theory, I agree entirely with Professor Dawes Hicks' criticisms in his recent paper, to which I should like to add two further considerations: (i) That "tendency" here, as elsewhere in philosophy, is a question-begging word, for the conception of "tendency" involves that of "direction," and that raises the whole problem of the "awareness of direction," and of how far we have a right to predicate it of a mind to which we ascribe a "felt tendency." The phrase would be intelligible, though inappropriate, if it referred to what Stout has elsewhere called "the judgment that so far as in me lies I shall do something." Short of such an explicit judgment of the direction of a proposed act, the term "tendency," if not positively misleading, at any rate shirks the problem whether we do not lose the right to speak of "volition" or even of "conation" in proportion as the awareness of direction, of the aim or goal or purpose of the process, disappears from consciousness. I cannot help thinking that, in using "tendency," we come dangerously near committing the psychologist's fallacy of attributing to the mind which experiences the process, but is unaware of the direction in which it "tends," the knowledge

which the psychologist has of that direction. The question which must be pressed is whether a "tendency" can, properly speaking, be "felt," if feeling is explicitly taken to exclude any *thought* of the "direction" or "end" of the process.

And, secondly, to find the essence of will in a unique "felt tendency" escapes reducing the will to a species of feeling only through the ambiguity of "tendency." Once more: *What* is felt? If the answer is given in terms explicitly excluding thought of direction, we can only urge: That, after all, makes will a mere feeling. It assimilates will to the "affects." Once that issue is clearly put, we may doubt whether any psychologist is really prepared to champion that view. For, on looking more closely into all the views which identify willing with "striving" or "conative tendency," we find that they do not really mean that this peculiar "feeling" is the *whole* of the fact. Rather they treat it as belonging to a certain complex with a definite structure, and it is this complex which is really the volition *in concreto*.

At this point I may be permitted to make a positive suggestion. Is it not a mistake to isolate the will-character as a specific and unique feeling-element within the complex, and to speak as if only the addition of this element to the complex made it a "volition"? It is a view which inevitably suggests that the nature of the complex has nothing to do with the character of this feeling, that, in the absence of this feeling, the complex, though otherwise unchanged, would not be a volition. Surely we ought not in this way to divorce the will-character of the experience from the rest of its nature or structure. Would it not be better to hold that, whilst the experience of willing is unique, yet it is also complex in that it has a definite and analysable structure? On this view, then, volition will be both complex and, in a sense, simple: complex in structure, but simple and unique in its character *as a whole*. Since labels are convenient, I will call the principle, which seems to me to be here involved, the *Principle of Psychic*

*Wholes.** On this principle, which will, of course, extend to psychic complexes other than volition, volition will be a process analysable into elements, an experience with a determinate structure. Yet it will, at the same time, *as a whole*, have a character which is simple, in the sense of unanalysable, in that we cannot break it up into, or substitute for it, the elements which we can distinguish within the experience. In short, I would suggest that we have not got "will" or "volition" where we have not an experience of determinate structure, but that the character of this experience as a whole is unique and not analysable into the character of anything else.

Along some such line as this we may reach an acceptable compromise and avoid either of two extreme views, viz., the view that will is will and not further analysable, and the view which would dissolve will into a complex of other mental elements, which neither in themselves, nor in their combination, possess the characteristic will-character. For the rest of this paper, then, I shall assume that we are dealing with an experience of a determinate structure.

## II.

### *Does "Realisation" or "Action" belong to the Essence of Volition?*

Passing, now, to the structure of volition, we may deal first with that important group of problems which arise when we ask whether the carrying out of a decision, the realisation of a purpose, the fulfilling of a desire—in short "action"—is an essential part of volition. The question is full of difficulties, as

* I use "whole" here to express that I am referring to complexes which are more than mere aggregates or compounds. The Principle was, I think, suggested to me by the Principle of Organic Wholes in Mr. G. E. Moore's *Principia Ethica*, though I do not know how far Mr. Moore would approve of the use I have here made of it.

may perhaps best be seen by reformulating it: What constitutes for a Psychologist a *complete* volition? (*a*) Is volition complete with the "act" of decision or resolution? Or (*b*) is it complete with incipient realisation? Or (*c*) is it complete only with full realisation? Whichever alternative we adopt, awkward "posers" can be put to us. To mention but a few by anticipation: if we adopt (*a*), we exclude from volition every process which does not involve deliberation, preference, choice, and on the other hand we include those idle resolutions of the weak-willed man which are never carried out. If we adopt (*b*), we shall get into difficulties over those volitions in which realisation is attempted but fails, or is abandoned from lack of persistence, or produces results far different from those intended or expected. If we adopt (*c*), we shall be pressed with the awkward question whether anything short of a "complete" volition, *i.e.*, one which has ended in full and successful realisation, can be called a "volition" at all. The argument is: If the essence of volition includes realisation, then short of realisation we have not got the essence, and therefore not volition.

Notwithstanding all these difficulties, I am bound to confess that to my mind the most satisfactory theory of volition is one which includes "realisation" or "action." This view, of course, is best known in the formulæ that "volition is the realisation of an idea" or "the self-realisation of an idea," or "the realisation of an idea with which the self is identified." The second and third of these formulæ involve special problems which we will postpone for the present. And even the first formula is for our present purposes satisfactory only if we are allowed to take its terms in a wholly *non-technical* sense—a sense which is perhaps best expressed by saying that to "will" is to adopt and carry out a purpose or plan. No doubt, this is only a rough-and-ready description in terms which purchase intelligibility at the price of being unscientific. The main point is that we must rule out from present discussion the various

technical senses of the term "idea." We do not, *e.g.*, want to be drawn into a metaphysical argument concerning Mr. F. H. Bradley's theory of "ideas," because Mr. Bradley happens to be one of the foremost defenders in recent times of the view that volition is "realisation of an idea." To go into the philosophical questions which centre round "idea" would require a separate paper. My present concern is merely to discuss some problems which can be quite satisfactorily dealt with if we give to "idea," without any *arrière pensée*, the simple meaning of "purpose" or "plan." "To have an idea" is, I take it, a synonym for "to think." So far, then, as there is an idea-element in volition, it means that we think of something to be done, a result to be achieved, an object which will satisfy a desire and is attainable, *e.g.*, by certain movements. There are countless different ways in which thinking of this kind enters into willing. And when we want a comprehensive term to refer to what is thus thought of, we speak of "purpose," or "object of will," or "aim," or "end." We need not, then, for the present take "idea" to mean more than this kind of thinking.

In this way, we shall secure several advantages: (*a*) We shall not wholly lose touch with the meaning which, in ordinary life, is attached to "willing"; (*b*) We shall include what is the most important part, if not the whole, of the meaning of "will" in Ethics and Politics, where "purpose" and "decision" are certainly not to be cut off from action and conduct; (*c*) We shall not break with philosophical tradition. For the view which includes realisation in will can be traced back at least as far as Kant, and it has been supported again and again by most of the great thinkers since Kant, both in England and on the Continent.

Before passing on to details, a reminder may be appropriate of how the *Principle of Psychic Wholes* applies to the problem under discussion. That the adoption and realisation of a purpose is a process which may be lengthy and complicated is

obvious. And it should be equally obvious that we shall miss the essence of it if we take a cross-section of the course of such an experience at any particular moment. For instance, a cross-section during the stage of deliberation, prior to decision, gives clearly something less than will, something "not yet" will. A cross-section during the stage of realisation, after decision—what does that give? Something "after" will, something "no longer" will, a mere "consequence" of it? Surely, such a view is, to say the least of it, strained. We surely are still "willing" when we are carrying out a decision. And, *per contra*, we may now say that, in so far as we were seeking a decision, seeking to "make up" our minds, we were "willing" before as well. Still, we may see here how it is possible to sympathise with all the various views which look for the essence of volition somehow and somewhere in the moment of decision. We then get all the problems centring round the medley of theories offered by James in his *Principles of Psychology, e.g.*, that decision consists in the "concentration of the attention" on the idea of the act, or in the "consent given" to the idea, or in the "fiat of the will" which releases the springs of action. But what of volitions not preceded by deliberation and decision? Or, in other words, is "ideo-motor" action to be treated as volition or not? If it is not, the theories just mentioned are far too narrow; if it is, they do not give the essence of volition.

In short, the Principle of Psychic Wholes challenges the Principle of Analysis by Cross-sections. The latter analysis is useful for accumulating details, but can give no comprehensive view of the nature of a psychic fact which, as a whole, extends beyond the present moment. To fix on one stage of, or incident in, a process and acclaim it as the essence of that process is, surely, a misuse of the method of cross-sections. We cannot thus do justice to the stages and the structure of a *process as a whole* at all. No doubt we may argue as to where the process should be taken to begin and where to end, but we

cannot really solve this problem by concentrating its whole essence into one moment of its course.

However, passing from these general considerations, let us raise the clear issue: Should "realisation" be included in, or excluded from, volition? Or to put it differently: Is a volition for psychological theory complete without realisation? Or again: Does the essence of volition, for Psychology, consist simply in "decision," or (where there is no decision because there has been no deliberation) in the "dominance" of an "idea"?

As always in Psychology, the answer to these questions depends, in the last resort, on certain assumptions, which are matters of principle. There are, broadly speaking, two standpoints: (i) There is the standpoint of those who start with some principle of distinction between "mental" and "physical" or "bodily" processes, who confine Psychology to the study of mental processes, and for whom Psychology ends where the "mental" passes into the "physical," the "idea" into "bodily movement." At that point, they would draw the line. On the mental side, and therefore for Psychological Theory, volition is complete with the dominance (however brought about) of the "idea" in consciousness. The "realisation" through the bodily organism lies outside its sphere. Psychologically, it is not part of volition. It should be noted, however, that on this view realisations which remain within the mental sphere, *e.g.*, voluntary recall, cannot be excluded from the province of Psychology, and the problem whether or no they should be included in volition is therefore not solved by the initial assumptions. (ii) There is the standpoint of those who avoid the whole problem—who, in fact, might fairly be said to "beg" the whole question—by setting themselves *ab initio* the task of analysing, not so much *volition*, as *voluntary action*. Now if we could look upon this as a deliberate attempt to return to a more concrete point of view, and to avoid some of the abstractions which stultify Psychology, it would deserve to be

heartily welcomed. But, unfortunately, it is not uncommon to find this very view combined with assumptions which wholly contradict it. To put the matter in a nutshell: if we want to have an intelligible theory of voluntary action, and especially of voluntary movement, we must not start off at the beginning with some theory of the distinction and relation of body and soul which makes all reference to action and movement in principle impossible. It does not matter much whether our theory be one of Interaction or of Parallelism. Either may be so formulated as to involve the fatal consequence. By way of illustration, let us consider the position of a Parallelist who deals with volition as voluntary action.

(*a*) First of all, we do, of course, want some methodological device for delimiting the respective spheres of Psychology and Physiology, and to prevent, on the part of either, that *μετάβασις εἰς ἄλλο γένος* which is the source of all confusion of thought in science.

(*b*) But if, for this purpose, we adopt some sort of distinction between body and soul, at least we ought not to formulate it in such a way that it makes our conception of mental processes, and consequently our Psychology, falsely abstract. This is what inevitably happens when the distinction between the "internal," "mental" process and the "external," "physical" process is so drawn that the one ends where the other begins. From that position only one conclusion can be consistently drawn, viz., that "voluntary action" is a process of which the first half is mental, the second half physical, and that for the Psychologist, who is concerned with the mental half, volition is complete with the inward "fiat" or the "concentration of the attention on the idea." The other half of the process, the "realisation," will lie with the physical machinery and fall, strictly, outside the scope of Psychology.

(*c*) But in thus construing mental process as passing at a certain point into physical process, are we not overlooking

the fact that when we take stock of the *primâ facie* sequence of mental process, *the experience of realisation frequently follows upon decision?* It is one thing to say that this sequence presupposes a bodily organisation, without which it could not happen at all. It is quite another thing to neglect or deny the sequence altogether. The realisation of purposes is as much part of the mental process as the purposes themselves. For this realisation, even though it consist of bodily movements and their effects in the "physical" world, is *de facto* experienced, and from this side of our perceiving it or inferring it or believing in it, it belongs to the mental series.

If this is clearly grasped, two important consequences follow:—

(1) *We cannot intelligibly construe the mental series at all if we abstract from its cognitive function.* We cannot intelligibly deal with the nexus of our perceptions and thoughts, with the way in which they refer to one another and have significance for one another, except through their "contents,"* *i.e.*, through *what* we perceive, think, etc. A certain thought, let us say, is followed by certain perceptions. We can construe this sequence as purpose and realisation only because we *de facto* experience *what* we perceive as being the fulfilment, the making real, of *what* we intended. The "actual" movement and its effects are experienced as realising the intended movement and effects. No abstraction of the "that" of conscious process from the "what" can give us a satisfactory basis for Psychology. Experiences, taken in abstraction from

* I doubt whether this term, however popular, is really helpful. It was introduced, I suppose, in order to eliminate the problem of the relation of the knowing mind to the object-world. In dealing with "anoëtic" consciousness, where "object" would be an inappropriate term, "content" has its uses. But, as a substitute for "object," it leads to needless abstraction. We may as well face the fact at once that, in judgment, we claim to apprehend a real "object-world" when we perceive and think. Psychology, however, need not go behind the claim.

what is experienced, are so empty and featureless that no significant sequence can be constructed out of them at all.

(2) If this be granted, we have a means of distinguishing between legitimate and illegitimate Parallelism. It is legitimate when with experiences (psychical processes) it correlates neural or cerebral processes which do not enter into the "what" of experience at all. It is illegitimate when it is substituted for the cognitive function of experiences in relation to their "objects," *i.e.*, when the experience of $x, y, z \ldots$ is split up into two parallel series, of which the one consists of "mental," the other of "physical" factors, the one of perceptions and thoughts, the other of the objects perceived or thought about. None the less, there can be found statements of Parallelism which, in language at any rate, are committed to this position. It is a position which is attained with insidious facility. For the cerebro-neural organisation, which, as we have seen, is not part of the object-world apprehended, yet forms with the body and with the rest of that object-world (which we do apprehend) part of a physical system. Hence the Parallelism which holds for part is easily extended to the whole, particularly when there is a causal nexus between the neural process (unperceived) and the movement with its effects (perceived). Thus there result statements of Parallelism which begin by so contrasting the "mental" and the "physical" series that their cognitive relation is destroyed. Once that is done, they are precluded from moving in both the "inner" and the "outer" worlds simultaneously; they have no right to jump from "internal" idea to "external" realisation, from "mental" purpose to "physical" movement. Yet such hybrid processes, compounded of psychical and physical factors are frequently offered by the very men whose initial theory insists on a clean separation. Their Parallelism is often little more than an ornamental flourish which gives a scientific air to a chapter on Body and Soul. If they were consistent even in their own interpretation of Parallelism they would at least

analyse voluntary action not as a sequence of "idea" and "action," but as a physical sequence of brain-process—muscular movement—physical effect of movement, running parallel to a psychical sequence of idea (purpose)—perception of movement—perception and inference of effect. But it is clear that the psychical side of this Parallelism can be stated intelligibly only in terms of its cognitive relation to the last two terms of the physical series. And even then the Parallelism is misleading, because what is parallel is not the movement as "external" and the perception of it as "internal," but the perception of the movement and some cerebro-neural process which is not perceived at all. Let me repeat it once more: any attempt to delimit the sphere of Psychology by defining psychical processes as "internal" in such a way that their cognitive relation to the "external" is destroyed, leads to nothing but an artificial mutilation of experience which is even for Psychology unworkable. For, in the concrete, just as in perception and thought we apprehend an object-world, so in willing we transform that world by realising our purposes in it. All theories of volition which fail to do justice to this situation, whether it be by drawing the line between "mental" decision and "physical" movement or by a false Parallelism, have been found to rest, at bottom, on false initial abstractions. They must give way before the pressure of analysis from a more concrete standpoint. One direction from which this pressure constantly comes is that of Ethics and Politics. Men have psychologised from an interest in Ethics long before they psychologised from an interest in Psychology. And the psychological analysis of conduct in Ethics has been in the past, and is often still being, conducted in comparative independence of Psychology pure and simple. It appears to me that, if the ethical thinker has suffered from the disadvantage of not surveying the whole field systematically, he has, as a set-off, had the advantage of not being committed, *ab initio*, to false abstractions. He has fashioned his theory of

the will under the full pressure of the concrete fact which we call "conduct." If he distinguishes "inner" and "outer," "purpose" and "action," "character" and "life," yet he also holds these together as merely aspects, and inseparable, mutually complementary aspects, of the whole concrete fact. He knows that any separation of "intelligence" and "will" from their "world" and their "expression" in that world, leads to absurdities. There are many detailed problems about the will which the psychologist legitimately debates, but in which the ethical thinker has no interest. But I should like to put forward the proposition that *no psychological theory of will, which does not supply a satisfactory basis for Ethics, can be accepted as satisfactory* even for Psychology, at any rate, if we demand of a satisfactory theory that it should deal with the *whole* fact with which it professes to deal. I should even be inclined to extend this proposition to Politics, for the psychological basis of which professed psychologists have so far done singularly little, notwithstanding volumes on *Völkerpsychologie*.* But to this topic I shall return in the last section of this paper.

## III.

### *What are the Limits of a Single Volition within the Stream of Consciousness?*

This question does not, perhaps, express very clearly the nature of the problems which I propose to discuss next. They are problems which, so far as I am aware, have hardly been appreciated, still less discussed, by psychologists. They are all of them problems which arise from the *serial* character of the stream of consciousness—problems, in short, to which one

* Of course, the study of Psychology from the explicitly social or political point of view has not been wholly neglected. Not to mention German and French writers, I may refer to the very striking psychological chapter in Bosanquet's *Philosophical Theory of the State*, and to McDougall's *Social Psychology*.

commits oneself by assuming the "stream" as one's fundamental working-conception.

(*a*) Broadly, the question of what constitutes a *single* volition is a special case of the general problem: what constitutes a single mental fact or process of any kind, *e.g.*, a single perception, a single thought, a single feeling. Or when should we rather speak of a *cluster* or a *series* of distinct experiences? *E.g.*, when I handle, taste, and smell a fruit, have I a single complex perception or three distinct perceptions, be they simultaneous or successive? The question, in this form, may hardly seem worth asking. One is tempted to reply that it is a matter of choice and that it makes little difference which view one chooses. Let us then look more closely at the more difficult problems of analysis which come under this head.

(*b*) We have seen already that, though there may be volitions in which thought and action occupy but a moment, most volitions extend through a more or less lengthy space of time. To experience volitions of this kind is to go through a process: in willing we are always in transition. Now Psychology wants to deal with the "whole" fact, but what is the whole fact and how is it accessible? Clearly, it will not help to whittle down the fact to the present moment—in psychological language the "specious present." Clearly, most volitions are not confined within the bounds of the mere instant. We cannot get the whole fact together, *totum simul*, by treating it as if it were instantaneous, as little as we can get at it by selecting any instant and treating it as if it were the whole. Retrospectively, of course, when a volition has run its course, we can deal with it as a whole. But with a present volition, now in course of being experienced or lived through, we cannot deal in this way. At any given moment, if we take an introspective cross-section of the stream of consciousness, we get but a small section out of a continuous process, of which part lies in the past and part belongs to the future.

Its past course we can more or less completely recall, its future course more or less completely anticipate, but the whole of the fact is not actually experienced at any one moment at all. The "whole" volition, then, the psychologist's "fact," is more or less largely what, in technical language, is called an "ideal construction"—an expansion and interpretation of present experience by memory and anticipation.

Perhaps we are beginning to see now why it is not always easy to assign the limits of any single volition. The same—we may incidentally remark—is, of course, true also of the stream of consciousness as a whole. The actuality at any given moment is poor in meaning and content compared with its expansion by memory and thought.

(*c*) But the problem goes deeper still. We have agreed that it would be a false method to try to attain completeness by whittling a psychical fact down to the minimum of thought, sensation, feeling, etc., of which our experience consists at any given moment. We have also agreed that there is always, in greater or less degree, the expansion of the present by ideal reference to past and future. But how far ought we to go in this direction? *How far should we credit present consciousness with what is implicit in it, but not actually thought of?* This is a crucial and far-reaching problem, which ought not to be neglected in Psychology, even if it did not crop up constantly in discussions of conduct from the standpoints of Ethics and Politics. In view of the fact that, later on in the year, I am to take part in a symposium on this very problem of the Implicit in mental processes, I may be excused if I touch only on a few points here. In a general way, of course, psychologists have always recognised that present experience owes most of its meaning and significance to its implications, that organised past experience is effective in present perception and thought, and makes them, so to speak, intelligent without needing to be always explicitly recalled. But it has not always been equally fully realised that the recognition of this fact is really

inconsistent with the conception of the stream of consciousness. For that conception rests on the time-scheme in which the past is no longer, the future not yet, real; whereas the past which is implicit in the present, like the past which is actually recalled, cannot simply be called "past" and "unreal." This, I take it, is the fundamental truth underlying Bergson's conception of *durée*. But, again, in what way are the implications contained in the present? The sentences, *e.g.*, which I am writing now, are but a small section of the total volition which will not be complete except with the end of this paper, yet the whole plan and purpose, though I can make them explicit to myself, if I choose, are not present to me when I am concentrated on the particular point on which I am writing. So, again, a comprehensive moral purpose, a resolution to live up to some general principle of good conduct, may be realised on particular occasions, without any need to call to mind the full nexus of thought, reflexion and resolution, which is implicit in the particular act. So a man's work in his profession might be looked upon as the sustained and continuous realisation of a single comprehensive purpose. Even life as a whole might, with due allowance for conflicting purposes and lack of system, be interpreted in this way. But how little of a whole scheme of life, or perhaps of a whole "Weltanschauung," need actually be present to consciousness at any given moment in which, none the less, it must be regarded as implied. Has any psychologist ever properly written the Psychology of these "psychical facts"? Has anyone fully investigated the way in which implications are effective in present consciousness?* Or what mental organisation we must assume to explain them, other than the crude conception of traces or dispositions? Or the way in which a given purpose grows and gets modified under the pressure of further experience

* James's theory of "psychic fringes," or, again, Wundt's theory of "Apperceptive Masses" might, perhaps, be adapted for the purpose.

and in the attempts to realise it? Or the difference between implications which were once explicit and are now implied, in the sense of taken for granted, and implications which are fresh discoveries, which only come to light by a special effort, not of memory, but of analysis and reflection? Are these latter part of the fact or not? And if not, why not? Clearly the whole subject of implication requires investigation, if we are to deal adequately with facts such as I have mentioned. And everywhere, according as we disregard or include implications, we can fix the limits of what we are to treat as a single volition differently. It is difficult enough to decide whether implications which were not thought of are to be treated as part of the fact. It is even more difficult when, in taking account of implications, we come face to face with the fact that what seemed separate and distinct volitions are, after all, but parts of, or stages in, the realisation of a single comprehensive purpose.

(*d*) After all that has been said, it is hardly necessary to point to yet another instance of the same difficulty. How are we to deal with *intervals* or breaks of continuity? Where these occur, are we to treat the discrete experiences as separate volitions, or as parts or fragments of single volitions? After all, there would seem to be comprehensive volitions in our lives which, with interruptions and resumptions, cover large portions of our existence. But have psychologists always been ready to permit so bold a use of the principle of identity? Or have they considered how far current abstractions would have to be abandoned or recast to make this use possible?

## IV.

### *What is the Relation of "Volition" to the "Will," and of the Will of the Individual to the Will of the State?*

The transition to these two questions from the group of problems which we have just discussed is not as forced as, perhaps, it seems at first sight. For, in truth, they contain the

same demand for a more concrete theory of willing. They involve an even bolder and more extended application of the principle of identity: they follow up in fresh directions the clue of *sameness* or *identity*. The questions of principle which I wish briefly to raise are: Has Psychology done all that it can legitimately be asked to do when it has treated of "volitions" as so many isolated happenings in the "stream of consciousness" which stands, in Psychology, for an individual mind? Or should it not *in* and *behind* "volitions" seek a "Will"? Again, does the interplay of the wills of individuals lie, on principle, outside the limits which Psychology has set to its inquiry? Or should it not give us a Theory of this interaction of minds in the sphere of their willing? Should it not examine whether it is not possible to view, not only the "volitions" of one mind as expressions of one "Will," but the "Wills" of many minds, under certain conditions, as expressions of one Will of a yet higher order? Has Psychology no concern with what is called in the Philosophical Theory of the State the "Real Will"? Has it no concern even with what politicians call the "Will of the People"? It is when one follows the clue of the term "Will" into these regions that current Psychology ceases to be one's companion. The point to be pressed is: Does Psychology lag behind merely because these problems lie beyond its present achievement? Or is it because they lie beyond its deliberate scope and intention? Does it claim these problems as its own—a field yet unworked? Or does it exclude them on principle? These are the questions of principle to which, in the final section, I want to draw attention.

(*a*) In the first section of this paper I gave some reasons for preferring to regard volition, not as an "aspect" or "character" of experiences, but as a concrete experience with a determinate structure and a unique quality as a whole. In all subsequent discussion, I had tacitly assumed that "volitions" in this sense are distinct, particular incidents in the stream of consciousness. The

search for the essential nature of volition had been interpreted to mean the search for the abstract class-character, in the language of Logic, of particular volitions, for the "intension" of the term "volition," a definition of the kind or type of structure peculiar to any experience, which deserved to be called a volition, and not to be found in any other experiences. Similarly, I had so far taken for granted that the term "stream of consciousness" is likewise an "abstract universal," fixing the standpoint from which the experiences of any and every individual "mind" may be construed. But so far the fact that particular volitions not only *occur*, but *appear to be connected*, in a given "stream of consciousness" or "individual mind" had been neglected and treated as irrelevant. And, similarly, the interrelation of individual minds and the fact that the volitions of one mind stand in different kinds of relations to the volitions of other minds had been kept out of sight. The question is: Can Psychology refuse to deal with these questions and, if so, on what principle?

(*b*) Now the assumption on which most Psychologists *de facto* argue is that of the existence of individual minds as isolated and distinct "centres of consciousness." Not that this standpoint is consistently maintained—*e.g.*, the treatment of "language" or of "intersubjective intercourse" would else be almost impossible—but it is currently the only one which is explicitly professed, either because it is the natural standpoint for introspection with its thesis that everyone is aware directly only of his own states of mind, and, at best, only inferentially of the states of other minds, or because experiences do not occur or exist *in vacuo*, as it were, but require to be referred to "centres." The psychologist is not a solipsist: he assumes the existence of distinct minds whose processes he investigates. But what is it that determines the attribution of given experiences to one "stream" rather than to another? The fact that each mind claims its own and distinguishes them from those of others. The simplest, and in the way of thought-

economy the cheapest way of theorising this fact is to group experiences round individual "centres." Of course, such a point of reference is far too abstract and empty to serve any useful purpose except in the first tentative gropings of Psychology. Psychology soon finds that it cannot really shut its eyes to the fact that the experiences of a given centre do not merely occur and succeed one another in the "stream," but have a definite nexus, a community of character, due to their belonging to this and to no other centre. Amongst the particular volitions which occur on the surface, so to speak, of the stream, we can soon trace a connexion. As we saw in the last section, with whatever breaks, intervals and modifications, particular volitions appear to point to one another, to be connected as parts of the same volition, or to be recurrent expressions, in response to recurrent situations, of some permanent and abiding purpose. Especially does this conclusion become irresistible, when we follow the clue of implications—at any rate, if we have decided that these are not, on principle, to be excluded. In short, we cannot well stop at particular volitions and the problem of their class-character—we are driven on by the pressure of concrete nexus to something like a "Standing Will" expressing itself *in* and *through* particular volitions. Of course, the analysis here follows the so-called "content," the positive "what" of purpose, and its result is not anything that can be called a "process" or "event" in quite the sense in which the terms apply to particular volitions. Instead we get some sort of abiding and permanent principle or system, or even a complex, or maybe a hierarchy, of systems, more or less harmoniously related to one another, and constituting "character" or "self." Our abstract "centres" of experience have become very concrete when they have been thus transformed into "selves" conceived as systems of interests and preferences. Most Psychologists follow the road from abstract to concrete so far—more or less. Few make clear the change of standpoint involved in passing from the

conception of mind simply as a continuous series (stream) of experiences to the conception of it as a self-centred system expressing itself in a series of experiences. Many oscillate from the one standpoint to the other, apparently without being aware of their own acrobatics.

(*c*) As regards the "self" and its relation to "volition" and "will" I need not say much, seeing that Professor Hicks has dealt very fully with this side of the problem in the paper to which I have referred already. There is, however, one point of immense importance which must be made clear. To speak of the "self" as a "system" of interests, etc., is no solution at all for the problems of *self-consciousness*. There is the fact that one of the most frequent experiences with which the psychologist has to credit his "centres" is each centre's awareness of itself as "self" and distinct from "others." This tremendous paradox of a fact is brought no nearer to our understanding by the conception of "system." From a spectator-standpoint we can describe a self as a system, and a self can so describe itself when, in reflection, it takes up the spectator-standpoint towards itself, but the immediate experience of self-consciousness is not thereby made intelligible. And this gives rise to the question whether we should not reserve the term "self" for those minds which are capable of self-consciousness in any one of all the different forms which it can take. In short, I seem to find the psychological use of the term "self" oscillate, without definite principle, and often without consciousness of the difference, between its application to a mind because it is a system and its application to it because that mind is capable of self-consciousness. It is on the basis of this second sense of "self" that all the questions about the relation of self-consciousness to "volition" and "will" arise in their most troublesome form. Must a mind (or soul) be capable of self-consciousness before we can say of it that it is capable of willing, *i.e.*, of carrying out a purpose or plan, of realising an "object" or "end"? Or, again, must

a mind be conscious of itself as a system, and determine its purposes on particular occasions by reflexion on the abiding preferences and principles which constitute its character, before we can say that it "wills"? If I have understood Professor Hicks correctly, he would answer "Yes" to both these questions. Yet, if we adopt that principle, large masses of mental processes, even in self-conscious minds, to say nothing of young children and animals, will be, on principle, excluded from "volition," *e.g.*, all impulses, desires, appetites, in which, however unreflective they may be, there is some thought of what is wanted. Would it not be well here to recognise the existence of "volitions" below the level both of "will" in the sense of some sort of system (it need not be more than habit) and of self-consciousness? It seems to me that experiences having the characteristic structure of volitions might well be allowed to occur at levels of mental life, where the impulse of the moment is not yet controlled by system, still less by reflective distinction of self and not-self.* On our decision of these questions depends, again, our attitude towards Dr. Bradley's phrases about volition being the "self-realisation of an idea" or the "realisation of an idea with which the self is identified." Critics have rightly complained of the ambiguity of these phrases, and it is indeed not easy to find out in what sense exactly Dr. Bradley intends them to be understood. In the first, apparently, the idea is supposed to realise itself—a view which is probably the result of the importation of a metaphysical theory into psychological analysis. In the second, the mind, not its idea, is the "self" referred to, but whether this

* Not to burden this paper unduly, I omit detailed discussion of the question whether the pathological phenomena of "fixed idea," etc., should be treated as "volitions," even though they lead to action against the explicit "will" of the "self." I should say they are volitions in fact and in principle, for we must admit that there may be any degree of disorganisation within the "self"; and why not use the conception of a perverted or morbid volition or will? Abnormal willing does not destroy the essential nature of willing.

identification with an idea implies self-consciousness or not, is not clear. It might mean no more than that the mind *de facto* has a certain purpose or desires a certain object. It might mean, also, that the mind reflectively has adopted that purpose or entertains the desire as congruent with itself. I mention these theories only to illustrate how necessary it is to be clear, on principle, about the sense in which "self" is to be treated as belonging to, or being excluded from, the essence of the experience of willing. And if this is clearly seen, we need not follow up the various complications of willing which result from complex modes of self-consciousness, *e.g.*, the contrast between "actual" and "ideal" self.

(*d*) Lastly, should the Psychologist, on principle, stop short at the distinction of individual minds or selves, and take it as his ultimate basis? Or should he follow up the interrelations of minds and mental processes, and examine the principles on which such an inquiry should be conducted and justified? And if he decides to include these interrelations within the scope of his inquiry, he may set himself two tasks, viz. (i) to trace the typical modifications of the processes of any individual mind by the action upon it of other minds; and (ii) to trace the processes of the "social mind." A good deal of psychological work on the lines of the former task has already been done. But, as regards the second task, most psychologists would, I take it, definitely exclude it from the scope of Psychology. It certainly raises the important questions of principle, whether the phenomena of social life and social action can be adequately theorised with the help of the conceptions merely of "individual mind" and "interrelation" or "interaction" in an "organisation of minds," or whether we shall not be driven to the conception of a "social mind," or, though the phrase is paradoxical, a "mind of society." In short, does Psychology stop at *individual minds in society* as its upper limit, or should it go on to the *mind of society existing in and expressing itself through the minds of its individual members?* The question is

the more worth pressing because, as a matter of fact, if psychologists do not stop at individual minds in social intercourse, they pass on to individual minds when collected in crowds, and speak of the "*mind of a crowd.*" But can Psychology stop there? Why, if a crowd can be said to have a "mind" in more than a merely metaphorical sense, should we not pass on from "crowd" to "society"? From the chance-interest of the moment which draws together the one, to the supra-individual community of purposes that holds together the members of the other? In answer to these questions, much will depend on how we have decided some earlier questions of principle. If, *e.g.*, we have decided to include "realisation" in the essential structure of volition, we can hardly exclude those modes of realisation where our purposes become effective not merely through our bodies in the physical environment, but *in* and *through* other minds. If, *e.g.*, my servant wills to do *my* will, makes *my* will *his* own, where and what is the limit of that volition, concretely taken? Can we confine even the single volition always within the limits of the "individual" mind as distinct from "other" minds? And without touching on the many legal and moral problems here arising, do we not get the same problem on the largest and most complex scale when the individual's will is the organ of the State's will? The alternatives are: either to say "hands off" to Psychology in the face of this problem, or to tackle it, and in doing so to raise the question of principle whether an adequate theory requires merely the interrelation of individual minds or a single mind of a higher order of which "individual" minds are, as it were, the organs. In short, what are the least abstract principles which Social Psychology requires?

## VIII.—DOES CONSCIOUSNESS EVOLVE?*

*By* L. P. Jacks.

(Abstract.)

If the story you are going to tell is that of the evolution *of consciousness*, then it is plain that the ends which are being evolved must be *in* consciousness from the first. On the other hand, if the story is to be one of the *evolution* of consciousness, it is equally plain that the mind cannot be conscious of them all to begin with; for in that case there would be nothing to evolve. Thus a mode of statement has to be contrived which shall represent these ends (or stages) as at first present in consciousness though not consciously present. But here a great difficulty presents itself. If you lay emphasis on the fact that the ends are not consciously present, you are open to the retort that it is not the evolution *of consciousness* you are talking about. If, to escape this, you emphasise their presence *in* consciousness, it would seem that the mind is conscious of them already, and no story of how it *becomes* conscious of them remains to be told. Thus there arises a perpetual see-saw of emphasis between the words evolution and consciousness. So far as evolution is needed there can be no consciousness; so far as there is consciousness there need be no evolution.

To meet this difficulty a step is taken which I cannot but regard as a wholly illegitimate compromise. "To begin with," the mind is represented as neither totally unconscious nor completely conscious of the ends to be evolved. A doctrine of betwixt and between is set up, according to which the mind, along with a clear consciousness of the stage already reached, has a dim consciousness of the stages to come. The sharp distinction "present in *but not* present to" is thus qualified by

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an understanding that "present in" means *dimly* "present to." "It cannot be," says Caird (italics mine), "but that in *some form or other* the elements which belong to fully developed rational consciousness should present themselves *to* the mind of the savage." And further on, "he could not go out of himself unless there were present *in* his consciousness the idea of an absolute unity which embraces all difference." The words "in some form or other" thus become a means of reconciling these apparently inconsistent views. Indeed the vocabulary which Caird employs to describe the twilight region in which the two views are mingled is peculiarly rich. The main adjectives are "dim," "inchoate," "obscure," "latent," "confused," "incoherent," "implicit," "shadowy," "vague," "distorted," "incomplete," "imperfect," "anticipative," "haunted," "masked." With one or other of these words the mouth of the objector is instantly closed when he raises the difficulties aforesaid; and over the whole group broods that other word against the seductions of which every student of evolution should be religiously on his guard—the word "gradual."

Now here the psychologist's fallacy is easily detected. It consists of course in treating a consciousness of what is dim as though it were a dim consciousness of what is clear; a consciousness of what is confused as though it were a confused consciousness of what is orderly; a consciousness of an evolving world as though it were the evolving consciousness of a world; a consciousness of low gods (or goods) as though it were a low consciousness of high gods. In short, "consciousness of degrees" is converted into "degrees of consciousness," and the idea of development becomes the development of the idea.

# IX.—KANT'S TRANSCENDENTAL ÆSTHETIC, WITH SOME OF ITS ULTERIOR BEARINGS.

*By* William W. Carlile.

In the view of Kuno Fischer, the Æsthetic is the truly fundamental feature of the Critique of Pure Reason. In it the conception of necessary truth, as illustrated by examples adduced from arithmetic and geometry, is, as we know, made the basis of the contention that we possess *a priori* knowledge in regard to the forms of experience, a conception which receives a further extension in the deduction of the categories. In endeavouring, therefore, to form an estimate of Kant's system of thought as a whole, the first thing to inquire into is his doctrine of necessary truth, together with its mathematical illustrations. In the present paper, however, it must be said that it will be not only his system considered in itself that we shall be concerned with, but also certain incidental results of his mathematico-metaphysical speculations which have recently come to occupy a considerable share of public attention.

An assertion which, more than any other, Kant reiterates and emphasises is this: that experience can only tell us what is, never what necessarily must be, and that, therefore, when we find ourselves in possession of the conviction that some proposition is universally and necessarily true, we may be sure that this conviction cannot have been gathered from experience, but that, on the contrary, the judgment which it expresses must be one of an *a priori* character, one, that is, in some sense born with us. Like so much else in the Kantian system, the view is Leibnitzian in origin. Let us for a moment inquire into its validity.

Necessary truths of the analytic type, at any rate, rest on

the Law of Contradiction. That is Kant's view as well as everyone else's. If, however, a truth rests on the law of contradiction, that means that its denial would contradict some assertion that has already, in the same sentence, been made by us either overtly or implicitly. Let us keep this clearly and steadily in mind. If we do so we shall see in a moment that the necessary character of analytic truths, at any rate, can have no sort of connection with ante-natal inspiration. That a man who is stone-blind cannot distinguish blue from yellow would be a truth of such a character. It rests on the fact that, in describing the man as stone-blind in the beginning of our sentence, we have already made the assertion that he cannot distinguish colours. The epithet "stone-blind" has, in the development of language, come to be assigned to men who, among other things, suffer from that incapacity. That being so, we cannot, of course, in the final part of our sentence, go back on the assertion virtually made in the earlier part. The cogency of such a conclusion is thus manifestly connected with the process of naming, and with the convention that underlies intelligible speech. It affords, consequently, no basis whatever for the view that the origin of truths of the sort is, in any sense, independent of experience.

I think it will be found, however, also that, in regard to the sort of necessary truths that have been called synthetic, we shall always be able to find an assertion which the denial of the truth would contradict if we look for it aright, and that these truths, equally with the others, have an intimate connection with the process of naming.

We can think away, it has been said, all that space contains, but we cannot think away space itself. Its existence must, therefore, be for us a necessary truth, and one of *a priori* origin. But what does the assertion that we cannot think away space itself really mean? It means simply this: that when we move the arm, say, in any possible circumstances, or in any possible situation, either we encounter resistance or we do not. When

we encounter resistance we say to ourselves that we are in the presence of filled space; when we encounter none we say to ourselves that we are in the presence of empty space. The name "space," taken generally, is applicable to what happens in either case, and that is the simple reason why space cannot be thought away.

Take, again, the proposition that space has three dimensions. Why, we ask, is it impossible to conceive of any space that has more than three; why is $x^4$, as applicable to space, necessarily devoid of meaning for us? For this reason simply: that the phrase "three dimensions" covers all that is above us, all that is below us, all that is behind us, all that is in front of us, all that is on either side of us. It embraces, in short, *all the possible directions* that lines radiating from our own bodies can be conceived to take. To say that space can have more than three dimensions would, therefore, be to say that there are lines which can take other directions besides all that are possible, and such a statement would palpably and manifestly contradict itself. The proposition thus postulates the assignment of names to the facts of experience and the consistent use of these names, and that is all.

What the *a priorists* have omitted to take account of is all that happens during the first year of life. This omission becomes yet more evident when we turn to Kant's illustration of synthetic truths *a priori* taken from the fundamental propositions of arithmetic and geometry. Take first the case of number. The proposition that seven and five are twelve, Kant says, is a synthetic truth of *a priori* origin. Let us take the same proposition in a simpler form: say that two and two are four, and let us ask, what does it ultimately mean? In teaching it to children you illustrate it on the abacus. You group two sets containing two balls each together, leaving a space between. This corresponds to the expression "two and two." You show them next the same balls grouped all close together on the wire. To this latter group the name "four" is

assigned. You point out to them that the balls are the same in each case; it is the grouping only that is different. In one grouping the balls are known as "two and two"; in another grouping the same balls present themselves as "four." That is the ultimate meaning of the proposition that "two and two are four." The general rule for naming in numeration is this: that the addition of a unit to a group always makes it necessary to give a fresh name to the whole new group thus constituted, and to this rule there can be no exception.

The part that naming plays in the genesis of the propositions that "two and two are four" or that "seven and five are twelve" is here very evident. Arithmetic would be manifestly impossible before the unit and the various groups of units had had names given to them and had become, as groups, recognisable by those names. That this has happened is one of the postulates of arithmetic. Another is to be found in what has recently been called the axiom of mobility. The necessity of postulating this axiom has been recognised in regard to the fundamental truths of geometry. Euclid's proof of the fourth proposition rests on it. I am not aware that it has been also recognised as necessary in regard to the truths of arithmetic. It seems to me that it is equally applicable to them. We must have the conception of material units of such a character that we can alter *ad libitum* their position in space without making them, let us say, melt away to nothing in the process, before we can constitute, break up and reconstitute the various groups to which we can give the names "two," "three," "four," and so on.

Kant speaks of number as derived from Time. A series of sounds or pin pricks might, perhaps, give us the idea in some elementary form. It is not easy to see how they would render possible the grouping and re-grouping of units at will on which arithmetic depends. The conclusion appears thus to be brought home to us that, even as regards number, the universe to which mathematical truths apply is not a universe

of pale abstractions, but is a world abounding in solid objects capable of being handled and passed from hand to hand.* The solid material object is for us the type of unity. Once we are in possession of this type we can extend the conception, more or less metaphorically, to much besides, say, to such things as a journey, or to such things as a constitution. How we have originally obtained the conception of an objective unit known to be the same thing for all of us is a question which must be dealt with on some other occasion.†

In the meantime let us turn to Kant's example of a synthetic proposition *a priori* taken from the elementary notions of geometry. This we shall have to deal with at greater length. His best known example is the proposition that a straight line is the shortest distance between two points.‡ He contends that the conception of quantity is not involved in the conception of straightness;§ and to whatever conclusion

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* M. Bergson acutely remarks: "Intelligence has for its object the unorganised solid" (*Creative Evolution*, Eng. Trans., p. 162). By "intelligence" he means here as always mathematical thought. A well known passage in Galton's *South Africa* reminds us that there is a stage in human development when literal superposition or some thing equivalent is indispensable in calculation. Referring to the Damara he says: "When bartering is going on each sheep must be paid for separately. Then suppose two sticks of tobacco to be the rate of exchange for one sheep, it would sorely puzzle a Damara to take two sheep and give him four sticks." What had to be done in the case of the kind mentioned was as follows: "Two sticks were put into the man's hand and one sheep driven away, and then the other two sticks given him and the second sheep driven away." In the case of the purchase of a heifer for 10 sticks of tobacco the Damara's "large hands being both spread out upon the ground, a stick was placed on each finger" (pp. 133, 134).

† It is dealt with by the present writer in a paper in the October number of *Mind*.

‡ The "shortest distance," as Lotze remarks, is plainly a solecism. We may, however, speak of the shortest route.

§ *Prolegomena*, Eng. Trans. (Mahaffy), p. 18. "My concept of straight contains nothing of quantity only a quality. The attribute of shortness is, therefore, altogether additional and not to be obtained by any analysis of the concept."

we may come as to the substantial validity of this contention we must admit that, read in the light of the discussions to which it has given rise, it has proved itself a memorable and important one. I may say here, indeed, that I am quite in accord with those who, like Mr. Moore, think that Kant has rendered no small service to philosophy by initiating his famous inquiry into the possibility of synthetic truths *a priori*. There is no question that, on the one hand, the truths of mathematics are regarded by us as universal and necessary, and, on the other, that they hold good in regard to very much in the world outside us; and the reconciliation of these two truths presents a problem that is a very real one, and one that we cannot even attempt to solve without going to the very heart of the theory of cognition and indeed of the theory of existence.

In regard to the axiom of the straight line let us suppose for a moment the case of several lines joining the same two points, and suppose that they all so closely approximate to straightness and are, at the same time, of such considerable lengths that it is impossible to tell by mere inspection which, if any of them, is straight, or, if none is, which is the most nearly straight; and then let us ask ourselves what method, if any, is there by which we could decide that question. We know at once that what we should do in the circumstances would be to measure the lines and thus find out which was the shortest. Once we knew which was the shortest we should conclude without a moment's hesitation that it was also the straightest. But if that is so, how is it possible to contend that the concept straight contains no thought of shortness. If it really contained none in any sense, then our reasoning, instead of being unavoidable, would be irrelevant and meaningless.

Again, however, it must, on the other hand, be confessed that Kant's contention manifests great superficial plausibility, at any rate, if not something more than that. A ruler, a pillar,

or a sun-ray presents itself to vision, and we ask ourselves, Is there in this simple presentation any thought of quantity? We are certainly forced to answer that there appears, at any rate, to be none. Where or how then does this thought of quantity come in?

To answer that question we have to recognise the fact that here we are in the presence, not of a simple sensation like that of blueness or of whiteness, but of the result of a process of rapid semi-conscious organic reasoning which co-ordinates two things that are by no means identical or indistinguishable to begin with. The two things, we may describe provisionally at any rate, as motor straightness on the one hand, and as the straightness that is embodied in visible and tangible material on the other.

Berkeley's theory of vision has made us familiar with the thought of the fusion of visual with motor sensations. The time and effort that will be occupied in reaching the various points in the scene presented to us by vision are, as we know, the realities of which the various sensations of form and colour are the indicators. So, it seems to me, visual straightness is the appearance to which motor straightness is the corresponding reality.

Motor straightness is, perhaps, a less obvious aspect of the conception than visual straightness. Its very familiarity veils it. It is, however, the postulate of all our activity. Practically whenever we do anything or go anywhere our motions approximate as closely to the straight line as circumstances will permit. The more urgent too the requirements that impel us to action and the more practised our muscles, the closer will the approximation be. The straight line in this sense thus is seen to be not a sensation but a thought and an ideal. It is the line that represents the principle of least action, the aim at the utmost economy of energy.

It is also, apparently, a widely prevalent ideal in the animal world. The aim at perfect directness is plainly postulated in

the action of the chicken that, fresh from the shell, picks up a crumb with accuracy, or of the sea bird that, poised in mid air, fixes its eye on its quarry and makes a dash for it into the depths of the ocean. Every dog, indeed, as we know well, will take the route that represents one side of a triangle in preference to the route that represents the other two. The thought of straightness in this sense appears thus indeed to be very little else than the thought of the shortest route between two points. If Kant had had this aspect of the conception before his mind he could hardly have made the assertion with such confidence as he does that the notion of shortness was not to be obtained by any analysis of the concept.

Motor straightness then manifestly contains the thought of quantity, but it must be said that it is as yet hardly spatial quantity that is in question. It is rather temporal quantity, or temporal quantity just caught in the act of becoming spatial. The earliest experiences of the untaught human being or of the animal amount probably merely to the dim recognition of the fact that the more direct his route, the more effective will his expenditure of effort be. He would learn, if not indeed to formulate the conclusion, at any rate to act on it, that the straighter his line of movement, the less time, other things being equal, would it take him to reach his goal.

The first thing learnt, it is thus worth while to note, would not be the mature truth that a straight line is the shortest distance between two points, but rather the cognate truth, sometimes looked upon as its corollary, that approximations to the straightest line, as apparent to vision, would be parallel approximations to the route that was traversible in the shortest time and with the least effort. This is plainly an empirically learnt truth. Innumerable experiences indeed both in the prehuman and human stages of thought would all point to this same more or less vague conclusion. Definite mathematical precision can hardly be said to belong to the conception at this stage. Such precision comes only with the subsequent fusion

of motor straightness with the straightness that is embodied in visible and tangible material.

This fusion of the two forms of straightness would no doubt be more difficult than it is if it were not the case that they have from the beginning one thought in common, the thought of uniformity of direction. There is no sensation of a swerve, or of a bend, or of any other form of change of direction in the movement of the gold digger's hand and arm as he picks up the £100 nugget which has just caught his eye, neither is there any in the motion of the finger that is passed along a well-made ruler or in the glance that takes in an upright pillar. That glance, as we know, is itself motion of a sort, the motion of the muscles of the eye, and it can thus like other motion embody the feeling of uniformity of direction.

We have thus in the concept of straightness first the immediate idea of motion simply; secondly, the idea of the tracks of that motion in plastic material, where it is, as it were, frozen for our leisurely inspection. All geometry consists at bottom in the co-ordination of the two. In other words it consists in reasonings from form to quantity and from quantity to form. That principle underwent a great development in the seventeenth century in the discoveries of Descartes and Clairaut, but it is there already in the germ in the simple axiom of the straight line, in the proposition that wherever two points are joined by lines the highest degree of straightness of visual form will always be found to characterise that line which manifests the relative minimum of length.

The fact that we find here the co-ordination of two distinct elements and not merely one simple sensation renders explicable much that would not be so otherwise. If straightness, like blueness, were the name of a simple sensation and of that only, it would be for ever impossible for us to explain the fact that it can be made not only the basis of an identical proposition, as blueness can, which, however true and certain it may be, leads us no further; but that, in addition to this, it can also

become the nucleus from which are evolved by reflective thought the lengthy chains of reasoning of which geometry consists.

It may illustrate this truth to point out that the 21st proposition of the first book is really nothing else but the axiom of the straight line, and that too in the form which we have found to be its most rudimentary one.

The proposition, it will be remembered, runs as follows: "If from the ends of the side of a triangle there be drawn two straight lines to a point within it these shall be less than the other two sides of the triangle but shall contain a greater angle." Plainly if you go on drawing lines inside of each fresh triangle that you construct on the same base, in the manner described, you will soon reach something indistinguishable from the base itself.

The proposition thus is equivalent to the statement not indeed of the mature truth, as we have described it, that the straight line is the shortest distance between two points, but to the earlier learnt and more elementary one, that the less circuitous the route that we follow between two points the more nearly straight will our route, when completed and made visible, be seen to be.

I have had occasion to refer to what has been called the axiom of mobility in connection with the early development of arithmetic. The part that the axiom plays in connection with geometry is, of course, far more conspicuous as well as more generally recognised. The proof of Euclid's fourth proposition manifestly rests on it. If the triangles with which he is dealing in that proposition were not of such a nature that they could be moved at will from one point of space to another without change of form there could then plainly be no such thing as the proof, by superposition, of their equality, and of the equality of their sides and angles.

The axiom, or postulate rather, we thus find, has been used in mathematical reasoning for more than 2,000 years past, but

used, during all that time, without any explicit recognition of its existence. The explicit recognition of it is a thing of yesterday. The historical developments which led up to it will engage our attention presently. We may, however, well note in passing what a remarkable fact it is that the indispensable postulate of a system of scientific reasoning could in such a fashion lie dormant, while, at the same time, it was used continually. The fact of its use, together with its dormancy, can hardly fail to suggest the question, may there not be other postulates which the further development of the theory of the subject may yet bring to the light of day?

The explicit recognition of the axiom of mobility connects itself—no doubt in a somewhat roundabout fashion—with the mathematico-metaphysical speculations of Kant. From the Kantian doctrine of Space, ultimately, originated the theories of metageometry, and in the discussions connected with these theories originated the recognition of the axiom of mobility. How all this came about will appear if we glance at these strange but now celebrated doctrines.

*The Doctrines of Metageometry.*

It will be familiar to many of my readers that the surprising question has been raised in recent years whether, after all, many of those axioms and propositions of Euclid which all the world has hitherto regarded as impregnably established must not be thrown overboard. Instead of there being only one Space, there are, it is now said, at any rate three or four Spaces of equal validity. In some of them all parallels if produced far enough will meet; in others any number of straight lines can be drawn parallel to one given straight line. The axiom of parallels, indeed, we are told, is the weak point of Euclid's system, and its refutation provides a lever that can be used to overthrow the whole structure. So eminent a man of science as the late M. Henri Poincaré delivers himself in the following fashion on the subject: "What vast effort has been

wasted in the chimeric hope (of establishing the axiom of parallels) is truly unimaginable. Finally, in the first quarter of the Nineteenth Century, and almost at the same time, a Hungarian and a Russian, Bolyai and Lobachevski, established irrefutably that this demonstration* is impossible."

The famous Helmholtz, too, as we know, has supported the new doctrines with much elaborate reasoning. Those of us, however, who continue to think, in spite of such high authorities, that the whole of this teaching rests on nothing better than confusion of thought and misuse of words can take shelter behind the yet greater name of Lotze.

Lotze looks upon the new doctrines as an outcome of the Kantian view that Space is "only the subjective form of apprehension which is evolved from the nature of our souls." If what the metageometricians now call "Euclidean" space is nothing but a form of our sensibility, why should there not, it began to be asked, be other possible forms of sensibility also, forms that can result in the genesis of other spaces. Hence we have Riemann's Space, Lobachevski's Space, Beltrami's Space, and so on. It is of interest thus to note that the new theories, though in more favour in the world of science than in that of philosophy, rest ultimately on a pre-conception that is essentially metaphysical.

In Riemann's Space the axiom of the straight line as well as the axiom of parallels no longer holds good. The straight line there, if produced far enough, will make the whole circle of the sphere and will ultimately join with itself again. In it, too, any number of straight lines can be drawn between the same two points, that is to say, between any point on the surface of the sphere and its antipodes. But who ever imagined that a line which followed the surface of a sphere from a given point to its antipodes could be, by anyone,

* The demonstration that through the same point there cannot be two parallels to the same straight line.

seriously described as a straight line? To whom is it not at once evident that it is a semicircle and nothing else? Who, again, before Riemann's day, in speaking of space, ever meant anything but empty space, space in which, by hypothesis, there is no let or hindrance to the direction that any line may take? The space, on the contrary, that is here in question is filled space; space in which lines are forced to follow the contour of spherical surfaces, and of saddle-shaped ones described in the new phraseology as "pseudo-spherical."

"The idea of a spherical surface," as Lotze justly remarks, "being that of a figure in space, presupposes the common perception of space." The metageometricians, he thinks, are here found "commending to notice absolute nonsense by the help of pretentious calculation."

A glance at some of the reasoning by which the new theories are supported by Professor Helmholtz in his well-known article in the first volume of *Mind** will not be calculated to make the investigator who comes to inquire into the subject for the first time at all inclined to think that Lotze has expressed himself here too strongly.

We are presented with the conception of "Reasoning beings of only two dimensions who live and move on the surface of some solid body."† They have organs like our own.‡ They can move about with perfect freedom in their "surface," and can apparently pass each other without difficulty; they can at any rate communicate with each other as they please. What can be more obvious than that such a surface is matter of three dimensions, not of two, though the third dimension is represented by what to our senses would appear as a thin layer. There is, after all, all the difference in the world between a thin third dimension and no third dimension at all. In the following

* Subsequently published in his *Popular Lectures on Scientific Subjects*, Series II.

† *Mind*, Vol. I, p. 303.

‡ *Mind*, Vol. III, p. 217.

sentence it will be seen that Professor Helmholtz forsakes the field of natural science, where his authority is of course considerable, and betakes himself to that of the psychology of cognition, where it is less so. He endeavours to explain to us what is imaginable and what is not. Of ourselves as human beings he says: "Inhabiting a space of three dimensions and endowed with organs of sense for their perception, we can represent to ourselves the various cases in which beings on a surface might have to develop their perception of space; for we have only to limit our own perception to a narrower field. It is easy to think away perceptions that we have." In a sense no doubt it is. We have points which are the termini of lines, lines which are the boundaries of surfaces, and surfaces which are the boundaries of solids; and we can without difficulty concentrate our attention on the point, the line, or the surface and dismiss for the moment the rest of the object from our consideration.

But Professor Helmholtz, when he speaks of surfaces—which are of course the surfaces of nothing at all—as the possible habitat of quasi-human beings, postulates much more than this. When we have concentrated our attention on the surface and thought away the solid body behind it, what have we got left? An abstraction beyond question, not a reality, an aspect of a thing, not a thing itself. Professor Helmholtz, however, erects this abstraction into a *thing* capable of independent existence. M. Poincaré similarly asks us "to imagine to ourselves a world only peopled with beings of *no thickness*." For anything analogous to such conceptions as these we have to fall back on one suggested by a very eminent metaphysician unhappily now no longer with us, the conception of the grin that remained behind after the cat had vanished. "Well," said Alice, "I have often seen a cat without a grin but never before a grin without a cat." Dr. Ward, as we know, makes it a charge against the men of science turned metaphysicians, that they are continually taking their abstractions for realities. Here certainly we have an instance in point.

I am far, however, from desiring to assert that the whole of the discussions set on foot by the metageometricians have been fruitless and valueless. On the contrary, they have, I think, incidentally led up to some conclusions of great importance. As I have already observed, they have forced on the world the explicit recognition of the axiom of free mobility.*

*The True Postulates of Euclid.*

The first hint of the necessity for the recognition of the axiom of free mobility came apparently from Riemann.† Kant's *a priori* spatial intuition, Riemann appears to think, may apply to many varieties of "space," even to things so disparate from common space as the colour and tone series. But to reach the properties of Euclidean space we must take account of much besides. Helmholtz takes up the cue at this point, and what he has to say on the subject is important and valuable. "It appeared," he remarks, "that space considered as a region of measureable quantities does not at all correspond with the most general notion of an aggregate of three dimensions [whatever that may be] but involves also special conditions, depending on the perfect mobility of solid bodies without change of form to all parts of it, and with all possible changes of direction."‡ "Meanwhile," he continues, three pages further on, "we must not forget that all geometrical measurements rest ultimately upon the principle of congruence.§ We measure the distance between points by applying to them the compass, rule, or chain. We measure angles by bringing the divided circle, or theodolite, to the vertex of the angle."‖

* Helmholtz refers to the moving of figures without change of form as "a fact so familiar to us that, but for this inquiry, it might never have been thought of as something that need not be." *Mind*, Vol. I, p. 313.

† *Mind*, Vol. I, p. 309.

‡ *Mind*, Vol. I, p. 311.

§ The principle of congruence is an *alias* for the axiom of free mobility.

‖ *Mind*, Vol. I, p. 314.

This, of course, is absolutely true, but surely it will strike the reflective reader that it assumes data that go far beyond anything that can be brought under the heading of the axiom of congruence.

There is a surprising amount of make believe, it must be said, in the manner in which that axiom is ordinarily supposed to be brought into use. You are supposed to "apply magnitudes" to each other, solid spheres, for instance, and to find them congruent. Everybody knows that you cannot do it. The theorists would probably reply: "It will do just as well to imagine the spheres as occupying the same space with each other." But will it? What we want is some process applicable to the actual things of the real world, not merely to our imaginations about them. We have already dropped far behind us the theoretical world of Kant's *a priori* forms. We may now just as well be hanged for a sheep as a lamb. We may as well follow out to the full the consequences of recognising the axiom of mobility, or congruence, as we choose to call it, as follow them only half way.

Again, there is surely a good deal of make believe in the famous suggestion of Euclid in the fourth proposition that we should take up one triangle and put it down on the top of another. If the triangles are figures drawn with a stick in the sand, or with chalk on a blackboard, it is quite certain that the thing cannot be done. What, indeed, is more certain than that we must, with Helmholtz—who, however, does not appear to be in the least aware of the ultimate bearings of his own suggestion—substitute for the conception of direct congruence the conception of congruence mediated by the chain, the rule, the divided circle, and so on. "That is a detail that does not matter to the theory of the subject," it will be said. I do not agree. The change makes many things appear in an altogether altered light, among them, some of the difficulties in connection with the question of parallels.

The compass, rule, or chain, Helmholtz, we see, assumes as

the necessary means of this mediated superposition. The mention of the last is very significant. We owe to Gauss, apparently, the introduction into geometry of the notion of things that "change their flexure without changing their dimensions." It is a notion that we cannot avoid bringing into play in connection with mediated superposition—in other words with measurement—by means of the chain. That we must make use of it makes us realise how far we have already travelled away from the region of *a priorist* fantasy, and how deeply we have penetrated into the world of realities.

If you wish to be satisfied that even the purest of pure theory in geometry cannot get on without the conception of measurement by the chain or something equivalent to it, consider for a moment the import of the proposition that the straight line is the shortest distance between two points. How can you satisfy yourself that it is so in any given instance? If the other routes take, in each case, the form of two sides of a triangle you think you can then prove the proposition as Euclid does. Perhaps so. But suppose that the other lines are irregular curves, that the distance between the two points is so great and that the curves are so near the straight that, as in our former example, it is entirely impossible to tell by mere inspection which is the shortest and, consequently, the straightest line, how will you solve the problem then? Divide the curve, perhaps you say, into minute arcs, and add the lengths of their chords together.* Who does not see that that process belongs to the realm of pure theory and of pure fancy? There is plainly no other way possible of achieving your object, but that of first taking your substance "that can change its flexure without changing its dimensions,"

* Mr. Russell, for example, takes it for granted that "the notion of length was derived from the straight line and extended to other curves by dividing them into infinitesimal straight lines" (*Foundations of Geometry*, p. 17). If the notion of length had been thus derived, then no one but a few mathematicians could possess it.

the chain, namely, and superposing it upon the various lines that claim to be the straightest; next by making the chain tense again and marking in some plastic material the various lengths of the lines as thus discovered. The axiom of the straight line can have no meaning without the assumption as a possibility, at any rate, of some such process as this.

Nor does this by any means exhaust the materialistic postulates on which geometry must rely. We have indeed plainly assumed another yet in the suggestion that measurements by the chain must be marked down in plastic material. Euclid's own postulates, however, have forestalled us here. That assumption lies but half hidden in the familiar instructions "Draw a straight line" and "Describe a circle." Could we do either if, as M. Poincaré suggests in a similar connection, we lived in a world where there were only fluids? We have surely to take account of this further dormant postulate, that in our world, in the world of our geometry, the motion of solid bodies can leave permanent tracks behind it. Beyond the province of geometry, indeed, all arts and manufactures assume that possibility. Their products may all be described as being the tracks of voluntary motion in plastic material.

Viewing the figures of geometry in this light we can see at once that the fifth proposition, the famous *pons asinorum*, can be proved quite as easily without any construction as with it. We have only to take up the original isosceles triangle, turn it around and put it down again on the top of itself or rather of its track. The proof follows as a case of the fourth proposition. We must of course assume that it is a triangle made of some solid and rigid material, but without that assumption, or the equivalent assumption of our possession of a measure which has these qualities we certainly cannot move a step forward in geometry. M. Poincaré remarks with point and truth, "If there were no solid bodies in Nature there would be no geometry."*

* *Science and Hypothesis*, Eng. Trans., p. 61.

As to Mr. Russell's attitude in regard to this point, it must be said that in some passages of his works he appears to be thoroughly and vividly alive to the force of the reasoning that leads to the conclusions just set forth, though of course he does not accept them in the end.

We find him saying, for instance: "To speak of motion implies that our triangles are not spatial but material" because "Motion in the ordinary sense is only possible to matter, not to space."*

He seems to think, however, unless I misconceive him, that superposition itself can be done without in geometry, and speaks of Euclid's use of it in the fourth proposition as a mere juggle which every schoolboy sees to be a juggle.† He does not appear, however, to have looked at the matter always in this light. We find him, on the contrary, remarking in his article in *Mind*, on the "Logic of Geometry," published in January, 1895: "Since spatial magnitudes are given, to begin with, in different places, comparison of them will only be possible if they are unaltered by the motion necessary for superposition."‡

The main ground on which he concludes that the materiality and rigidity of geometrical figures must be discarded is this, that there are, as a matter of fact, no perfectly rigid objects in the world; and this is a line of reasoning that it will be best to endeavour to deal with before we go further. It is of a piece, of course, with the more general contention on which Hume lays such stress, that, as there are no perfect straight lines or circles in nature or in art, the truths of mathematics are purely ideal. Kant, as we know, was so much impressed by this reasoning that he felt it necessary to come to the rescue

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* *Principles of Mathematics*, p. 405.

† *Op. cit.*, p. 406. Kant remarks (*Prolegomena*, Eng. Trans., p. 27): "All proofs of the complete equality of two given figures come ultimately to superposition."

‡ Page 22.

of mathematical truth from scepticism, and in the end came to believe that he had achieved that object by the contention that it rested on an *a priori* basis.

Is the argument, however, really as formidable as it may, to some of us, at first sight appear? Take the case of rigidity, with which we are primarily concerned. Granted that, tested by the microscope, or by hypothetical senses that may be finer than ours, every apparently rigid object might be discovered not to have remained perfectly rigid while being moved through space, we still have the fact that innumerable things remain perfectly rigid, as judged by the unaided senses of our selves and of all mankind. We have thus no difficulty in picturing to ourselves the perfectly rigid object. The very imperfection of our senses indeed furnishes us with that idea. So much as regards the image. What, however, about the concept? What hinders us, I would ask, from thinking away the microscopic changes that take place. If we think them away we then have in our minds the ideal of perfect theoretical rigidity.

Looking at the question in its wider aspect, as regards the necessary imperfection of all the straight lines and circles of nature and of art, we have seen that what geometry is always busied with is the co-ordination of form and quantity, in other words, with inferences from form to quantity and from quantity to form. Now if we conceive of both form and quantity as things to be tested only by such processes as the unaided senses of mankind render possible, it is beyond question that we are in possession of a great mass of impregnable truth in the fact that these inferences, thus guarded, are absolutely valid. Say that it has to be admitted that there are not in the world of real things either right angles perfect as regards form or squares perfect as regards equality of quantity, yet that fact does not infect with uncertainty the simple truth, or its converse, that in the case of what is judged by the ordinary senses of mankind to be a right-angled triangle

the square on the hypoteneuse will be found equal to the squares on the other two sides, this equality being also by hypothesis thought of as subjected to the same test of unaided human sense and to that only. This is of course sufficient for all the practical purposes of life. Every gardener finds it sufficient, when to test a right angle he measures 4 feet one way and 3 another and then ascertains by measurement whether the line that joins the points thus determined is 5 feet in length. We can, however, as we have seen, go further than this if we wish to reach more perfect theoretical truth, and say that the more closely form in the right-angled triangle approaches perfection, the more exact will be the relation of equality of quantity between the squares on the hypoteneuse and the squares on the sides.

It is worth while in this connection to ask what are the qualities of outward things generally in regard to which perfection and imperfection can be predicated. We can speak of the perfectly pure, the perfectly even, the perfectly straight, the perfectly smooth, and so on, but not of the perfectly impure, uneven, crooked, or rough. Such expressions would have no meaning. Perfection appears thus, as regards material things, at any rate, to be predicable of homogeneous qualities only. In other words, of qualities that rest on uniformity of sensation. If water is pure one portion of it is precisely like another. Introduce a foreign element, it becomes impure. So one part of a materialised straight line causes to touch or vision the same sensation as another part. Introduce a change in the sensation that the sweep of the eye or finger along the line experiences, it is no longer straight. It is surely very easy for us to suppose that these changes of sensation that we know as foreign elements in the water or twists in the line, do not occur, especially in cases where our unaided senses furnish us with nothing that corresponds to them, and whenever we simply suppose them entirely absent we have the concepts of purity, straightness, and so on in their perfect form. This

perhaps explains how the concepts of these qualities may be gathered from experience, and how, nevertheless, experience may be transcended in their final development.

To return to our last-named postulate, that of the possibility of registering in plastic material measurements once taken by means of mediated superposition, we are familiar with Kant's conception of number as the schema of quantity. It is plain, however, that the connection between number and quantity is not in itself necessary, or, as it were, innate, but, on the contrary, is absolutely dependent on this fact of the markability of the material dealt with. Without it, spatial units could be greater or less than each other in size, no doubt, but could not be divisible into given numbers of smaller units. The reasonings of arithmetic, I conceive, are primarily based on the adding of integer to integer, and it is by what we may regard as an after-thought that they come subsequently to be extended to the measured and marked subdivisions of matter and space. The more or less artificial character of this last application of the principle of numeration must not be lost sight of in connection with the world-famous puzzles that arise in connection with the indefinite divisibility of spatial distance.

Kant's hunt for antinomies as regards the infinitely extended in space ends in manifest failure. The only puzzle there is to discover where it is that he imagines any puzzle has arisen. The case is different when it is the infinitesimal that he has to deal with. There he has the problems of the Eleatics ready made for his use. Into the famous puzzle of Achilles and the Tortoise there enters, I think, something in the nature of an illusion of vision, or, to be more precise, of ideal vision. Say, for simplicity's sake, that Achilles is moving just twice as rapidly as the tortoise, we then go on halving at each imaginary pause the distance between the two competitors. No difficulty emerges till the *minimum visibile* is reached. Let us consider what it is that really occurs then. The *minimum visibile*, we must remember, is also the *minimum imaginabile*. The result

of that fact is this, that, in the course of our constructive reasoning, instead of really dividing the minimum into two, as we intend to do, what we really do is to insert it over again as an undivided whole, and this not once only but perhaps innumerable times. As long as we continue to re-insert it whole we, of course, do not reduce the distance between the tortoise and Achilles.*

We have found it necessary, then, to supplement the axiom or postulate of the mobility, without change of form, of rigid bodies, by the postulate of change of flexure without change of dimensions in such bodies as the measuring chain, and, in regard to the application of both by means of superposition to other bodies, we have had to assume the existence of that plasticity of the material, which forms the only possible basis of permanence in the measurements once taken.

It is hardly necessary to say that it is quite manifest that it is from experience that we gain the conceptions of rigidity, of change of flexure without change of dimensions, and of that plasticity of material which can render the tracks of the motion of solid bodies permanent; and as all these assumptions underlie every axiom and every proposition in geometry, the recognition of their necessity is manifestly fatal to the conception of that science as being merely an extension of formal logic, or as being anyhow derivable from data that are themselves non-materialistic.

### *The Axiom of Parallels.*

I had occasion in passing to allude to the bearing of the fresh points of view opened up by the recognition of the new

* The above attempt at a solution of the famous puzzle was worked out by me while still at college, about 1864, I think. I sent it to Mr. Mill, who had been dealing with the subject in his *Examination of Sir William Hamilton's Philosophy*, and received a very kind and complimentary letter from him in reply. He preferred, however, it must be said, his own solution.

postulates on such questions as those of the axiom and definition of parallels. It may be worth while to go into that question a little more fully here.

It has, of course, for long been universally recognised that the conventional mode of treatment of the question of parallelism in Euclid leaves a good deal to be desired. It is one thing to admit that, however, and quite another to accept the new doctrines on the subject. I have quoted above M. Poincaré's remarks to the effect that Lobachevski's geometry has made the axiom of parallels for ever indemonstrable. If it has done that it has done much more; it has shown that as universal propositions the main truths of parallelism are false: it has shown for instance that it is false to state universally that through a given point only one straight line can be drawn parallel to a given straight line. With the truths of parallelism too, of course, falls the 47th proposition, which rests on them, and Pythagoras, we must now reckon, was somewhat previous in offering up his Hecatomb. All this follows as the night the day unless, indeed, Lobachevski's geometry and kindred speculations are, as Lotze puts it, "one huge coherent error"* from beginning to end.

How, we may ask, is the question of parallelism dealt with in the ordinary school geometries nowadays, and what, if anything, is wanting in the treatment of it from the point of view of validity, or from the point of view of clearness. Take Godfrey and Siddons' *Manual*, for instance, one which, I believe, is very widely used. We find at p. 70 a proof of the main truths of parallelism given which is said to be good enough for beginners, but which is not to be regarded as finally satisfactory. This proof, however, is identical with that which Lotze puts forward as definitely satisfactory.† A figure is constructed or referred to by both writers in which the "corresponding angles,"‡ as they are called nowadays, are by measurement made equal

* *Metaphysic*, Eng. Trans., Vol. I, p. 276.

† *Ibid.*, pp. 291, 292.

‡ In *Euclid* "the exterior angle" and "the interior and remote."

to each other. From this the rest of the truths of parallelism of course follow. Where, then, is the hitch? Messrs. Godfrey and Siddons say in a note that they have "virtually assumed" the equality of the "corresponding angles." But they have measured them out equal to each other by superposing a third materialised angle first on one and then on the other. Is that "assuming" their equality? The truth is, perhaps, that they are haunted by the notion that what they have done does not come under the rubric of "superposition" as sanctioned by Euclid's time-honoured usage in the fourth proposition. But Euclid did not really lift his angles out of the sand in which he drew them to place one on top of another. He measured them, no doubt, by means of a third materialised angle, just as Godfrey and Siddons have had to do. No other course was open either to him or to them. What is required is, thus, as I have contended above, the full recognition of the postulates on which measurement and, with it, geometry depends, instead of their present half recognition.

Lotze follows up his proof of parallelism as determined by the equality of the corresponding angles with the further proof that in such a case the two parallel lines will be equidistant from each other at all points of their course. If they are everywhere equidistant, that of course is saying that they will never meet if produced, and saying a good deal more besides. It is characteristic of Euclid's method that he often takes a fraction of the truth and sets it forth, when it would really be simpler to set forth the full truth. That two straight lines cannot enclose a space is thus a mere fraction, a mere collateral result, of the truth that, once two lines have intersected—if they are straight—they will always, in the event of their being produced, thenceforth diverge more and more from each other. So the truth that two parallel lines will not meet, no matter how far they are produced, is a mere fraction, a mere collateral result, of the truth that they will be always and everywhere equidistant. Yet the half truth complicates the case more than the

full truth would have done, as it introduces the difficult conception of what will or will not happen at infinity.

Lotze, I think, is in the right in proceeding from the ordinary data of parallelism to the proof of the equidistance from each other of the parallels, throughout their course. That the lines are of unlimited length is, of course, as by Euclid, taken for granted. His proof of equidistance is not, however, altogether satisfactory. He makes it depend upon the equality of lines which do not represent the shortest distance between the two parallels.* In connection with the axiom of the straight line we have seen that measurement by the shortest possible route is involved in the very meaning of the word "distance." What, however, is the shortest route between two parallels? Beyond question a perpendicular to both. Can we, however, always reckon on being able to draw a perpendicular to both? A proof that we can, as well as that all the perpendiculars that we draw will be equal to one another, occurs incidentally in Euclid's 46th proposition, and so it need not be repeated here. We have still, however, it must be said, the further question to answer: "Must the perpendicular necessarily be the shortest route?" If not, try another, from one of the points of intersection of the perpendicular with the first parallel to some point in the second. That this line will be longer than the perpendicular admits of a simple proof, and one that only relies on propositions (the 16th, 13th, and 18th) which do not assume to begin with any of the truths of parallelism.

### *The Nature of Ultimate Proof in Geometry.*

I cannot see that there are, in truth, any greater difficulties connected with the proof of the salient propositions of parallelism than there are in connection with the proof of the truths upon which the axiom of the straight line depends. The true nature of the proof of these latter is, however, a matter that is still in

* *Ibid.*, p. 291 *ad fin.*

controversy. Mill's attempted elucidation of it is probably familiar to most of us. He affirms that the proposition, for example, that two straight lines cannot enclose a space is to be set down simply as a generalisation from experience, differing in no respect, as regards the nature of the evidence on which it rests, from any of the propositions of natural science. He asserts, indeed, in one passage that the equality of the radii of the circle is likewise simply a generalisation from observation.* The only reason, he holds, why the proposition that two straight lines cannot enclose a space seems to partake of greater axiomatic certainty than any confessedly empirical proposition is to be found in the capacity of geometrical forms for being painted in the imagination, with a distinctness equal to reality. We can thus, he thinks, copy mentally lines and figures and argue from the copies as one would from the originals.

Superficially plausible as this reasoning is I cannot imagine anyone being really satisfied with it. When we are told that the equality of the radii is a mere generalisation from observation we cannot help reflecting that the true ground of our belief that the radii in any given case are equal to one another is simply this, that the radius is nothing else but a rod made to revolve on a point, and that it cannot very well help being equal to itself, although it assumes at each moment a fresh position. We reflect again perhaps that the lines and circles which Mill is talking about appear in his view to be specimens which he has picked up in the course of his rambles, analogous, say, to specimens of schists or sandstones; whereas what the geometer is at any rate always primarily concerned with are lines and circles which he has supposed himself to have constructed in accordance with a rule, or, at any rate, which he has supposed someone to have thus constructed. The point of view thus in the two cases is altogether different.

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* *Logic*, People's Edition, p. 148.

Mill remarks that we can satisfy ourselves even in the privacy of our chamber that two straight lines cannot enclose a space, because, if we follow up the lines in imagination from their point of intersection and divergence, we see that if they are to enclose a space one of them must take a bend, and so must cease to be straight.

That is all quite accurate, but is it a description of the process of learning a truth by experience? On the contrary, it is, of course, a description of the process of thinking out a conclusion altogether apart from any fresh experience. The ideal inspection of the lines, moreover, could tell us nothing if we had not in our minds to begin with the rule for the construction of the straight line, viz., that it must preserve uniformity of direction, or some equivalent one.* It is on the postulation of such a rule that the reasoning really depends. We cannot, of course, construct two straight lines that intersect and then diverge without limit by following the rule for constructing two lines that enclose a space, any more than we can construct an ellipse by following the rule for constructing a circle or—to descend for a moment from these abstractions—any more than we can construct a coat by following out the rule for constructing a pair of trousers, or any more than we can construct a window by following out the rule for constructing a door.

This line of thought, again, is suggestive in connection with the reasoning of the metageometricians. In a recent article in the *Popular Science Monthly* one of them has the following remarks. In making them, it must be said, he does little more than echo M. Poincaré and Professor Helmholtz. "If in our real space," he says, "parallels are not exactly and everywhere equidistant geometry is incorrect. The slightest deviation

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* *Cf.* paper by Sir John Herschell in the *Quarterly Review*, quoted by Mill, *Logic*, People's Edition, p. 164. He (Herschell) remarks: "The only clear notion we can form of straightness is uniformity of direction."

in parallels would give the victory to Lobachevski or else to the third competitor, Riemann."*

The irrelevancy of such reasoning as this will be brought into a clear light if we put alongside of it the following from Lotze:—"Philosophy can never come to an understanding with the attempt which it must always find utterly incomprehensible to decide upon the validity of one or the other assumption by external observations of nature. . . . . If it should happen that astronomical measurements of great distances, after exclusion of all errors of observation, revealed a less sum for the angles of a triangle (than two right angles),† what then? Then we should only suppose that we had discovered a new and very strange kind of refraction."

When we say that two straight lines cannot enclose a space, we have seen already that what we mean is that if we construct two lines that intersect and diverge and are straight throughout their course, neither of them will bend itself so as to enclose a space with the other. To say that either would do so would be manifestly to contradict in the latter part of our sentence the assertion that we had virtually made at its beginning. The proposition thus rests on the law of contradiction, and that alone is the ground of its validity. It has primarily, at any rate, nothing to do with the straightness or crookedness of any lines found in nature.

The reasoning that we find necessary with regard to the truths of parallelism is, at bottom, perfectly similar to the above. Say that we may take it that the general conception of parallels is that of straight lines in the same plane, whose starting point is different but whose direction is the same, which, in other words, in as far as anything that follows from "direction" is concerned, might always be substituted for one

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* Vol. 78, p. 559. Article by Professor Edward Moffatt Weyer, Ph.D.

† The reference is to Lobachevski's pretended demonstration to that effect.

another. Identity of direction is a perfectly clear and valid conception, though Euclid does not seem to find it possible to make any direct use of it. The trouble is that you cannot prove identity of direction by superposition, because once you move a line to superpose it on another, you by that very fact alter its direction. When, however, you have a figure consisting of three straight lines, of which two have the same direction relatively to the third, which cuts them, you can then prove that identity by superposition, or, rather, by what I have called mediated superposition. Identity of direction is, in that case, nothing but another name for the equality of the corresponding angles.* To say, therefore, that two straight lines have the same direction is really another way of saying that the corresponding angles are equal; and the rule for constructing parallels is thus, we see, this: to make the corresponding angles equal, just as the rule for drawing a straight line is to preserve in it, from beginning to end, uniformity of direction. If the above rule, then, is observed in the construction of parallels, equidistance, we have seen, must follow. We can satisfy ourselves, however, directly on that point. If we picture in our minds any variation from equidistance as taking place at any given point in either of the parallels, we find at once that we must then also picture an equivalent variation in the direction of one of the lines. That, indeed, is another aspect of the same fact. Such a variation in direction, however, is, again, another name for an equivalent variation in the size of one of the corresponding angles, and if there is no variation in the latter, simple inspection tells us that there can be no variation in the former. The proof is thus absolutely on all fours with the familiar proof of the proposition that two straight lines cannot enclose a space. In both cases it rests primarily on ideal construction and inspection, ultimately on

* Euclid, as we know, omits to define what he means by the equality of angles. If he did formulate that definition a large number of his propositions would be surplusage.

the evidence of conformity to the rules of construction which are postulated in each case. The fact that either certain straight lines or certain parallels in nature are not perfectly constructed according to our rule has plainly no bearing on the matter whatever.

It may be asked here, however, Are we not now heading for the conception of mathematical truths as purely hypothetical, as mere matters of idea and not of fact; and, if so, what are we to make of their plain and palpable application to so much in the external world?

In a former section I had occasion to dwell on the necessity of adopting as a postulate in geometry the truth that geometrical figures are really the tracks in plastic material made by the motion which we impart to rigid bodies; and I had, at the same time, occasion to remark that all the products of human arts and crafts come under this very same category. They too can be thought of as simply the tracks of voluntary motion in plastic material.

An immense proportion of the things of the external world, thus, we now see, are things constructed by rules by human beings and, for that matter, by rules that are identical with those that apply to the construction of geometrical figures.* Seen in this light, we gain, I think, some fresh insight into the cause of the certainly noteworthy fact of the interlocking of the principles of the ideal world with the things of the actual world.

What we have said, so far, applies of course only to things of human manufacture. What are we next to say in regard to the application of ideal principles to the straight lines, circles, spheres, semicircles and so on of Nature? That, indeed, is a

* It is perhaps of interest in this connection to note that while the method of describing a circle is a very ancient discovery, that of describing an original straight line—one not copied from any existing straight line—is so new that its inventor, M. Peaucellier, was, in quite recent years, awarded the Montyon Prize for its discovery.

question of profound interest. We may here perhaps find ourselves reminded of Clerk Maxwell's "atoms," things that at bottom were "manufactured articles." It may be that whenever we find even the simple preservation of uniform direction in Nature we may have in the end to fall back, for the explanation of its origin, on the conception of a Mind that acts by rules, as somehow and somewhere at work.

# X.—THE NOTION OF TRUTH IN BERGSON'S THEORY OF KNOWLEDGE.

*By* Miss L. S. Stebbing.

## I.

Bergson's conception of the nature of truth arises directly from his theory of intuition. It will, therefore, be well to examine this theory first.

M. Bergson has worked out his theory of intuition from two different standpoints—first, from the point of view of philosophical method; secondly, from that of the development of consciousness in the process of evolution. The former statement occurs in an article entitled "Introduction à la Métaphysique,"—published in 1903 in the *Revue de Métaphysique et de Morale*. This article, although it contains M. Bergson's earliest account of the nature of intuition and his most thorough examination of it as the method proper to philosophy, nevertheless has not attracted, until quite recently, nearly so much attention as the later account in *L'Évolution Créatrice*.

But it seems to me to be of very great importance in view of the fact that it contains no mention of instinct. Whereas in *L'Évolution Créatrice* intuition is defined as "l'instinct devenue désintéressé conscient de lui-même," while intellect and instinct are diametrically opposed—for "nous ne saurions trop le répéter, l'intelligence et l'instinct sont tournés dans deux sens opposés"—in this earlier account intuition is described as "une espèce de *sympathie intellectuelle*."

Before considering the significance of this divergence in statement we must refer briefly to the two accounts given.

There are, M. Bergson says in his "Introduction à la Métaphysique," two different modes of knowing a thing. Either we can view it from outside by "turning round it," or we can "enter into it."* The knowledge gained by the first method depends upon the point of view of the observer, hence it remains external and relative, it is essentially a work of analysis which gives first one aspect, then another, but never the thing as a whole. The fact that what is thus attained remain "points of view," partial aspects seen from without, prevents us from attaining the essence of the thing we seek to know. If, on the other hand, the contention runs, we could for a moment "coincide with it" so as to see it from within, or rather to *be* it, then, and then only, should we know it absolutely.

The first way of knowing is that of the intellect analysing into concepts and expressing itself in symbols; the second is that of intuition, sympathetic insight whereby knower and known in some measure coincide. Only by thus becoming one with the thing can we know "ce qui est proprement elle, ce qui constitue son essence."

Such knowledge, it will readily be admitted, is of the nature of *sympathy* in the fullest meaning of the word. M. Bergson describes it as "cette espèce de *sympathie intellectuelle* par laquelle on se transporte à l'intérieur d'un objet pour coincider avec ce qu'il a d'unique et par conséquent d'inexprimable," and he contrasts it with analysis which is "l'opération qui ramène l'objet à des éléments déjà connus, c'est-à-dire communs à cet objet et à d'autres . . . . Toute analyse est ainsi une traduction, un développement en symboles, une représentation prise de points de vue successifs." Such analysis is the method used by the positive sciences and admirably adapted for this practical purpose; metaphysics, however, must dispense with symbols which fail to give

* "La première implique qu'on tourne autour de cette chose; la seconde, qu'on entre en elle," *loc. cit.*, p. 1.

knowledge of the inner reality and must surrender itself to intuition or "intellectual sympathy."

When, however, we turn to the account of intuition in *L'Évolution Créatrice* we find it sharply opposed to intellect, although sometimes described as the luminous fringe surrounding the nucleus of intellect, and itself partaking of the nature of instinct. The antagonism of intellect and instinct is, however, brought out by Bergson with regard to their development along divergent lines of evolution, with regard to their function—intellect being above all the faculty of practical social life whose work is to procure the satisfaction of social and biological needs, instinct being the faculty whereby we may install ourselves within the current of life and thus gain knowledge of extra-intellectual reality—hence, with regard to the kind of knowledge they are adapted to give—intellect dealing with *relations*, instinct with *things*,—and, finally, with regard to their intrinsic nature, for intellect is fitted to seek, instinct to find.*

But instinct will never seek the things which it alone can find, for it is blind and unconscious. It must be awakened into consciousness, it must be turned towards knowledge, it must become reflective and self-conscious; that is, it must become intuition. It can do this, M. Bergson maintains, for instinct is sympathy, a "feeling with" its object, and "si cette sympathie pouvait étendre son objet et aussi réfléchir sur elle-même, elle nous donnerait la clef des opérations vitales," for, he adds, "c'est à l'intérieur même de la vie que nous conduirait l'intuition, je veux dire l'instinct devenu désintéressé, conscient de lui-même, capable de réfléchir sur son objet et de l'élargir indéfiniment."†

From a comparison of these two accounts of intuition we see that it is essentially of the nature of sympathy, of "intuition" in its ordinary meaning of an insight that

* See *Év. Cr.*, p. 164.
† *Év. Cr.*, p. 191–2.

transcends logical formulation. Whether it is to be accounted a development of intellect, as M. Bergson would seem to have held in the earlier article, or, whether it is rather of the nature of instinct, as would appear from his later treatment, is largely a matter of words, for whatever may be the meaning that is usually attached to "instinct" it is not a term applicable to a reflective consciousness. The important point, however, is whether we may not consider that intuition is not *opposed* to intellect but that it transcends it.

In a passage in the Introduction to *L'Évolution Créatrice* which refers to his theory of intuition, M. Bergson, speaking of the forms of consciousness other than intellect which have been developed in the evolutionary process, suggests that were these complementary forms fused they would afford complete and absolute knowledge.* Even here, then, intuition appears to be the fusion of intellect and instinct, hence not in opposition to intellect. Nevertheless Bergson's whole point of view seems to demand that *intuition* and intellect, no less than *instinct* and intellect, should be regarded as inverse and opposed, in spite of many passages in which he speaks as though intuition were the completion of intellectual knowledge, ultra-intellectual, indeed, but still *intellectual.* At times he is willing to go even further and to admit that there is no essential difference between intellect and intuition.† The sharpness of the opposition between them which led to the relegation of intellect to an inferior plane is here overcome.

Nevertheless intellect is not adapted for the pursuit of truth; it has been evolved solely for the purpose of action on matter and is bound to the service of practical needs. By

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* *Év. Cr.*, p. 5.

† See, for instance, the following. "S'il y a ainsi deux intuitions d'ordre différent (la seconde s'obtenant d'ailleurs par un renversement du sens de la première), et si c'est du côté de la seconde que l'intelligence se porte naturellement, il n'y a pas de différence essentielle entre l'intelligence et cette intuition même."—*Év. Cr.*, p. 389.

reason of its practical function intellect is powerless to give us knowledge of the real, for it carries over into speculation the practical necessities of action, thereby vitiating the results of our speculation by making it also relative to our action. M. Bergson insists that, in so far as our apprehension is determined by the exigencies of practical life it is *mis*-apprehension; the immediate necessities of action distort our apprehension of reality. The conclusion that M. Bergson draws is that the philosopher must free himself from the tyranny of practical needs since, under their sway, he can think only matter, the inverse of the living reality, and must examine "le vivant sans arrière-pensée d'utilisation pratique, en se dégageant des formes et des habitudes proprement intellectuelles."*

When, therefore, Bergson is claimed as an anti-intellectualist, it must be remembered that the intellect he condemns is a one-sided development, an intellect bound to the service of practical needs—in other words, pragmatic in structure. It is just because intellect is thus associated with utility that M. Bergson considers it disqualified for theoretical speculation, and would replace it with intuitive sympathy, the essential nature of which is disinterestedness on our part, absorption in the object for its own sake, with no reference to utility.

## II.

This theory of intuition is carried to an extreme by M. Le Roy, by whom the notion of truth implicit in M. Bergson's metaphysic is carefully developed. M. Bergson does not himself directly face the question as to the nature of truth, but in the philosophical writings of his disciples, MM. Le Roy and Wilbois, the conception of truth becomes the centre of discussion. It is therefore in their writings that it may best be studied, and that the alleged relations between it and the pragmatic theory of truth may be examined.

* *Év. Cr.*, p. 214.

In the preface to *Studies in Humanism*, Dr. Schiller, reviewing, in 1906, the spread and development of Pragmatism on the Continent, declares that the new movement is most marked in France, "either in its properly pragmatic forms or in their equivalents and analogues." In support of this contention he cites the names of Professor Bergson, Professor Poincaré (with some reservations), and MM. Le Roy and Wilbois, the two latter of whom he describes as "ultra-pragmatic followers of Professor Bergson" (p. xi).

Now it is not difficult to show that in not one of these cases can the claim be substantiated. Although, perhaps, it is not easy to determine what precisely is included in the "equivalents and analogues" of "properly pragmatic forms," it is at least clear that the four French philosophers cited depart from the latter in just what constitutes the essence of Pragmatism, namely, its theory of truth.

(A.)

In the philosophy to which M. Le Roy has given the name of "La philosophie nouvelle," and which he sometimes describes as "un positivisme nouveau," elements appear which, at first sight, give it the appearance of Pragmatism, and isolated passages could be found which might have been written by Dr. Schiller himself. Nevertheless, when we examine M. Le Roy's conception of truth, we find that it is entirely different from the "James-Schiller" theory, and in opposition to it, being, indeed, a development from Bergson, which is possibly ultra-Bergsonian, but, for that very reason, *not* "ultra-*pragmatic*." The sole point that the two theories have in common is their anti-intellectualism, but, even here, the standpoint of each is different and is the result of opposed lines of reflection. This divergence is, from the point of view of philosophical construction, vital.

Dr. Schiller founds Pragmatism on the assertion that "all mental life is purposive," and hence derives his conception of

truth as a "value," admitting, however, that it is "*logical* value." Not only would M. Le Roy not admit "logical" value in truth, but the whole conception of purpose that plays so large a part in Dr. Schiller's theory is absent from his. That science is founded upon purpose, M. Le Roy would admit; it is his complaint that science aims at the satisfaction of our practical needs, and, in so far as this purpose is fulfilled, the real is "deformed" to suit our needs. Thus we attain utility but not truth. This need not trouble us, since truth is not the aim of science, which seeks only the conquest of the material world by manipulating it to suit our purposes. Science is thus "l'essai de construire un schème rationnel de la représentation susdite, schème au travers et par le moyen duquel nous parvenions par l'habitude à voir et à manier les éléments de l'expérience commune." Here "*le schème sera dit vrai s'il remplit son office.* La vérité scientifique n'est ainsi, en dernière analyse, que la fidélité au point de vue essentiel qui définit la science même: est vraie toute proposition qui s'accorde avec lui et contribue à le dégager plus nettement. Cette vérité est donc entièrement *relative:* à une certaine attitude intellectuelle, à une certaine orientation de la pensée, à un certain projet de l'esprit—très légitime, sans doute, mais nullement unique ou pré-éminent."*

This passage, and the whole discussion of which it forms a part, brings out exactly M. Le Roy's double point of view and the distinction he makes between the scientific point of view with the truth relative to it, and a more ultimate point of view not yet defined. It is from exclusive attention to the former that he has been regarded as a pragmatist.

Science is, according to M. Le Roy, an elaboration of common-sense knowledge, and he follows M. Bergson in regarding this as formed under the influence of practical

* *R.M.M.*, 1901, p. 560. Italics are M. Le Roy's unless otherwise stated.

necessities, that is, with direct reference to utility. Common-sense knowledge springs from the "simple appréhension des choses par leur extérieur" and "l'extérieur des choses, c'est la face qu'elles tournent vers notre action."* Science is but the systematisation and development of this; it makes no attempt to pierce to the bottom; its aim is solely power, and its chief method is spatialisation, space being "le schème général de notre pouvoir sur la nature." Since science seeks only practical manipulation of reality, its sufficient criterion is "la satisfaction de notre pensée en face de son œuvre," and for its purposes all is true that "succeeds" for just so long as it *is* successful. Science is based on the need for organisation (*mise en ordre*); in other words, "la science est une ruse de l'esprit pour conquérir le monde." But it is not self-sufficient, for the mind seeks not only practical utility but a supreme unity which science, because of its dependence on our needs, is powerless to give.

Having submitted the knowledge derived from common sense and from science to a careful examination, M. Le Roy draws the conclusion that we must pass beyond it in order to obtain complete satisfaction. There is left philosophic intuition which will undo the work of science and practical life, and put us into contact with the primitive reality uncontaminated by the influence of practical necessity.

There could not be any philosophical view more obviously anti-pragmatic. Science is organisation under the guidance of practical activity; philosophy is an intimate knowledge of the underlying reality—its purpose is to arouse in us "les *sens des choses*, donner l'*habitude* et comme l'*instinct* de celles-ci, conduire en quelque sorte à les *devenir* et fournir le moyen de vivre ainsi dans leur intime familiarité."† Philosophy, then, must look in the exactly opposite direction away from science and considerations of utility.

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* *Loc. cit.*, p. 421.

† *Ibid.*, p. 721.

From this it would appear that if we were to stop short at science we should be led to class M. Le Roy as a pragmatist, and from this point of view the claim could be well substantiated. He is even ultra-pragmatic in his assertions that scientific laws are "recettes pratiques," and hold only in so far and for as long as they are successful. On the other hand, he continually points out that just because they are practical adaptations we cannot rest satisfied with them or regard them as final truths. As practical receipts, he urges "elles ne sont pas *vraies*, mais *efficaces;* elles concernent moins notre connaissance que notre *action;* elles nous permettent de *capter* l'ordre de la nature plutôt qu'elles ne nous le découvrent."*

If, then, the true is not to be identified with the useful, we must consider further what M. Le Roy takes the true to be. The pragmatic conception of truth having been rejected implicitly, for in formulating his conception of truth M. Le Roy never considers the equation of the true with the useful, he develops his own theory in opposition to the realistic notion of truth. The definition of truth as the conformity of thought with its object sets up, he urges, an irreducible opposition between Thought and Being, whereas "la pensée est l'être même," so that "l'objet de l'affirmation coïncide avec l'affirmation même."† Truth thus ceases to be a matter of the contemplation of an object; it is *action.*

In thus defining truth as "action" M. Le Roy seems once more to be taking up the pragmatist's position. He is aware that the ambiguity of the word may lead to misunderstanding and from time to time he points out the different senses in which the word action may be used. There are three senses which may be distinguished—namely (*a*) practical action which engenders common-sense knowledge; (*b*) discursive action

* *Bulletin de la Société française de la Philosophie*, 1901, p. 5. Compare again, *R.M.M.*, 1901, p. 141—"L'esprit tend spontanément à l'*utile*, non au *vrai*."

† *Bulletin de la Société française de la Philosophie*, 1904, p. 144.

which controls science; (*c*) profound action which is the "action" in question in philosophy, and is defined as life, as love, as "lived thought." It is of action in this sense that he speaks when he says, "Je sais que ce qu'il y a de meilleur en l'homme est sa puissance d'agir."* Here he uses the same expression as before when calling attention to the distorting effects of our "puissance d'agir" on the reality thus manipulated. But the distinction is clear, for he at once goes on to add "Or toute acte profond et vrai est amour, dévouement, don de soi: là est la vie réelle." In a discussion at the French Society of Philosophy, the equivocation of the term "action" or "life" having been pointed out, M. Le Roy replied that the difficulty could easily be avoided by using the term "*Pensée-Action,*" since such "action" implies thought and is, indeed, "la pensée en tant qu'agissante et productrice."† He adopts, then, the term "thought-action" to differentiate it from practical or "industrial" action, and the distinction is essential to his philosophy, which, in a previous article‡ he had described as a "*spiritualism*" since it subordinated dead results to the living progress of thought, and as a "*positivism*" because it adopted as the ultimate criterion profound action, or the "life of the spirit." Thus it may be called indifferently "lived-thought," "profound-action" or "thought-action," and in each case it may be defined as "*l'activité mentale supra-logique*, celle qui préside à l'invention."§

This profound action, the source of discursive thought, though not itself discursive, is manifested by imperfect concepts each of which reveals it from afar. It is the error of intellectualism to hasten towards clearness (la clarté), whereas the "New Philosophy" of Bergson turns the other way and hastens towards action. For intellectualism clear thought is the end,

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* *R.M.M.*, 1901, p. 425.
† *Bulletin de la Société française de Philosophie*, 1904, p. 168.
‡ *R.M.M.*, 1901.
§ *Loc. cit.*, p. 152.

hence knowledge will be the work of "discourse." In opposition to this the New Philosophy affirms that to be fruitful thought must be lived, so that consequently knowledge is not the attainment of clear ideas but is rather "un effort et un mouvement pour descendre dans l'intime obscurité des choses et pour s'insérer dans le rhyme de leur vie originale."*

To bring out the divergence of these views, M. Le Roy takes the image of an "inner visual field." In the centre is a luminous area of clear day, where "discourse" has cleared up obscurities; around is the penumbra fading into darkness, which denotes action and life. All agree, M. Le Roy says, that we must increase the luminous area, but the question is, how? Rationalism —or intellectualism—tries to do this by projecting the light it already has, *i.e.*, by way of concept; hence it makes *light* supreme, whereas it should be *movement*. The New Philosophy turns in the other direction, and aims at action *because* "ce qui est clair n'est plus intéressant, puisque c'est ce à propos de quoi tout travail de genèse est achevé, ou du moins cela n'offre plus qu'un intérêt relatif au point de vue pratique du discours."†

Is not M. Le Roy inconsistent here? Formerly he seemed to seek the obscure for its own sake; now he says that all agree that the luminous area must be increased, and that here the penumbra plays the essential *rôle* "un peu à la manière d'un cause finale," since only the obscure needs to be made clear. All progress in philosophy, he says, has been gained by a victory over the obscure and contradictory by making it intelligible. The end would thus seem to be clearness, yet the obscure ceases to be interesting as soon as it becomes clear! What is the end the clearness is supposed to serve?

Changing the metaphor, M. Le Roy compares the clear ideas to the *rungs* of a ladder, and says that to take them as the essential is to mistake the rungs for the energy of the man who mounts. Discursive thought is an instrument of know-

* *Ibid.*, p. 297.
† *Ibid.*, p. 304.

ledge, just as the steps are a means for climbing the ladder. It now appears that the *energy* is the end, and that nothing corresponds to the top. Presumably, when the top is reached interest will cease, just as before it was found that interest ceased when the obscurity was enlightened. The difficulty is not that energy or activity is taken as the end, but that it is apparently directed towards a purpose that defeats itself—unless, indeed, its sufficiency lies in the fact that it acts as a spur to an activity directed to no other end than its own continuance. There would then seem to be no top; the ladder would be endless, and the climber need not fear that interest will cease, since he will never reach the top. That this is M. Le Roy's view would appear from a passage in which he points out that "Connaître n'est pas tant projeter une lumière apriori sur les choses que fabriquer la lumière même dont notre vue se servira. . . . . Alors on aperçoit un fait capital: *le discours est subordonné à l'action et le clair à l'obscur.*"*

(B.)

Thus, finally, we are led to sum up M. Le Roy's conception of truth as life, movement itself. "La vérité," he says, "est *vie*, donc *mouvement; croissance* plutôt que *terme;* caractère de certains *progrès* plutôt que de certains *résultats.*"† Hence there is nothing permanent in truth; it is continuous change, relative to the moment, the transitory expression of a fleeting movement. Nor does he mean by the changingness of truth that it is incomplete and may be developed by a *fuller* view, hence rendered complete. Truth is never "faite"; it is the life of mind, the series of its experiences; it is "une *vérification progressive* plutôt qu'une *vérité faite.*"

If truth is life, can there be any error? It would seem that all is true. Nevertheless, the existence of error cannot be

* *Ibid.*, p. 303.
† *Dogme et Critique*, p. 355.

denied, hence a criterion of truth must be sought. This is found in life itself; the only way to determine what is true is to *live* it. M. Le Roy goes further. Having pointed out that mistake will arise unless "life" be rightly conceived, *i.e.*, unless it be "acted," and not transformed into the *concept* of action, he concluded that "si l'on n'est pas vécue par avance la doctrine que je vais resumer, *on ne doit pas la comprendre.*"* This obviously removes the criterion altogether. Life is at once Truth and the criterion of Truth.

I think, however, that when we remember the contention of the New Philosophy that to know an object one must *be* it, that truth is intuitively seized, it does not seem necessary to provide a criterion at all, for error would seem impossible. Necessary or not, however, the criterion cannot be found; to take "life" for it is obviously absurd.

M. Le Roy, it seems to me, perceives this, and leaving out of consideration the question of a criterion, he asserts that error is always the result of practical needs and social intercourse, but if we pierce below them we reach the flow of life which is truth, where no question of error can arise. Thus, he says, "l'erreur ne provient jamais que des limitations discursives ou pratiques apportées à l'action. De l'action prise en elle-même, dégagée à l'état pur, on ne saurait aucunement douter. Elle saisit l'être adéquatement puisqu'elle le pose et le constitue. Et j'ajoute qu'il n'y a pas d'incohérence à craindre tant que l'action reste pleinement et purement elle-même, car elle est alors *durée*, c'est-à-dire développement suite, continuité vivante."†

Such "Truth" does not *need* a criterion, and it would seem that M. Le Roy only tries to find one when he looks away from his conception of "Truth" to the errors that arise in everyday life. This, of course, Dr. Schiller would admit, but

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* *R.M.M.*, 1901, p. 310.

† *Bulletin de la Société française de Philosophie*, 1904, p. 165.

it only goes to prove the contention that the origin of their views is different.

(C.)

To sum up M. Le Roy's relation to Pragmatism. He asserts that scientific facts are "conventions," that formulas and laws are "receipts for practical action," and hold only in so far as they are useful for that purpose, *i.e.*, for so long as they "work"; in religion he asserts the practical nature of dogmas and holds that their value is, from the intellectual point of view, purely negative, *i.e.*, dogmas only condemn errors the consequences of which would be harmful—their purpose is not to augment our knowledge but to assign a direction to spiritual life.

Were he a pragmatist M. Le Roy would stop here and, having found something that is "useful," he would call it true, since for the pragmatist "truth" *means* relevance and adequacy for practical needs. But M. Le Roy denies this, and expressly declares that, since the purpose of science is to render nature "agissable" for us, its value lies in its efficacy, but that it is not true. His search is for something that is not merely *useful* but also *true*. If he fails to find it, that is no reason for classing him as a pragmatist.

(D.)

In working out his conception of the nature of truth M. Le Roy is developing Bergson's contention that the practical needs of action play an important part in determining the general nature of our knowledge by reason of the "utilitarian character of our mental functions, which are essentially turned towards action."* The results of this influence may be briefly summed up as misrepresentation of the real due to: (*a*) The division of matter into independent, isolated bodies which in their independence and isolation can be utilised by us; (*b*) the

* Introduction to English Edition of *Matter and Memory*, p. xvii.

creation of homogeneous space and time as the diagrammatic schema of our eventual action on matter, and hence to an inversion of reality by which we make rest logically prior to movement; (*c*) the isolation of a "fact" as real, whereas it is an adaptation of the real in the interests of action; (*d*) the neglect of the past except in so far as it is practically useful, and the consequent narrowing down of consciousness to the present, *i.e.*, to the state of our body; (*e*) the discontinuity of knowledge due to the requirements of discontinuous action, hence the erection of clear-cut "concepts" that deal only with the motionless and discontinuous, thus failing to give the movement of the living reality.

These points are further developed by M. Wilbois, who is in close agreement with M. Le Roy. His main philosophical position is stated in a series of articles entitled "L'Esprit positif."* In an important article on "La méthode des sciences physiques,"† M. Wilbois deals with the conception of "fact" with especial reference to physics, pointing out at the same time, however, that his remarks apply to all the sciences. A "fact," he holds, is an arbitrary symbol, whether it be a "fact" as recognised by common sense, or a "physical fact." The only difference between the two classes of fact is that the physical fact is *more* arbitrary, *more* symbolical, hence farther from the underlying reality. A physical fact is a symbolised perception. These symbols are freely chosen by the scientist, his object being to reduce the "real" to a manageable form, hence to obtain "facts" that he can group into "laws." It follows that scientific laws are symbolic and arbitrary, so that "on progresse dans la science en allant vers l'artificialité," *i.e.*, in going farther and farther from the real. There is no necessity in science except the necessity we put there to further our own purposes.

Science, therefore, can give us no knowledge of the "real,"

* Published in the *Revue de Métaphysique et de Morale*, 1901–1902.

† *R.M.M.*, 1901, p. 181.

that is, M. Wilbois adds, "le réel dans le sens bergsonienne";* its work is "tout pratique." Further, since all scientific theories are only symbolic, and laws are only arbitrary decrees of the scientist, it follows that we have no means of determining which of several contradictory theories—each of which explains the facts equally well—is, in any given case, the right one; rather, *all* are right in so far as they fit the "facts," and *none* is "*true*." The theory chosen will be the one that best suits the scientist's "character," and, hence, we see characteristic differences in theories adopted, for example, by the French, and those adopted by the English, each being the reflection of the national character. A theory is only a language and a point of view arbitrarily chosen; thus, "le théorie, c'est l'homme même, et c'est dans ce sens qu'on peut dire que chaque savant a son style."†

But although the theory is not true or false in the absolute sense, nevertheless it is symbolic, and experience fixes "peu à peu" all the properties of the symbol. Experience itself, then, imposes a limit on our arbitrary choice of symbols; it is not a perfect fluid that resists equal pressures equally in all directions, but rather a crystal that yields to pressure in one direction more easily than in another.‡ We cannot, therefore, verify any law, chosen haphazard, by multiplying its conditions to make it fit, for "il y en a auxquelles la matière était prédisposées."

M. Wilbois accordingly, in discussing Euclidean and non-Euclidean conceptions of space, recognises a distinction between them from this point of view. "Le postulatum d'Euclide," he says, "n'est pas un axiom de logique, comme le principe d'identité, ni un postulat arbitraire, comme le postulat de Lowatchewski; il contient une part d'expérience, aucune

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* *Ibid.*, p. 306*n*.
† *R.M.M.*, 1899, p. 614.
‡ See *loc. cit.*, p. 636.

expérience ne le *prouve,* mais l'expérience journalière le *suggère;* il tient de notre esprit et des choses."*

In thus making a distinction between the *arbitrary* postulate of Lowatchewski and the Euclidean postulate as being "*suggested* by experience," it seems to me that M. Wilbois would be forced to admit that the latter is more "commode" in the sense of being nearer to the reality it symbolises. If all postulates as to the nature of space were equally arbitrary, then it might be said we *choose* one which happens to suit our point of view; but if one is to be recognised as peculiarly suitable to *our* habits, it would seem to correspond to something in the nature of reality which the other postulates lack. The pragmatist would be willing to accept this, and would say that just because it is suited to our needs the Euclidean postulate is "true," but M. Wilbois is careful to point out that just because a postulate is thus selected in accordance with our convenience, it cannot be "true," if by that we mean, as he thinks we *should* mean, anything else than more or less useful. The Bergsonian intuitionist is anxious to attain a truth that shall be independent of our needs, and, if anything be shown to be relative to these, it is, for that very reason, to be rejected as not ultimately true.

It appears, then, that having adopted a pragmatic standpoint in science, M. Wilbois feels the need of going beyond it to obtain truth. His conclusion is that "il est vrai encore que l'examen des tendances générales de la physique nous montre une des façons dont l'homme cherche à dominer choses; la science apporte ainsi sa contribution à la psychologie; mais ce fait, si important pour notre orgueil, est bien petit pour notre savoir. Et voilà tout le réel que la science apprend à connaître."†

MM. Wilbois and Le Roy in common with M. Bergson reject, then, the utilitarian standpoint in metaphysics. From

* *R.M.M.*, 1899, p. 601. Italics are M. Wilbois'.
† *R.M.M.*, 1900, p. 322.

the point of view of action we obtain a representation of the universe as the result of a utilitarian coördination of the elements of experience. Pure knowledge of the real, however, cannot be attained unless we turn our backs on practical requirements and abstract from the conditions of utility. So far from agreeing with the pragmatist in the identification of the true and the useful, the exponents of the New Philosophy go to the other extreme and utterly divorce the useful from the true. Thus M. Bergson says, "justement parce que ce morcellement du réel s'est opéré en vue des exigences de la vie pratique, il n'a pas suivi les lignes intérieures de la structure des choses,"* a statement that is assuredly anti-pragmatic, however little justifiable in its conclusion !

(E.)

M. Wilbois agrees with M. Le Roy in describing the "New Philosophy" as "un positivisme nouveau," and he explicitly connects it with "positivisme comtienne," at the same time claiming that it is *new* because based on a truer conception of fact that leaves room for human freedom. Whereas Comte accepted facts as "given," the "New Positivists" regard them as arbitrary creations, fabrications of the mind.

A comparison of the "New" Positivism with the "Old" will, I think, show that the differences are more important than the resemblance, and will further bring out the relation to Pragmatism.

The characteristics of the Positive Philosophy may be found, Comte says, in the meaning of "positive" as real (*i.e.* as opposed to chimerical), useful, certain, precise and "positive" (*i.e.* as opposed to "negative") and to these may be added, as a further characteristic, the conversion of absolute into relative conceptions. "To conceive all our speculations as products of our intelligence, destined to satisfy our diverse essential needs,"

* *Matière et Mémoire*, p. 202.

is, Comte says, "the attitude of a truly positive philosophy,"* and his position is summed up in the motto "Voir pour prévoir."

This is in radical opposition to the Bergsonian intuitionist who adopts to the fullest extent the attitude of "voir pour voir." Thus M. Le Roy says, "Je dirais volontiers avec M. Bergson qu'on peut et qu'il faut s'habituer à penser l'être directement, pour lui-même et non pour nous ; qu'on peut et qu'il faut tâcher de voir pour voir, et non plus de voir pour agir et utiliser. Cet effort de désintéressement, c'est la tâche même de la philosophie."† So, too, M. Wilbois lays stress on the need of the "regression bergsonienne" if we are to come into contact with reality. Comte, on the other hand, abandons the search for the real nature of things, for "causes" as distinct from laws which bind phenomena together, and denounces the "sterile erudition" which deals with science from any other point of view than that of rational prevision. "Ainsi," he says, "le véritable esprit positif consiste surtout *à voir pour prévoir*, à étudier ce qui est afin d'en conclure ce qui sera."‡

In thus renouncing all questions prompted by a sterile curiosity, hence admitting the existence of "useless" knowledge, and in linking the useful with the humanly knowable, Comte seems in agreement with the modern pragmatist. But he makes no attempt to consider epistemological questions arising out of his view of the sciences; he does not ask what is the ultimate foundation of this positive knowledge, by what test we can determine its validity. He is content to say that truth is relative. His position is thus rather agnostic than pragmatic, although, no doubt, dicta could be drawn from his works to support pragmatic pretensions. There is much in the attitude of old and new positivist alike that appears

* *Discours sur l'Esprit Positif*, Pt. I, Sect. vii.
† *Bulletin de la Société française de Philosophie*, 1908, p. 274.
‡ *Discours*, Pt. I, Sect. iii.

pragmatic until we examine the meaning they respectively attribute to truth. The Comtean positivist says: "If there be a real, absolute truth, we cannot know it, and we don't want it." The pragmatist says: "There *is* truth, or rather 'truths,' and we not only know them, but we *make* them." The new positivist agrees that there is absolute truth, but denies that it is to be found by means of the utilitarian procedure of the sciences; truth must be sought, he contends, by diving into the underlying flux, and to do this, the consideration of what is useful and practical must be left behind.

We conclude, then, that the New Philosophy is not Pragmatism. In calling itself a "new positivism" it appears to neglect a radical difference that separates it from Comtean positivism, for it claims above all to be a "metaphysic" that reaches the real by means of an intuitive method that Comte would have utterly repudiated.

(F.)

A closer parallel exists, it seems to me, between the New Philosophy and Aristotle's doctrine of *νοῦς ποιητικός*. The conception of "living the real," which is fundamental to the New Philosophy, bears a striking resemblance to Aristotle's conception of *θεωρία*. To "live the real" is the supreme end-in-itself, and in it there is no opposition between knower and known, but a union that is deeper than knowledge and in which the knower may be said to "know" his object only because he *is* it.

Such a view would seem to come direct from Aristotle, however different may be its formulation from a passage such as the following: "And thought thinks itself because it shares the nature of the object of thought; for it becomes an object of thought in coming into contact with and thinking its objects, so that thought and object of thought are the same."*

* *Metaphysica*, XII, vii (Oxford Trans.).

It is true that with Aristotle the stress lies on "thought" and he has been regarded as the source of "intellectualism," nevertheless, there is a marked affinity between his doctrine of contemplative activity and the latest modern theory of "profound action." Both, too, in the end, fall back on the conception of "life" to express its essential meaning. Thus Aristotle says: "For the actuality of thought is life, and God is that actuality; and God's essential actuality is life most good and eternal."* So, too, M. Le Roy uses "life," "lived-thought," "lived-action," and "thought-action," as synonyms for "profound action," or "living the real" which is truth.

M. Bergson also seems to find the highest life in "voir pour voir" and holds only that intelligence, *i.e.*, discursive reason, is inadequate to the task. He, too, seeks an activity in which knower and known would be one. There must, further, be no reference to practical activity. For M. Bergson and his disciples, no less than for Aristotle, contemplative activity appears as incomparably superior to practical activity, and perhaps each might conclude with the words: "This contemplation would seem also to be the only activity which is loved for its own sake, for it has no result beyond the act of contemplation, whereas from the active energies we gain something more or less beyond the performance of the action itself."†

The conception of *θεωρία* and "voir pour voir" cannot by any means be brought into harmony with Pragmatism. It seems, then, that we must reject Dr. Schiller's claim to rank the "New Philosophy" among the "equivalents and analogues" of Pragmatism.‡

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* *Ibid.*, *cf. Év. Cr.*, p. 270.

† *Ethica*, X, vii.

‡ There is, it seems to me, a close affinity between Bergsonian Intuitionism and M. Blondel's "Philosophie de l'action." The "action" of which M. Blondel speaks is the "pensée-action" of M. Le Roy. It is true that M. Blondel lays more stress on logical considerations than does M. Le Roy, and he does not glorify the "obscure" at the expense of the "clear," nevertheless the tendency of his philosophy is towards a

## III.

The Bergsonian intuitionist claims, then, to have discovered an additional faculty, *intuition*, which is the philosophic faculty par excellence because it alone is competent to attain truth, since it alone is able "transcender la condition humaine," which is, according to M. Bergson, the aim of philosophy.* In one of his striking similes M. Bergson says that science, the elaborated knowledge of ordinary life, has thrown a bridge across the river, and metaphysics has dug a tunnel beneath it, but both alike have left the river untouched. It is the peculiar work of philosophy to plunge into the river of life.

According to M. Bergson there are, as we have seen, two opposed ways of knowing; by intellect we know matter, by intuition we know spirit by insertion within the ascending life current. At times M. Bergson seems anxious to insist that *both* forms of knowing give us knowledge of absolute reality; he protests that "c'est la réalité en soi, la réalité absolue, que les sciences mathématiques et physiques tendent à nous révéler"† but they fail to do so completely owing to the necessity of posing the problems one after another.

But, in spite of this protest, M. Bergson frequently speaks as though intellect were incapable of giving *any* knowledge of absolute reality, for the knowledge that it gives is always relative to action, and, M. Bergson continually insists, the needs of action *distort* our apprehension of reality. Intellect is the faculty that has been evolved to subserve the needs of action and to adapt us to our material environment. In a noteworthy passage, M. Bergson says, "si elle (intelligence) était destinée à la théorie pure, c'est dans le mouvement qu'elle s'installerait, car le mouvement est sans doute la réalité même," but he adds,

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mysticism that escapes the limits of clear thinking, and can be expressed only in symbols.

* See *Introduction à la Métaphysique*. *R.M.M.*, 1903, p. 30.

† *Bulletin de la Société française de Philosophie*, 1903, p. 21.

"l'intelligence, à l'état naturel, vise un but pratiquement utile," and the philosopher errs when he transfers to the domain of speculation "une méthode de penser qui est faite pour l'action."*

The opposition between such a view and Pragmatism is marked. While M. Bergson condemns the intellect because it *is* pragmatic, the pragmatist condemns any view of the structure of intellect that makes it *not* pragmatic, and repudiates the "pure intellect" of the intellectualist because it takes no consideration of utility.

For M. Bergson, obviously "utility" is not the way to truth; indeed, it seems rather to be synonymous with error, for, in a passage already cited, he remarks that just *because* the division of reality is effected under the influence of our needs it does not follow the real structure of things.†

But surely, we may ask, is it not odd that, if our intellect distort matter, it should be useful and adapt us to it? We are living, M. Bergson seems to say, in a world built up by intellect in the interests of action, but which does not resemble "reality," for, the better to subserve our needs, "reality" has been deformed. This is an extreme of pessimistic scepticism that may well seem to justify a plunge into Pragmatism by way of reaction! "If this be the case," it may be said, "then let us call this 'distorted world' the reality, and bother not at all about that *other* reality that is so unsuited to us."

I think that the reply Bergson might make is that a radical distinction must be made between two *kinds* of life: the lower is adapted to the "distorted reality," whereas "reality itself" is adapted only to the higher spiritual life, and that these are attainable by intellect and intuition respectively.

In this case three questions call for consideration: (*a*) Is not instinct, of which, we may take it, intuition is a more developed form, more radically bound to action than intellect,

* *Év. Cr.*, p. 168.

† See p. 241 above.

hence, is it not more *useful?* (*b*) What is the relation of utility and truth, and why must we reject alike the pragmatist's identification of them and Bergson's complete divorce? (*c*) Can such a radical distinction between the lower and the higher "life" be made, for does it not involve an untenable dualism of the self?

(*a*) It is not necessary to elaborate instances to show that instinct is of immense use in adapting the animal to his environment, and that it appears to have been evolved for this purpose. If it were knowledge at all it would certainly be *useful* knowledge, and useful for purely animal ends. It is true that Bergson says that instinct fails because it is turned exclusively towards action, but he asserts that if it were diverted to knowledge and became conscious, it would be knowledge of the real that it would give us. But would this knowledge cease to be useful? If not, would it not be *true?* The assumption, further, that "our needs" are necessarily corporeal needs, needs of action in its lowest sense, is surely unjustifiable. To assume this is to degrade man to the brute level, to deny him any aspirations other than those of the lower animals which may possibly be sufficiently provided for by a knowledge of matter that is adequate to adapt them to their environment. But man seeks other ends than the preservation of his body. To reply that intuition will supply these needs is to beg the question, for it has not yet been proved that the function of the intellect is restricted to the needs of bodily activity, and the *onus probandi* lies with those who deny that these higher demands are the product of man's rational nature and capable of satisfaction by means of it. The appeal to a transformed instinct here is as unnecessary as it is futile.

(*b*) In the consideration of the relation between truth and utility M. Bergson and his disciples are at the opposite pole from Pragmatism. We have seen that M. Wilbois, when discussing non-Euclidean geometries, made a distinction in

favour of Euclidean space on the ground that it is more "commode" and is suggested by our experience, while he refused to admit that it is more *true* than, for example, Lowatchewski's.* I have pointed out that this position is contradictory and that in so far as Euclidean space is suggested by our experience and conformable to it, it would seem to correspond to reality in a way that other "spaces" do not, and should for that reason be called true.

The use Dr. Schiller makes of non-Euclidean geometries is to illustrate his thesis that axioms are postulates and that the axiom of parallels was postulated by Euclid because he wanted it, and any other of the contradictory postulates would have given just as useful results if we had been differently constituted. Hence he concludes that Euclidean space, spherical and pseudo-spherical space are all three equally *real*, but Euclidean space is more useful and "is true because it works and in so far as it works."† That is Dr. Schiller equates the useful with the true; M. Wilbois equates the useful with the not-true.

Both start from the same assumption, which seems to me untenable, viz.: There are many geometries any one of which is applicable to space as we know it. Both agree that Euclidean space is most convenient because it fits our needs and habits best, as it were by chance. They differ only in their conclusions: Dr. Schiller argues that since Euclidean space is most useful and works it is true; the "New Philosopher" argues that since Euclidean space is most useful it must be admitted that it is suggested by our experience, but because it is useful it cannot be *true* for our needs distort reality, and because the other geometries are conceivably useful they cannot be true, therefore *none are true.*

It seems to me that both conclusions are wrong. First

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* P. 240, *supra.*

† *Personal Idealism*, p. 114.

I have disputed the assumption that non-Euclidean geometries are equally applicable to our space. Hence the pragmatist appears to me right in saying Euclidean space is true, but he is wrong in identifying this truth with its usefulness; the "New Philosopher" appears to me to be quite wrong when he argues that utility necessarily disqualifies for truth.

Similar arguments apply to the general contention that use distorts reality. In summing up then the relation of utility and truth I should argue that what is true is useful in the widest sense, *i.e.* useful theoretically and practically; but I should also contend that what is useful is not necessarily true because reality is not perfectly harmonious. In any case it would be impossible to identify truth with utility, because it is but a consequence of truth that it is useful.* The utility depends on the truth and not *vice versâ*. Hence the equation of the useful and the true is not justifiable; still less so, perhaps, is its identification with error.

(*c*) The distinction made by M. Bergson between the lower life of intellect and the higher life of intuition corresponds to his distinction between the fundamental and the superficial self.† This splitting of the self into two establishes within it a dualism comparable to that of mind and matter—a comparison that is further borne out by Bergson's study of their relations. It is true that he protests that the self must not be regarded as "split up"; nevertheless the distinction established is radical and constitutes an irreconcilable conflict between the two selves.

The fundamental self by means of intuition is inserted within the current of life, or duration, hence *knows* ultimate reality. Such a direct contact with, or "perception" of the real is the aim of Bergson's Intuitionism, and in his Oxford Lectures he connects it with the work of Kant, pointing out

* The pragmatist first identifies truth with its consequences, then selects one of these, namely, utility, and substitutes one for the other.

† *Les Données Immédiates de la Conscience.*

that Kant recognised the supreme need for intuition, or "vision," and that it was his inability to find it that led him to his negative conclusion.*

The reference to Kant is worthy of note. M. Bergson's intuition is no less an appeal from knowledge to something other than knowledge than is Kant's appeal to noumenal knowledge. He is faced by an even greater difficulty of saying anything about the intuition owing to his radical separation of intuition from conception, since concepts "*negate* the real" by manipulating it in the interests of action. But intuition is essentially disinterested; it is an attempt to "voir pour voir."

Such disinterestedness of view is found in its highest and purest form only in art, hence we penetrate the nature of reality only in so far as we attain the artistic standpoint. Consequently, to illustrate the application of his philosophical method, the Bergsonian intuitionist makes frequent appeals to art, generally pictorial art. Throughout, the analogy of artistic intuition is apparent; it becomes, in fact, more than an analogy.† The standpoint adopted is that of the artist at work, not of the spectator contemplating a work of art, nor of the artist himself when he reviews his own work. The emphasis lies on his creative activity in which he and his object are one, and he may be said to *know* his object only because he *is* it. From this point of view argument is seen to be superfluous, and M. Bergson does not offer arguments in support of his intuitions. Metaphor is the sole means of expression possible for such a philosophical method.

The resort to intuition in metaphysics gives rise to serious difficulties. It involves an extreme individualism. Each has his own intuition which cannot be expressed nor defended; there can be only reiteration without argument. Even if the intuition were expressible it could not be refuted, for, since

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* See *La Perception du Changement*, p. 15.

† See *e.g. Le Rire*, p. 153 *seq.*, and *M. Le Roy's writings passim.*

the appeal *is* to immediate intuition, there is no criterion that may decide between rival intuitions. There is no possibility of any rational justification of these intuitions. The Bergsonian Intuitionist would probably reply to this that to attempt to justify intuition by rational grounds would be to degrade it and detract from its original purity. But until intuition is raised to the level of mediate thought there can be no question of truth.

From the intuitionist point of view philosophy has no greater universality than art, and this is a position with which these philosophers appear content. But in so far as the line between science and art is clearly drawn, philosophy is a science and not an art. We shall never learn philosophy by living it, any more than we shall know what justice is only by doing just actions.

M. Bergson adopts the standpoint of art because he holds that to know a thing as it is, one must be it. The distinction between subject and object, the antithesis between the act of knowing and the thing known, is abolished in the interests of knowledge itself. But, as Lotze has pointed out, such an antithesis is involved in the very meaning of knowledge which "will never *be* the thing itself but only an aggregate of ideas *about* the thing." Thus "he who demands a knowledge which should be more than a perfectly connected and consistent system of ideas about the thing, a knowledge which should actually exhaust the thing itself, is no longer asking for knowledge at all, but for something entirely unintelligible."*

MM. Bergson and Le Roy might perhaps reply that it is "unintelligible" because above intellect and deeper than knowledge. Indeed their constant use of such expressions as "union" and "communion" with the real would seem to involve a reference to something "deeper" than knowledge. In this case the conception of knowledge would be meaningless and the question of truth and falsity would cease to exist.

* *Logic*, Bk. III, Ch. i, § 308 (Eng. Trans.).

A theory of knowledge that makes such intuition the supreme philosophical method is confronted with two dangers—either that of scepticism, or of vagueness so extreme as to be compatible with any metaphysical theory, hence leading back again to scepticism. Intuition is, by definition, individual and incommunicable. When, therefore, we have dived down into the living duration that is the object of the Bergsonian intuition, we cannot state the result of our experience. It may be that we are not, as M. Bergson assures us we are not, shut up to the contemplation of ourselves but are put into contact with "toute une continuité de durées,"* but we are unable to state the fact or convince anyone else of the contact. Thus it would appear that this intuition is essentially akin to that religious intuition which finds expression in an exclamation such as F. W. H. Myer's "O could I tell, ye surely would believe it!" But the vision cannot be told. From the philosophical point of view the difficulty is that a metaphysic exists for the purpose of expressing the "vision" and a theory of knowledge as a means thereto.

That such is the outcome of this intuitionism would seem to be recognised by M. Bergson in that he holds that all philosophical systems are at bottom essentially agreed, that is, in so far as they are derived by means of intuition; but they differ in the course of development which depends upon the conceptual analysis of the original intuition. All systems are, therefore, true in so far as "vivified by intuition," inadequate and false in their development by dialectic. Nevertheless, dialectic is necessary, M. Bergson says, to put intuition to the proof, to analyse it into concepts and to communicate it to others; but the intuition itself is fugitive and incomplete, and is thus in need of being prolonged.

The theory of intuition itself, however, affords no suggestion as to how the intuition may be prolonged, nor what criterion

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* *R.M.M.*, 1903, p. 25.

may decide the differences that arise when the original and single intuition is expressed, as it necessarily must be, by concepts. It is, indeed, a self-defeating process; the dialectic that is to continue the intuition is said to proceed in the contrary direction and "le même effort, par lequel on lie des idées à des idées, fait évanouir l'intuition que les idées se proposaient d'emmagasiner."* The part assigned to dialectic is, therefore, contradictory, and it is not shown that the intuition is capable of enlargement into the construction of a metaphysic.

The claim, therefore, that Bergson makes† to have brought what Kant excluded back into the realm of knowledge, fails, for it is the knowledge given by intuition of which Bergson speaks. But this we have seen lacks all the essential marks of knowledge and remains inarticulate.

The conclusion is forced upon us that the result of the Bergsonian Intuitionism is scepticism. On the one hand, intellect provides only knowledge that is practically necessary but theoretically invalid; on the other, intuition takes us into the heart of reality but can give us no information about it. Both would give absolute knowledge, intellect of matter, intuition of life, if the movement of reality were completed; but it is not, and it remains impossible for us to transcend the human point of view. This, however, is just what the Bergsonian philosophy requires.

Two questions then arise: What is the nature of truth, and what is its criterion? These two questions are hopelessly confused by most "anti-intellectualists," alike by the pragmatist who makes the criterion of truth its nature, and by the Bergsonian intuitionist who makes its nature its criterion. On the other hand, the distinction is generally recognised by their opponents, *e.g.*, by Mr. Russell,‡ and by Mr. Joachim, who

* *Év. Cr.*, p. 259.
† See *Bulletin*, 1901, p. 64.
‡ *Philosophical Essays*, p. 170.

says: "A *criterion* of truth—*e.g.*, something other than the truth itself, by which we are to recognise the truth—is not what we require, for we want to know what truth in its nature is."*

The failure to make this vital distinction constitutes a serious blunder, comparable to that which the moralist would make were he to formulate a set of rules for determining whether a given action be right or not, and then were to identify the rules with the Moral Ideal. The question of the nature of truth is logically prior.

We have already seen that the Bergsonian intuitionist identifies truth with its criterion, finding them both in "life," and I have suggested that this view of the nature of truth, which makes it existing reality itself and transfers it from the realm of *knowledge* to that of *being*, dispenses with the need for a criterion, the notion of which is valid only within the realm of knowledge.

The identification that the "New Philosophy" makes of "knowing the truth" and "living the real," results, I think, from the fact that M. Bergson makes Duration the stuff or substance of Reality itself, and Truth he regards as but another name for Reality. In order, then, to know truth, the knower must be one with it, inserted within the reality that is to be known. Hence is necessitated the plunge into the "stream of time," or "flux," that constitutes the Bergsonian regression. The knower thereby becomes *part of the flux*—if the spatial metaphor may be allowed—and the distinction between knower and known, knowledge and reality, is abolished. There is no longer Truth but only Reality, which—to use Mr. Bradley's phrase—"swallows up" knowledge. In fact, at this point, Bergson's views appear to converge towards Bradley's, in so far as the latter seems to regard the non-existent character of truth as a defect, since thereby it fails to be "quite identical

* *Nature of Truth*, p. 67*n*.

with reality."* They differ in that Bradley holds fast to intellect, while making Reality supra-rational in the form of an Absolute, in which Truth is transformed into a higher Reality; whereas Bergson scorns intellect, and makes Reality extra-rational, in the form of an "élan vital," prior to the genesis of intellect. In each case, knower and known are to be identified, and the problems of knowledge are to be solved by the abolition of knowledge!

The objection that Bergson and Bradley alike feel against a Truth that is "knowledge *about* an other" is due, it seems to me, from their making Truth an Existent. When this is done, then the knower, who is existent, in order to know another existent, namely Truth, must somehow "enter into it," as Bergson puts it, and an example can be given that to know another person completely one must be that person, hence to know anything one must be what one knows.

But we have already seen that it is on the antithesis between knower and known that knowledge depends, and no satisfactory theory of knowledge can abolish this distinction.

If, however, we admit that Truth is not itself existent, but is a way of knowing existing things, then surely Truth will always be *about an other*, for this is its very nature, and it may be *complete* just because the knower in knowing is no longer the part that he is as an *existing* knower.

It seems to me, then, that M. Bergson's theory of an intuition in which "l'acte de connaissance coïncide avec l'acte générateur de la réalité," closely resembles Mr. Bradley's monistic theory of truth and fails in just the same way, namely, that it seeks an accomplishment that would frustrate its own end, viz., Truth. If, however, it be admitted that knowledge is necessarily, and rightly, dependent upon the distinction of knower and known, it would follow that Truth is always "about an other," and may be complete because it is not an existent.

* *Appearance and Reality*, p. 167.

The basis of this error in M. Bergson's case comes out very clearly in M. Le Roy's treatment of "Truth" as "Life." But Truth is not "life"; it is a way of apprehending life. Nor is philosophy "life," but the interpretation of life by means of reason.

# XI.—SYMPOSIUM—CAN THERE BE ANYTHING OBSCURE OR IMPLICIT IN A MENTAL STATE?

*By* Messrs. Henry Barker, G. F. Stout, and R. F. A. Hoernlé.

## I.*—*By* Henry Barker.

### § 1.

The subject of our discussion, as I understand it, is this: Have the distinctions of Clear and Obscure, Explicit and Implicit, any application to the contents of a mental state, when the latter is considered from a strictly psychological point of view?

I had better first explain what I mean† by the qualification that the mental state is to be considered from a strictly psychological point of view. And I will try to do so by means of a few simple examples, in order to obviate, if possible, the necessity of a more general and abstract discussion.

1. It is difficult to discriminate in gaslight between the colours navy-blue and black. Suppose now that two persons A and B are looking at coloured stuffs in gaslight, and that A is seeing them for the first time, whereas B has seen and marked them in daylight. A, taking a particular stuff for black, may be told by B that he is wrong, and that, though he may think the stuff in question is black, it is really navy-blue. Now in such a case it is plain that B's statement, that the colour is really navy-blue, does not express—of course it is not meant to express—A's actual experience. The colour which A actually sees is indistinguishable from black, and is certainly

* I regret that the writing of this paper had to be deferred so long that I have not had time to revise and extend my knowledge of the literature. This applies especially to § 4 on Perceptual Clearness, which would doubtless have been considerably modified, if I had been able to study such experimental investigations as those of Wirth.

† For the purposes of this discussion.

not navy-blue. B's statement, that the colour is really navy-blue, is a judgment which criticises the knowledge-value of A's actual experience in the light of B's fuller knowledge. In this case the knowledge-value is determined by the practical purposes of ordinary life. For these purposes we regard a colour as being really that, which it is actually seen to be by the average person in ordinary daylight. But this practical point of view is plainly not the point of view of psychology. For the purposes of ordinary life—and in the main, of course, for those of science also—we standardise our experience. We accept the standardised object as the real thing, and, in comparison with it, regard the actual object of the passing experience, in so far as this differs from the standardised object, as subjective and unreal. Whereas it is precisely the actual object of the passing experience with which psychology is concerned.

I propose, when a distinction is required, to use the word "object" (which ought surely to be taken as implying a correlative subject) to denote that which is actually experienced by the individual subject, and to use the word "thing" to denote the standardised object of ordinary speech.*

2. I have contrasted A's actual experience with B's critical judgment upon it. But we may dispense with B, since A himself may pass judgment upon his own experience. He may himself have marked the colours in daylight and may say, This looks like black to me now, but it is really navy-blue. If, however, he expressed his meaning in strictly psychological language, he would say, The colour which I actually see now is black, but if I saw the same thing in daylight its colour would be navy-blue.

3. Finally, A may not even have marked the colours in daylight, but may merely know in general that he cannot distinguish navy-blue from black in gaslight, and may then say,

* I think that a usage of this sort is, on the whole, less likely to give rise to confusion than Professor Stout's distinction between Presentation and Object.

I am not sure what this colour is; it looks like black, but it may really be navy-blue. And of course this does not mean that there is any sort of wavering about his actual experience of the colour, but merely that he cannot infer with certainty from the gaslight colour to the daylight one.

4. Although in ordinary life we thus constantly subordinate the object of our actual experience to the standardised "thing" of our critical judgment, it can hardly be said that any real misunderstanding is caused thereby. There is probably much more danger of real confusion and fallacy when people begin to appreciate strongly the psychological reality of the object of actual experience, and then, in their eagerness to emphasise this point of view of actual experience, forget, or omit to notice, that the actual experience must always be that of a particular subject. For, if we forget this particularity of the experience, we are liable to do far more violence to actual experience than the plain man, with his standardised object or "thing," ever does. Where he is content to enforce as a standard the average experience of the average man under the conditions that are practically most important, we are now liable to enforce as a standard the particular experience of a particular subject under conditions that are quite exceptional, and to insist that this exceptional experience of one person is the real experience of all other persons, whether they are aware of it or not. For instance, artists sometimes paint familiar objects and scenes in colours which to the layman are quite unnatural. And in such a case the artist is not always content to say, that the picture shows the object as he himself actually saw it. He sometimes insists that the picture shows the object as everybody really sees it, and that the artist knows better what the layman really sees, than the layman himself does. Whereas, of course, all that the artist is properly entitled to say is, that his picture shows what the layman would see if he had the artist's training. The picture may reveal to the layman what is there to be seen, but in the

case supposed it certainly goes beyond what he actually does see, otherwise he would not feel the colours to be unnatural.

We need not, however, have recourse to the case of the artist to show the danger of the fallacy in question. For it is evident that the experimental psychologist is exposed to the same danger at every point and in a much greater degree. For, whereas the artist aims, after all, at expressing some ordinary perceptual experience in all its concrete fulness, the experimentalist expressly isolates as far as possible some special kind of experience, and causes it to occur under highly artificial conditions.

5. There is still a further stage of the same fallacy, when—instead of inferring from one person's experience what everybody else's must be, whether they are aware of it or not—we infer from the presence of certain physical conditions or stimuli that the subject must have had a corresponding experience, whether he was aware of it or not. Of course I do not deny that we may have good reasons for asserting that a person had an experience which he himself afterwards quite sincerely disclaims. For instance, when a person is deeply engrossed in a book, he may answer Yes or No at random to a question which you address to him, and then afterwards affirm quite sincerely that he never heard you ask him any question at all. In this case the fact that he made an answer shows that he heard that some question was being asked. But suppose he made no answer at all. Are we still entitled to infer that, because the question was asked in an audible voice, he must actually in some sense have heard it? To me the inference seems precarious indeed.

But some psychologists are prepared to go far beyond such an inference as this. They are prepared to infer from the presence of the physical condition or stimulus to the existence of a corresponding experience or modification of the subject's mental state, although the subject himself at the actual time of the occurrence of the supposed modification is not aware of

it, and cannot even make himself aware of it by attending with all his might. Professor Stout in his *Manual* reproduces an argument of Stumpf's which is advanced to justify this kind of inference. The argument purports to prove the existence of sensational differences which are not perceptible by the subject. It runs as follows (pp. 120–121):—"We may vary the physical "conditions on which the pitch of a musical note depends, so "as to produce a graduated scale of notes increasing or "decreasing in pitch. Symbolise the series by $P_1$, $P_2$, $P_3$, $P_4$, "$P_5$, . . . $P_n$. Now, if the variation of the physical conditions "is sufficiently gradual, $P_1$ may be quite indistinguishable from "$P_2$, and similarly $P_2$ may be quite indistinguishable from $P_3$, "and $P_3$ from $P_4$. None the less, $P_4$ will be perceived as "distinctly different from $P_1$. But this would be impossible "unless the change in the physical conditions were accom-"panied by a change in the sensation, even when the change "is imperceptible." This argument seems to me to fail entirely to prove the required conclusion. When we are told that $P_4$ will be perceived as distinctly different from $P_1$, the meaning, I suppose, is that, when the pitch rises to $P_4$, the subject is able to affirm with certainty that a change of pitch has taken place. How precisely he is enabled to attain this certainty I do not undertake to say, but it seems probable that he must do so by way of inference, and not by way of perception. It is not as if he were comparing $P_1$ with $P_4$ directly, hearing first $P_1$ sounded and then $P_4$, so that he could be said, in the strict sense of the term, to perceive the difference between the two pitches. There would then, of course, be no difficulty in understanding how, although he could not appreciate the interval between $P_1$ and $P_2$ or $P_2$ and $P_3$ or $P_3$ and $P_4$, he could yet appreciate the interval between $P_1$ and $P_4$, simply because the interval between $P_1$ and $P_4$ is a bigger interval than that between any of the other pairs. On the other hand, it is of the very essence of the argument that, as the pitch rises continuously from $P_1$ to $P_4$, he does not perceive

any difference whatever at any intermediate point. How, then, are we to understand the emergence at $P_4$ of the perception of difference? To assume changes in sensation at the intermediate pitches does not seem to help us at all, if these changes are themselves unperceived. The alleged *perception* would still emerge abruptly at $P_4$, and might as well be ascribed to the merely physiological effect of the changes in the stimulus as to the interpolated but unperceived changes in sensation. But the more, indeed, we emphasise the gradual, and therefore imperceptible, nature of the change, the more probable it seems to become that the subject does not *perceive* the change in P directly at all, but *infers* it from some other change which is perceptible; just as we infer that a very dim light has improved because we are able to see something which we could not see before.

The above examples will, I hope, have indicated sufficiently what I mean by speaking of a mental state "considered from a strictly psychological point of view." A mental state so considered is that actual experience of an object which the individual in question himself has, considered strictly as he has it, and not (1) with reference to the knowledge which it gives of the thing it is supposed to represent,* nor (2) with reference to the supposed knowledge about it which is obtained from some other experience (our own or somebody else's) of the same thing, nor (3) with reference to the supposed knowledge about it which is inferred from our knowledge of its physical conditions.

* Of course the individual himself regards the object as a thing with which he is, for the time being, in experiential contact; hence he may not himself accept the immediately experienced object at its face value, but pass a critical judgment upon it, as in 2 and 3 above. And in that case we ought in strictness to say that the total object in the mental state is the immediately experienced object as thus referred to the standard thing. But for the purposes of the present discussion it is necessary to distinguish what is immediately experienced from what is due to a critical judgment, and it is, therefore, convenient to define the term object in the narrower way.

§ 2.

Our question, then, is whether the distinctions of Clear and Obscure, Explicit and Implicit, have any application to the contents of a mental state taken in this strict psychological sense. And, first of all, we must ask how the two distinctions themselves are related to, or differ from, each other. It seems to me that the distinction between the explicit and the implicit is the wider distinction of the two, and that the distinction between the clear and the obscure must be regarded as falling under the more general conception of the psychologically explicit.

When we speak of a component of a mental state as being psychologically implicit, we may agree to mean, (1) that, on the one hand, the component is really present in, and gives some sort of colouring to, the mental state, so that the mental state with the component is different from—and might be known by the subject to be different from—a mental state otherwise the same but without the component, (2) that, on the other hand, the subject is not aware of the component itself as a distinct or distinguishable component; he cannot, or at any rate, for the time being, does not, distinguish it at all from the other components with which it is blended. The first of these two marks serves to distinguish psychological implicitness from logical or again physiological implication: and it is all important to keep these three things entirely distinct. A physiological cause or correlate has no psychical existence at all, while the logical grounds or consequences of a person's beliefs may be totally absent from his consciousness, and possibly even beyond his unaided mental grasp altogether. Whereas a psychologically implicit component is actually present and operative in the mental state itself, though not apprehended in its distinctness from other components by the subject. In one sense he is aware of it, and in another not; and this is an ambiguity against which we must be on our guard. He is

aware of it in the sense that it is actually part of the total object of his consciousness. He is unaware of it in the sense that he has no distinct awareness of it as a part of the total object distinct from other parts.

It seems, then, that we must say that any component of which we have any specific awareness at all, however obscure the component may be, has ceased to be strictly implicit. And the clear and the obscure must thus be regarded as degrees of the psychologically explicit.

It would seem preferable, therefore, to discuss the psychological application of the two distinctions separately. For even if we admit the application of the distinction of clear and obscure to the contents of a mental state, we may still deny the application of the wider distinction. The view to which I incline myself is (1) that psychological implicitness is a sheer fiction, and that the distinction between the explicit and the implicit has no psychological application whatever, (2) that, while the distinction of the clear and the obscure, on the contrary, is actually based on psychological facts, it nevertheless expresses these facts in an unpsychological way, and is thus a distinction which cannot properly be employed in a psychology which remains strictly at the point of view from which the science is supposed to regard its subject-matter.

## § 3.

I begin with the distinction of clear and obscure, and my purpose, so far as this distinction is concerned, is mainly to state the difficulties which I find in determining what exactly the distinction means, and what exactly is the nature of the psychological facts which it is meant to describe.

It seems necessary to distinguish at the outset between two ways in which the distinction may be applied. It may be applied (*a*) in comparing one total mental state with another, (*b*) in comparing one component of a mental state with other components of the same state. The difference in clearness

between two total mental states may be due either to objective or subjective causes—more precisely expressed, either to physical or to physiological causes. As an example of the former kind we may take the contrast between one's view of a strange place on one's first arrival in the evening and one's view of it the next morning. I suppose it will hardly be disputed that in this case the greater clearness of the morning view consists, on the one hand, in the physical clearness due to the stronger illumination, or, on the other, in the more ample, detailed, and accurate perceptual knowledge which goes along with the physical clearness. The case is exactly parallel to the case of the navy-blue and black as seen by gaslight and by daylight. The difference between the evening view and the morning view consists essentially in this, that the morning view affords much more information about what I have called the standardised thing. But the fact, that the evening view affords less information, does not make it less clear in itself. An artist would, I suppose, regard both views as equally definite subjects for his art. To use the terminology suggested above, the difference in clearness comes, as it were, between the object and the thing, not between the subject and the object.

Now this distinction throws some light, I think, on the question, "What is to be our test of clearness and obscurity in a mental state, as such?" Obscurity in a mental state as such must be an obscurity which comes somehow* between the subject and the object, not between the object and the thing. And from this follows at once the conclusion, at first sight paradoxical, but really a truism, that when the subject is able to say that the object is obscure, the mental state as

* I am not called upon to *explain how*. The negative meaning of the phrase is plain, viz., that the obscurity in question is not the obscurity which pertains to the object as representing the thing Before we can give any positive meaning to the phrase, we must be convinced that the alleged obscurity in mental states is a fact—and a fact, I perhaps should add, which is open to psychological investigation.

such is clear and not obscure. In other words, the obscurity belongs to the object in its representative character, not to the object in itself or in its psychological character. For the subject is able to characterise the object definitely, even if this definiteness consists only in the definite recognition of the indefiniteness of the object in its representative character.

With this distinction between representative obscurity and mental obscurity proper before us, two things seem to follow :—

(1) Any attempt to establish the existence of mental obscurity must be involved, to say the least, in a peculiar difficulty; for, on the one hand, any obscurity of which the subject has any definite or direct awareness at all must be an obscurity of the object in its representative character, and, on the other hand, if we venture to attribute to the subject a mental obscurity of which he is not himself aware, we must certainly be in grave danger of committing the sorts of fallacy referred to in §1. When we ourselves apprehend something clearly, and another person—who, as we think, ought to do so too—does not, we are apt to take it upon ourselves to say that his mind is confused, although the true state of the case may be, that his mind is as clear as our own, but has a different object before it.

(2) Any comparison between two total mental states in respect of clearness and obscurity can hardly mean in strictness what it professes to mean. As we have seen, it may easily mean that the total object in the one case gives far less definite knowledge than the total object in the other. Or, if it does not mean this, it may mean that the subject is describing shortly, as want of clearness in the mental state as a whole, a number of particular effects which are due to fatigue; so that when he says his mind is not so clear as it was, he really means that, to judge from results, it is not working so well or so quickly. It seems hardly possible in fact, that the subject could be aware, either directly or inferentially, of a mental obscurity that was diffused over his

whole mental state. Certainly the more uniformly diffused the obscurity was, the less could he be aware of it. I do not mean at all to deny the existence of diffused mental obscurity, brought about in the second way mentioned above, viz., as a result of physiological causes. For such diffused mental obscurity seems indeed to be more defensible than a more limited obscurity within a state otherwise clear. I merely suggest that it is a limiting case or abnormal condition, which is beyond the reach of any strictly psychological investigation. It would be the condition, I suppose, of a person dazed by a blow, or stupefied by drugs, or rendered almost unconscious by severe illness. But obviously a person in such a condition could not really be aware of his condition. As soon as he became definitely aware of anything the condition would have already ceased to exist. Nor does there seem to be much force in the suggestion, which may naturally be made here, that his emergence from the condition must be gradual. For the case hardly seems to be one to which the idea of continuity will apply. There are some transitions which must be abrupt. In the same way as the transition from unconsciousness to consciousness, from sleeping to waking, must be abrupt, so must that from mere feeling to definite cognition. And once the necessity of an abrupt transition at some point is granted, there seems to be no theoretical gain in interpolating a stage of confused or obscure cognition between that of mere feeling and that of definite cognition.

It would seem, then, as if any obscurity, which the subject can attribute to his own mental state, must be attributed only to certain parts or components of it on the strength of comparisons or inferences based on other parts or components which are not obscure but clear. We must, therefore, now consider the alleged difference in clearness between components of the same mental state.

§ 4.

In the discussion of the question in this second form it will be desirable, I think, to separate the consideration of sensational or perceptual clearness from that of conceptual clearness or clearness of thought. The fundamental issue is no doubt the same, whether we are considering perceptual obscurity or intellectual confusion, but for definiteness of treatment it will be more convenient to take them separately. I begin with sensational or perceptual clearness and obscurity.

The most emphatic assertion with which I am acquainted of the distinction between the clear and the obscure in this sphere is that of Titchener, who says roundly that clearness is an *attribute* of sensation, that is to say, sensory clearness is of different degrees, and every sensation has some degree or other of clearness.* The confidence with which Titchener affirms his view may be partly due to the fact that he not merely connects clearness with attention or the attentive consciousness, but practically identifies the two things. The difference between the clear and the obscure, or between the more and the less clear, is the difference between the focal and the marginal content of consciousness, and this latter difference is, of course, a commonplace. On this view, it is argued, we get rid of much of the perplexity in which the theory of attention is usually involved, for we turn away from fruitless controversies as to the nature of attention as an activity,† and devote ourselves to the investigation of the definite attribute of clearness and the conditions of its presence in greater or less degree.

Now I should have thought that, even from the purely technical point of view, it must be a mistake to speak of

* In Titchener's opinion there are only two degrees or levels of clearness, although the difference between these two levels is not always the same.

† Either Titchener or Dürr, who takes the same general view of attention, says something like this.

clearness so understood as an "attribute of sensation." For the more we identify clearness and attention the more necessary it would seem to be to consider clearness, not as an attribute of particular sensations, dependent essentially or primarily on *their* specific causes or bodily conditions, but rather as a characteristic of the mental state as a whole, with reference to which alone its distribution and variations can be discussed. But the question with which we are here concerned is the more elementary question as to what this "clearness" actually is or means, and more particularly whether it is or means any one particular fact or property, as the phrase "attribute of sensation" would seem to imply. Now Titchener certainly seems to suppose that every one must know at once what is meant by clearness, and that it is a perfectly definite and easily distinguishable feature of the sensation of which it is predicated. "There are," he says, "in my experience, very few departments of psychological observation in which the distinction of clearness from the other attributes of mental processes offers appreciable difficulty."* One would feel more hesitation in questioning this confident statement of a recognised expert, were it not that the experts are in the most extraordinary disagreement among themselves as to what actually happens in the mind and what is actually present in it, when a mental content sinks from one level of clearness to another. Speaking with reference to certain experiments in which the observer listened to series of metronome beats, Titchener tells us† that, according to Wundt's view, "we are to suppose that the metronome beats march out of consciousness, in single file, each one growing dimmer and dimmer until it finally crosses the conscious limen and disappears." But other experts, such as Schumann and Titchener himself, profess that of all these gradations of diminishing clearness they can in their own

* *Psychology of Feeling and Attention*, p. 211.
† *Ibid.*, pp. 235–6.

introspection discover no trace whatever. In view of disagreements of this sort one would think that clearness can hardly be the simple and easily recognisable, though indefinable, attribute of sensation, which Titchener would have us believe it. For my own part I must confess that, when clearness is described in this way, I simply do not understand what is meant. When it is said that clearness is a simple and indefinable attribute comparable with quality, intensity, extension, and duration, I simply do not find in the statement the description of anything which I can recognise in my own experience.

There are two kinds of clearness which I see to have a definite meaning, and two corresponding senses in which the psychological object may be said—though the statement is psychologically loose and vague—to become clearer. The one case is that of physical clearness, the increasing clearness of the view when a mist lifts, of particular things when one approaches nearer to them, of the interior of a railway carriage as the train emerges from a tunnel, and so on. But it is obviously impossible to regard the corresponding change in the psychological object as a mere variation in the degree of a single attribute. Except as regards the increasing intensity of the light in the last example, the change would seem to consist, not in the variation of any one attribute, but in the perception of many new objects or parts in the total object. Again, there is the intellectual clearness of which we are conscious when we get rid of confusion or contradiction in our thoughts. Here too we could not possibly regard the psychological change as a mere variation in the degree of an attribute. But it is not really cases of these two kinds that Titchener has in view. What he has in view is the change which is involved in a movement, or new distribution, of attention, and which he regards as consisting essentially in a difference of clearness. That a psychological change takes place is, of course, unquestionable. But what is the nature of the change? Suppose a subject S, who is looking, say, at a wide landscape,

looks first at a point $P_1$ and then at a point $P_2$, what is the nature of the psychological change that takes place? The answer apparently assumed to be self-evident is, that whereas at first $P_1$ was clear and $P_2$ obscure, now $P_2$ is clear and $P_1$ obscure. It is perhaps worth while to recall the fact that there is another possible answer of a very simple kind. S, looking intently at $P_1$, may not at first have been aware of $P_2$ at all, but then, having had his attention diverted to $P_2$, ceased in turn to be aware of $P_1$. Of course, it will be objected at once that a change of this kind is irrelevant, since the change with which we are now concerned is a change within the *same* psychological field of consciousness, not a transition from one psychological field to another. With symbols of so simple a kind the objection seems forcible enough. Yet even then, I think, it really begs the question in assuming that the field *can* remain the same when the direction of attention is altered. The same physical things are there to be seen, but it does not follow at all that the total psychological object remains the same; in fact, the presumption is that it does not. Let us make our symbols rather more complex. Let $P_1$, when attended to, be seen to contain the elements $p_1$, $q_1$, $r_1$, and $P_2$, when attended to, be seen to contain the elements $p_2$, $q_2$, $r_2$. Then the change may be one from a $P_1P_2$, in which all the elements of $P_1$ are apprehended but only some of those of $P_2$, to a $P_1P_2$, in which all the elements of $P_2$ are apprehended but only some of those of $P_1$; say, from $p_1q_1r_1p_2$ to $r_1p_2q_2r_2$. Of course, these symbols are not particularly happy, because they suggest that while some details of $P_1$ drop out, when the attention changes to $P_2$, the one detail $r_1$ remains the same as before. Whereas the real nature of the change would be that all complexity and detail, as such, drops out, and some perceptual element of a much simpler kind is left. Thus when we look directly at a large building, it is full of detail—doors, windows, and other architectural features—but, as we turn our gaze further and further away from it, it becomes only a dark mass. An

example like this would lead us to define focal clearness as consisting in precision of outline and richness of detail, while marginal obscurity consists in the absence of these. So far as I see, perceptual clearness and obscurity must always mean something like this.

Now, if this is the meaning of the contrast between the perceptually clear and obscure, we may ask, in the first place, Has the contrast any peculiar connexion with attention? For the same absence of precision and detail may be produced by merely retiring to a sufficient distance from the thing observed while continuing to look at it as directly as before. However, it may be replied that equally distant objects, *not* directly looked at, would be still more vague, so that relatively the distinction remains. But, in the second place, we may ask, Is the distinction, as stated above, really a psychological one, or is it not, after all, a distinction in the cognitive values of the focal and marginal parts of the field? And finally, if we expressly exclude this cognitive reference, and confine ourselves to mere psychological description, we may ask this last question, Do the terms clear and obscure express one simple contrast in respect of a single attribute, or are they not rather mere shorthand designations for a great variety of particular differences which are not differences of clearness, but differences of some other kind, *e.g.*, quality, spatial figure, etc. ?

From an incidental reference of Titchener's* to the "confusion of attentional clearness with cognition," it may be inferred that, in accordance with his general attitude, he would be the last to admit that the psychological distinction between the clear and the obscure is one of cognitive value. And in that case I do not myself see what other meaning clearness can have than that expressed in the other alternative, viz., that the so-called "clearness" is no single additional attribute, but simply a short way of referring to a number of differences in

* *Ibid.*, p. 370.

the ordinarily recognised attributes of sensations or perceptions, according as the thing, from or of which we have the sensations or perceptions, is being attended to or not—together, of course, with differences in the number of these sensations or perceptions themselves. And this would imply, that if in psychology we speak of the *same* object as being now more, now less, clearly apprehended, we are simply using a loose and inaccurate way of expressing the fact that the object itself has altered and is no longer the same.

I am inclined to suggest that the experimental treatment of sensation may help to maintain the confusion between a difference in the object and a difference in the mode of apprehension. For in experimental work the sensation occupies an ambiguous position. It should strictly be regarded, I suppose, as analogous not to the "object" so much as to the "thing," for it is an objective element which is detached from things and made into a thing on its own account. But for the experimentalist it is at once an effect of the stimulus and a mode of apprehending the stimulus. If, then, marginal discrimination of the stimulus is inferior to discrimination with full attention, the experimentalist will be apt to take this as a proof of degrees of clearness in the mental state, whereas it is no more a proof of this, than the difference between direct and half averted vision of the large building in the previous example was a proof of it.

Perceptual clearness, then, I am inclined to maintain, may involve psychological differences of other kinds, but is not itself a psychological difference, either in the sense that there are degrees of being conscious, or in the sense that clearness is a single attribute which mental contents possess in different degrees according to their place in the mental state as a whole. On the contrary, it must be defined as consisting either in the higher cognitive value of the objective content, or in the greater precision and detail of the objective content which gives it this cognitive value, or lastly in the physiological and

psychological conditions which are required for the perception of an objective content of this kind. In other words, the objects before the mind differ from each other, and one part of the total object differs from another part, and these several objects or parts yield a better or worse knowledge of the corresponding things, but as regards any one object or part of a total object, it must either be there in consciousness or not, and, if there, then there in some definite way. It cannot, as it were, be half there and half not, or there only to half the degree it might otherwise be. When it is said to be there in a dim way, the real fact is that something else is there which, under the altered conditions, corresponds to the same thing or is produced by the same stimulus.

§ 5.

The subject of conceptual clearness or clearness of thought is simpler to this extent, that the question of a marginal content does not arise in the same way as in the case of perception. In the case of perception the fact that we are constantly surrounded by external things, and that our senses are therefore constantly being stimulated, makes it natural to assume that we must have many more sensations than we are ever clearly aware of or even aware of at all. But there is no such passive receptivity of stimulation in the case of thought, and therefore the question of a marginal region of thought practically does not arise at all. We can hardly be said to think a thought without also being really aware that we think it. The thought may be fleeting and sketchy, so to speak, but it cannot merely happen to or in us; as the sensation may seem to do, when we think of it more as a bodily impression than as an experience. In the case of conception, and conceptual obscurity, therefore, there seems no reason why we should not apply the dilemma noticed above (§ 3). Is the subject aware of obscurity in the object of his thought? Then his thinking is clear and not obscure. Is the subject

not aware of any obscurity in the object of his thought? Then we have no right to impute to *his* thinking an obscurity of which *we* are aware; for in the very fact that we have become aware of such an obscurity it is implied that we are thinking not merely his thoughts but others besides, which show that those which he was thinking were defective and incoherent. The force of the dilemma is illustrated by every case in which we seem to see quite clearly the solution of a "puzzle," when the solution is nevertheless wrong. Take, *e.g.*, the following "puzzle." Suppose that a ship leaves each side of the Atlantic every day throughout the year, and that the passage takes eight days; how many American ships will an English ship pass on its way across? Those who answer "eight" seem to see the truth of their solution quite clearly, and yet it is wrong. Now we have psychologically no right to say that their thinking is obscure because it is wrong. They think quite clearly what they do think, but they do not think the proper thoughts, they do not think all the thoughts that are required for the true solution of the problem. Of course, after the considerations which they have omitted are pointed out to them, they are aware of a confusion, or defect, or obscurity, of which they were not aware before. But it is only from a logical, and not from a psychological point of view,* that we can say that the confusion was there all the time, although they were not aware of it.

§ 6.

It remains to consider the distinction between the Explicit and the Implicit. This I propose to do quite shortly, because in the case of this distinction it seems to me that we are concerned, not so much with particular facts, as with the *a priori* legitimacy of the hypotheses which are to be used in their interpretation.

* I use this distinction for convenience, not because I think it ultimately sound.

It may be well to refer again to the ambiguity in which we are involved as soon as we begin to speak of our awareness or unawareness of the alleged implicit elements in a mental state. We may be said to be aware of them in the sense that we are aware of a whole in which they are contained, but we are not aware of them in themselves, not aware that the whole does contain these elements, since we have not yet distinguished them. The implicit must therefore be distinguished from the simply potential. If I have forgotten a name which I afterwards remember, the name was not implicit during the period of forgetfulness, because it had then no conscious existence at all. Implicit elements, on the contrary, are actually present in the mental state ; they are potential, not for consciousness, but only for discrimination. As I do not believe in the existence of such implicit elements, it is impossible for me to give an example which seems to myself satisfactory. But the cases which those who do accept the distinction have in view are such as the following. "When I hear a sound I am actually aware both of its pitch and of its loudness. But I need not distinguish the pitch from the loudness or either of them from the sound in its unity. When in seeing a person I recognise him, I do so through certain characteristic features. But I need not, and usually do not, separately discriminate these features from each other or from the whole appearance of the person."*

It is most important not to mix up with the distinction between the explicit and the implicit another distinction which has often to be drawn in psychological and philosophical discussion, the distinction between the conscious apprehension of an object of perception or thought, on the one hand, and a reflective statement about what is perceived, an abstract formulation of what is thought, on the other. This second distinction I regard as entirely sound and necessary, but it also seems to me to be essentially different from the distinction

* Professor Stout uses examples of this kind.

between the explicit and the implicit. Examples will make this plain. Everybody consciously makes inferences from effects to causes, very few in comparison can give an abstract formulation of the principle upon which they go in making such inferences. When a watch will no longer go, its owner takes it to the watchmaker, for he is sure that something is wrong with it. Even a child, if he leaves his toy on a chair and finds it gone when he returns, will think that somebody has taken it. In these cases there is nothing *implicit* about the causal inference, it is quite consciously made, although the owner of the watch may not know, and the child be unable to understand, the abstract law of causation. Again, suppose I meet in a room ten persons of whom I know all but one; I am asked afterwards who were there and how many; I give the names of those I knew, and add that there was another person whom I did not know, and that there must therefore have been ten persons in all. Here the naming is an instance of reflective statement. It does not alter the perceived content in any way, or add anything to it, but simply communicates in a definite way what was perceived. An exact description of the unknown person as remembered would be another instance. For, although I had not separately enumerated the characteristics of his appearance to myself before, I am now merely reading them off from my memory image. I am not making the image more definite than before, but am merely stating in a definite and successive way what was already definitely but simultaneously apprehended in it. The counting, on the other hand, may be a piece of new knowledge based on the data supplied by memory. I did not know exactly how many were there until after I had counted, and am therefore adding to my previous awareness something which was logically (or arithmetically) involved in it, but of which I was, strictly, not aware in any sense at all until the counting had been done. Now we must distinguish from both of these processes—both from the reflective statement and

from the subsequent operation upon the mental data—the relation of the explicit to the implicit. Suppose I had been asked if the unknown person was dark or fair. I may be unable to say. Now, if we suppose that it is not the case that I knew at the time and have simply forgotten, there still remain two possibilities: on the one hand, it may be said that although I perceived the person sufficiently well to know that I did not know him, I did not perceive him as either dark or fair—of course we may assume that he could not have been either in a very marked degree—on the other hand, it may be maintained, that, if the person was, say, fair, and I perceived the person, I must also have perceived, or been aware of,* his fairness, although my perception or awareness of it remained implicit.

Now the latter contention is plausible, but it seems to me to depend wholly on one of the fallacies referred to in §1. The argument, stated in general form, is really this, that, because the object was there before me and because it had certain features, I must have been somehow aware of them. My answer is that, in the first place, no amount of indirect argument from the presence of the stimulus will prove that I have a sensation or perception when I myself am not aware of having it, or that I have had it if my memory truly records no awareness of having had it. And if it is objected that I am here playing on the ambiguity of the term awareness, I answer, in the second place, that implicit awareness—awareness without distinction, awareness of two in one without awareness that the one contains the two—is a conception which is to me simply self-contradictory. And on this view, of course, the question really ceases to be one of fact, for it becomes the question whether the hypothesis of implicit elements is really thinkable at all as applied to consciousness. For my own part I am bound to say that I am unable to make intelligible to

* I insert this alternative phrase to anticipate the objection that the word perception implies too definite a sort of awareness.

myself the sense in which *two* items can be said to be present in consciousness, when there is no consciousness of difference between them, or how any item can be said to be present when I have no awareness of *its* being there among other items. I simply do not see what such presence can mean. Hence no indirect arguments even from conscious data themselves seem to me to be in the least adequate to prove the supposed implicit awareness. It may be argued, *e.g.*, that the schoolboy rival, from whose jacket the youthful Walter Scott cut off the button, must have had an implicit awareness or sensation of its absence, since his repetition of the lesson showed definite conscious effects which demand a cause in consciousness. But, of course, the answer is, that while the repetition was affected, and the boy must therefore have felt some sort of unusualness and discomfort, it does not follow that he had any awareness, implicit or otherwise, of its source; all that is required is that he felt something which distracted his attention.

But it may be said that there is one decisive proof of implicit awareness, viz., the proof that is given when two elements, which were not discriminated at the time, are discriminated by subsequent reflection. I suppose this would be a proof, if one could believe that it ever happened, but I am afraid that only those, who already accept the conception of implicit elements, are likely to be able to do so. Those who do not accept the doctrine will hardly be convinced that the subject of the experience had not really been aware, in the ordinary sense of the term, of both elements, although he had not reflected upon their difference and named them separately. Suppose a person describes a sound he has heard as a loud shriek, or even simply as a shriek. He does not expressly distinguish the loudness of the shriek from its "shrieky" quality, but he is surely quite explicitly aware of both. If he merely describes the sound as a shriek, and is then asked if it was loud, he does not in his answer do more than read off what was already explicit in the memory image.

The real importance of the question of implicit elements lies in its connexion with the more general question of psychological method. From the point of view of method the appeal to implicit elements seems to me to be, in its very nature, both useless and mischievous; mischievous, in fact, because useless, because it makes a show of explanation without really explaining, and prevents us from seeing that the real work of explanation has still to be done. When it is said that the elements $\alpha$ and $\beta$ were already implicit in a prior state X and are now distinguished in a state Y, we are apt to think that we have obtained some information as to X and some explanation of the possibility of Y. Whereas the statement merely asserts that X contains the potentiality of Y, and asserts it in a way which tends to prevent us from inquiring what X really was in itself. We do not really get any information at all by being told what X was or contained *implicitly*. What we need to know is, what X was or contained *explicitly*, and how the transition was made from the explicit X to the explicit Y. And it is hard to see what help the merely implicit presence of $\alpha$ and $\beta$ in X can give us in explaining this transition. The properties of the "thing," to which these undiscriminated elements in the object X correspond, must of course be before the mind when they come to be discriminated; but they are there in the thing itself, so what do we gain by saying that they were also in the mind before it recognised them in the thing? We do not make it any easier to understand how the subject comes to discriminate them in the thing now, by supposing that they were implicitly present in his previous perceptions of the thing. That his previous perceptions of the thing were affected by the fact, that the thing had these properties, may be true enough, but we gain no light upon the actual manner in which the perceptions were thus affected, when we make the effect consist in the transference of the properties to the mind in the shape of undiscriminated mental elements.

The notion of implicit, like that of unconscious, mental

elements is so obviously at variance with the very nature of consciousness itself, that its introduction could only be justified, apart from metaphysical considerations, if the notion were imperatively demanded by the requirements of psychological explanation. But, so far as I can see, any promise which it may seem to give of fulfilling these requirements must turn out in the end to be wholly illusory.

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II.—*By* G. F. Stout.

Unlike Mr. Barker, I hold that within the field of consciousness there are contents which are not separately discerned. By this, I mean that we apprehend or experience them, without, in the same act, apprehending that they are distinct from each other or from the whole of which they are part.

Mr. Barker, in common with other opponents of this view, rejects it on the ground of intrinsic absurdity. "For my own part," says Mr. Barker, "I am unable to make intelligible to myself the sense in which *two items* can be present to consciousness when there is no consciousness of difference between them."* The notion of "implicit mental elements" is, he holds, obviously at variance with the very nature of consciousness itself. The question is not one of fact; it is the question whether the hypothesis is really "thinkable at all." Now no proposition is strictly unthinkable unless it is either self-contradictory or contradicts some self-evident proposition. According to Mr. Barker, the conception of undistinguished

* It should be noted that my account of implicit consciousness does not exclude all experience of difference. What it does exclude is *judgment* of difference. I do not mean to deny that difference between *a* and *b* may be present to consciousness without awareness of the *fact that* they differ. But such presence would fall short of what is called distinguishing *a* from *b*, or being aware of *a* as being distinct from *b*, or separately noticing either *a* or *b*. It would be the presence of a difference without the presence of a distinction. Mr. Barker, as I understand him, held that all presented differences must be distinguished.

contents, or "objects," is at variance with the very nature of consciousness. If he means the nature of consciousness as revealed by study of conscious life in its special phases, the question is one of fact. But, as he holds that the absurdity is obvious apart from all reference to facts, the alleged inconsistency must be an inconsistency either with the very meaning of the word "consciousness," or with some proposition self-evidently implied in what we mean by consciousness. The first alternative is that the presence of a content A in consciousness is simply identical with the presence to consciousness of A's distinction from other contents. But this can hardly be maintained unless we are prepared to assert that A simply is A's distinction from other contents—a proposition which is itself internally inconsistent. The second alternative is that, owing to the very nature of consciousness, where there is an apprehension of A there must be an apprehension of it as being distinct. To Mr. Barker this proposition appears self-evidently true; it appears so certainly self-evident as to supersede all need for inquiry into particular facts. I, on the contrary, am in the same case with such men as Leibniz, Kant, Hegel, Lotze, Bradley, Wundt, Stumpf, and Ward. I fail to detect the self-evidence. It follows that what I and those who agree with me have in mind when we deny self-evidence, cannot be just the same as what Mr. Barker and those who agree with him have in mind when they assert self-evidence. The self-evidence must depend, for Mr. Barker, on some lurking presupposition which I do not share with him. The earth flattener finds it self-evident that if the earth were round, the water in the Suez Canal would flow out in opposite directions at both ends so as to leave the canal dry. He proceeds on the assumption that the case of such round bodies as an orange on the surface of the earth is in all relevant respects analogous to that of the earth itself. On this assumption, it really is self-evident that the water must flow out at both ends. But the assumption itself is not self-

evident. If the earth flattener could bring himself to consider impartially the alternative which his opponents have in mind, he would be able to see that it is not so.

Now if what appears self-evident to Mr. Barker really is self-evident, it ought to be possible for him to present it in such a form that the self-evidence will be discernible to all other competent inquirers. Judging from my own case, he has failed to do this. How then am I to carry the discussion further? I might content myself by saying that as the self-evidence is plainly very dubious, we are justified in neglecting such abstract and *a priori* considerations and making the issue depend wholly on scrutiny of facts. But as this course cannot be very satisfactory to my opponents, I shall first make some tentative suggestions as to the nature of the underlying assumptions which lead them to find absurdity where I find no absurdity. In the first place I suggest that they may be confusing two distinct propositions. One is that nothing can both appear and not appear in consciousness. The other is that all attributes of an appearance, as such, must appear along with it, or, at least, all its ways of being related to other simultaneous appearances must appear along with it. This last statement would imply that if, for instance, a number of patches of colour, differing in shape and size and distributed at random in space, are simultaneously apprehended by me, and if, in fact, the colours are qualitatively so related as to form a graduated series, I must therefore be aware of the place which each colour has in the qualitative order. I submit that this is contrary to fact and also that it is not self-evident. In the second place, the real root of Mr. Barker's difficulty may be that he cannot understand how the same content A should be exactly the same when it is distinguished as when it is not. But this is no essential part of the theory of undistinguished contents. There must at least be this difference between A as discerned and A as undiscerned—that in the first case we are aware of it as being distinct and in the second

we are not. But, besides this, it is not inconsistent with the theory to admit that A in becoming distinguished may also be otherwise modified. All that is presupposed is similarity of nature and continuity of existence sufficient to make recognition possible; to make possible the awareness that the distinguished content is not something absolutely novel which comes into being for the first time in the moment of being distinguished, but rather an experience which, existing before, is now continued in a new phase. But the perception of undiscerned contents, taken abstractly, does not require us to assume so much as this; it is sufficient that there should be *any* contents which are undiscerned, whether or not these are capable of being recognised as previous phases of discriminated contents. As we shall see, the validity of part of the special evidence is independent of such possibility of recognition.

The last suggestion which I have to make is perhaps the most important. If implicit consciousness exists, its existence is less obvious and more indirectly discovered than that of explicit consciousness. To ascertain its presence requires a process of analytic scrutiny for which in ordinary life there is usually no motive or occasion. Hence it is for the most part overlooked and the word consciousness comes to be associated only with distinction. Thus, when the question is raised whether contents may be present to consciousness without being distinguished, there is a tendency to substitute for it the self-contradictory question whether contents can be distinguished and also not distinguished. I am strongly inclined to think that Mr. Barker's whole attitude is based on this confusion.

I have now said what I have to say from this abstract and *a priori* point of view. My end is attained if I have succeeded in showing that the initial argument from alleged self-evidence is by no means so conclusive as to justify us in dispensing with an independent and impartial scrutiny of special facts. I would also add that such a special inquiry is likely to yield

the best way of deciding the disputed question of self-evidence itself. If the appearance of self-evidence in an abstract proposition is illusory, it ought to vanish, when we become familiar with the detailed applications of that proposition.

As Mr. Barker indicates, the problem before us is twofold. We have to consider separately the case of sensuous experience and that of thought or conception. I shall begin with sensuous experience.

### A. Sense-Experience.

#### 1. *The Complexity of the Stimulus.*

"No amount," says Mr. Barker, "of indirect argument from the presence of the stimulus will prove that I have a sensation or perception when I myself am not aware of having it, or that I have had it, if my memory truly records no awareness of having had it." Whether Mr. Barker is justified or not in taking up this position, he ought, I submit, to have given us some account of what he supposes really to take place when a multitude of different stimuli affect the senses without severally giving rise to distinguished sensations. Here there are two exclusive alternatives between which we must decide. Either the complex stimulation makes a difference to our sensuous experience or it makes no difference. Now, I cannot suppose that when once the question is definitely raised, Mr. Barker or anyone else will seriously maintain that it makes no difference. I am, let us say, sitting in a wood on a fine day in summer: my senses are affected by the bright sunlight and by countless impressions of sight, smell, and sound; besides this, there are innumerable impressions from my internal organs which owe their peculiar character to my body being in a state of exuberant health. Substitute for this a close and somewhat dark room, full of the smell of tobacco; substitute for exuberant health, a disordered liver, a relaxed throat, and general lack of tone. Plainly in the two cases my experience as a whole will be profoundly different. Yet in both cases my attention may be absorbed in examining

the minute structure of the stamens of a flower, so that almost the only sensations apprehended in their distinctness are those which are relevant to this task.

Now, if the multitude of stimuli in combination modify sense-experience without severally producing distinguished sensations, we have a right to demand some positive account of the way in which this takes place. Those who deny the doctrine of undiscerned sensations cannot be allowed merely to offer a blank negative. They are bound to put forward a positive view in place of that which they reject. What then have they to say on this point? So far as I can see there is only one course open to them. Simplicity and complexity are mutually incompatible. Inasmuch, therefore, as the experienced effect of the complex stimulation contains within itself no complexity, it must be absolutely simple. Nay, it would seem that we are justified in going further than this. On the hypothesis we are considering, there is no content of consciousness which is not separately distinguished from all other simultaneous contents. The absolutely simple sensation, due to the manifold stimuli, ought therefore to appear in its distinctness from all else present to the mind at the same time. It ought, therefore, to be possible to become clearly conscious of the contrast between its simplicity and the complexity that becomes discernible when, as the result of analytic attention, the several stimuli which at first combined to produce it begin to give rise to a plurality of different sensations. Fully formulated, this seems to be the view which I have to oppose. I now proceed to give what seem to me decisive reasons for rejecting it as false and for accepting a doctrine entirely opposed to it as true.

### 2. *Positive Awareness of Confusion.*

The most direct evidence of undiscerned differences in sense-experience is two-fold. It consists (1) in the direct and positive awareness that there *is* experienced complexity, where only part of the details entering into the experienced complex

are severally distinguished from each other and from the whole; (2) in the direct awareness that a sense-experience has previously existed although not previously distinguished. These two kinds of evidence can be best appreciated and they possess their main cogency when they are found in combination so as to supplement and reinforce each other. It will, however, place the general argument in a clearer light if we begin by saying something about each of them separately.

As regards the first, we have only to open our eyes in order to find an example of it. We are aware, or at any moment we may become aware, of the field of visual sensation as being a whole; further we may be aware of the general nature of the whole as extensive and coloured; we may be also aware, and in general we are so, that the total field contains a vast multitude of details differing in shape, in colour, in play of light and shade, and so forth. We may even distinguish the different features according to their kinds or classes. So far there is only distinct consciousness. We are distinctly conscious that there is present a vast mass of particular and varied detail and of its general nature and general subdivisions. But let us now raise another question. Let us ask whether the whole complexity which we clearly recognise as present can always be reduced without remainder to just these particulars which, at any moment, we separately pick out so as to be aware of each of them singly in their distinction from each other and from the whole. Perhaps it would not be too bold to say that this never is so. I shall, however, content myself with asserting that in most cases, when I raise the question, at the critical moment, I am quite clearly aware that the separately discriminated particulars are only parts of the whole, standing out in relief against the rest as a vague background. Further I am clearly aware of this vague background, not as a simple sensation, but as a complex totality. The like holds good, still more plainly, for the field of skin sensation, for organic sensation, or for such a jumble of various sounds as the hubbub of

a crowd. In these instances the failure to discriminate arises, in large part at least, from the limitation of simultaneous attention. But there seem to be others in which the nature of the sense-experience itself baffles our effort to analyse it adequately even by successive steps. "Go," says Ruskin, "to the top of Highgate Hill on a clear summer morning at five o'clock, and look at Westminster Abbey. You will receive an impression of a building enriched by multitudinous vertical lines. Try to distinguish one of these lines all the way down from the one next to it: You cannot. Try to count them: You cannot. Try to make out the beginning or end of any one of them: You cannot."* Here there is the awareness of the presence of a multitude of particular lines in the visual appearance. Yet discernment so far fails that no single line can be so picked out as to be apprehended in its distinctness from adjoining lines. A more familiar instance is that of a field of grass seen at a distance. Here we are aware of the presence of a vast complexity of diverse detail, constituting a marked difference between the appearance of grass and that of a piece of wood painted green. Yet we cannot mentally disentangle the complexity. We cannot fasten on any single simple detail so as to apprehend *its* distinctness from other details and from the whole. As a last illustration I may refer to what we may call vague extensity. Touch the nape of the neck with a somewhat blunt pencil point. You receive a touch sensation which is recognisably extensive or diffused; and to be extensive or diffused is to have parts. Now try to single out one part from other parts and from the whole. You will find it to be impossible. The same holds in general for what James calls the roominess of joint sensations. It also holds, in a special degree, for the "protopathic" sensibility of the skin.

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* *Modern Painters*, Pt. II, Sect. II, Ch. IV, § 12. All that Ruskin says about this "inextricable richness" is well worth considering.

### 3. *Retrospective Evidence.*

"No amount of indirect argument," says Mr. Barker, "will prove that I have had a sensation, if my memory truly records no awareness of having had it." What precisely is Mr. Barker here requiring from the evidence of memory? Does he demand that his memory must record that he was aware of having the sensation at the moment in which he had it? If so, he is asking more than the conditions of the problem demand, and he is really begging the question at issue. It is enough that we should sometimes become aware in retrospect that we have had a sensation without also becoming aware that we then knew that we had it. Now it seems to me that retrospective evidence of this sort is to be found in abundance. I was recently walking and talking with a companion. Suddenly I noticed what I had not previously noticed, that I was uncomfortably warm. Being ever on the alert for any fact bearing on the topic we are now discussing, I turned round to my companion and said, "I have just now begun to notice that I am feeling uncomfortably warm. In doing so, I was distinctly aware that the feeling was not something quite new, coming into existence for the first time at the moment in which I distinguished it, as if it were due to a new stimulus. It may have become intensified and otherwise modified. But it appeared to me as continuous with my pre-existing experience; and not only with my pre-existing experience in general, but with a special strand of it, belonging to the domain of temperature sensations, not of sight, touch, smell, or taste sensations." This was my finding at the time, and it is a typical example of many such findings under similar conditions.

Apart from deliberate attempts to analyse exhaustively the contents of sense-experience, the most obvious cases are those in which the previously undiscerned presence of a sensation is recognised, owing to its sudden discontinuance or to some marked change in it. Take the following illustration from the laboratory. Strike a tuning-fork and let the vibration

gradually die away: there arrives a moment at which the sound is no longer discernible. Now remove the tuning-fork suddenly and rapidly to a distance; it then frequently happens that the subject of the experiment becomes aware of the occurrence of stillness supervening on and interrupting a previous sound-sensation. He becomes aware that the sound has been there, though too faint to be detected. Now that his attention has been adjusted to it he may even discern the sound of the tuning-fork when it is again brought near to him. Similar examples are not uncommon in an ordinary life. It sometimes happens that the striking of a clock is not noticed till the last stroke is reached. Yet we may have retrospective awareness of preceding strokes; some persons even succeed in counting them. We soon cease separately to discern the noise of the train or of the steam-engine by which we are travelling. But let it stop abruptly or undergo any large or sudden change, we become at once distinctly aware of it; we are aware of it in the act of being aware of its cessation, or increase, or diminution, or change of character. Similarly a candle flame may be quite unnoticed; but we become conscious at once of its previous presence if it suddenly begins to flare or flicker, or if it goes out.

I can think of only one way of explaining such occurrences without assuming undiscerned sensations. We may suppose an illusion of memory. The ticking of a clock may have been entirely unnoticed up to the moment it stops, but with the stopping there comes at once not only the knowledge that it has stopped but the last ticks are distinctly noticed. Here it may be suggested that the ticks as they occurred did not really give rise to sensations at all; none the less they so excited the brain as to leave behind physiological dispositions such as they would have left had they produced sensations. When attention is roused by the cessation of the stimulus, the physiological traces begin to affect consciousness so as to produce an illusion of memory. Sensations which were never

actually experienced appear to be remembered. This we may admit, though it is a somewhat far-fetched hypothesis, is yet a conceivable explanation of this special group of facts. But it seems to be excluded when we take into account both the retrospective evidence and the awareness of confused complexity as supplementing each other and forming together a single argument.

To this argument I now pass.

### 4. *The Evidence of Analytic Attention.*

When I expressly set myself to the task of discerning all the sense-experiences which fall within the field of my total consciousness at any moment, I may spring this question upon myself when the only sensory contents distinctly apprehended consist in a relatively small group of visual presentations, connected, let us say, with a line of print I am reading, or with the striking of a match, or the threading of a needle. But I become at once aware that this is not all I am experiencing even in the way of the visual sensation. It is only a relatively small portion of a diffused total of visual sensation, containing a rich complexity not yet explored, so as to discriminate all its parts. I now proceed to analyse its complexity by picking out part after part, avoiding as far as may be movements of the eyes. I then successively distinguish such items as the appearance of the margin of the page I am reading, of the window on my right, of the books in front of me, and so on through a very long catalogue. Now to some extent the sense-experience thus distinguished may be recognisable as new, and as coming into being for the first time owing to involuntary eye-movements,* or merely to the process of attention itself. But in contrast to this partial novelty I have, frequently, the retrospective awareness that the items successively distinguished are not entirely

* To avoid this and other complications we may select for analytic scrutiny the visual sensations experienced when the eyes are closed.

new, but in each case the continuance, in a new phase, of a previously existing experience. Further, each item as it emerges is apprehended not as isolated, but as continued beyond itself into a background of indefinite complexity, and each item, as my selective attention dismisses it, appears to lapse into this background. What I am doing is not to create and annihilate sensations one after another, but rather to single out successively the manifold components of a vague total impression. As I proceed with my analysis, it occurs to me that I have been occupying myself with sights as if my only sense organ were the eye. I now inquire whether I am experiencing nothing but visual sensations. Perhaps, after a momentary pause of bewilderment, I now become, for the first time, alive to the fact that I have a body. I discern, for the first time, the extensive field of skin sensations, together with connected organic sensation. But in the act of discerning the existence of this complex feeling, I am positively assured that this is not the first moment in which I begin to feel it. I am able to reject as absurd the suggestion that up to this point my skin and internal organs had been insensible. Having once noticed my complex bodily sensations, I may proceed, as in the case of vision, to single out special parts. I pick out, one by one, sensation of pressure, of warmth, of coolness, of tingling, of pricking, of tickling, and so forth. I pass successively from the tip of the nose to the back of the neck, the big toe, the tongue, the breathing apparatus, the beating heart, the throat troubled by phlegm, and the like. All that I have said as to the results of analytic scrutiny in the case of sight holds good here also. The only difference is that in this domain of sense-experience they are more clear and unambiguous. Similar results can also be obtained for smells, sounds, and tastes.

We may now dispose of the suggestion that the apparent pre-existence of sensations before they are noticed is an illusion of memory due to the persistence of physiological dispositions.

produced by the stimulus. What this view fails to explain is that the several contents successively distinguished appear as partial ingredients of a complex experience, and as having entered into the composition of this complex before being singled out within it.

5. *Analysis of Sensation and Analysis of Things Perceived.*

I am fully prepared to find Mr. Barker still unconvinced—perhaps quite unshaken. He will continue to maintain that I am the victim of a confusion, a confusion between analysis of the features and qualities of things perceived and analysis of sensations actually experienced. It will therefore be advisable to deal with this point more directly.

I shall take for my text a passage from Stumpf, together with James's comment on it. According to Stumpf: "When, on entering a room, we receive sensations of odour and warmth together, without expressly attending to either, the two qualities of sensation are not, as it were, an entirely new simple quality, which first, in the moment attention analytically steps in, *changes into* smell and warmth. . . . ." So, too, "when we clearly perceive that the content of our sensation of oil of peppermint is partly a sensation of taste and partly one of temperature." James remarks on this: "I should prefer to say that we perceive that objective fact known to us as the peppermint taste to contain these other objective facts known as aromatic or sapid quality and coldness respectively. No ground to suppose that the vehicle of this last very complex perception has any identity with the earlier psychosis—least of all contained it."

Here we are confronted with the question: What is meant by an objective fact? If we have in view the distinction between what is apprehended, known, or thought of, and the apprehending it, knowing it, or thinking it, then sensations are objective, as Mr. Barker recognises when he calls them objects. But this enables us to set aside as irrelevant an argument urged

with much emphasis by James,* the argument that we have no right to transfer the characteristics of what is known or thought of to the knowing or thinking of it; to assume, for instance, because what is apprehended is complex, the act of apprehending it is complex, or that, because the same object has appeared in two acts of apprehension, the two acts are themselves to be identified. "Objective fact" must, for our present purposes, mean features or characters of a material thing, or of its qualities, as contrasted with the features or characteristics of its sensible appearance, or the sensible appearance of its qualities. In the present instance the objective fact is that quality of the peppermint which we call its taste. According to James, we first apprehend this quality of the thing as simple, or, at least, fail to apprehend it as complex; we then become aware that it is really a combination of two qualities. How, we may ask, is the transition effected? Plainly we do not know of the complexity of quality in the same way as we may know that the peppermint has been compounded of certain ingredients by the confectioner. This last is information due to other sources besides the sense-experience itself. On the contrary, my perception of the complexity of the "objective" quality which I call the taste of the peppermint seems purely and immediately conditioned by the recognised complexity of its sensible appearance. Similarly, my identification of the quality which I now apprehend as complex with that which I previously failed to apprehend as complex, seems to depend directly and immediately on some connexion between the earlier and the later phases of my sense-experience, in virtue of which both are taken to be sensible appearances of the same quality of the thing perceived. If we ask what this connexion is, there seems to be only one answer. The successive experiences are not separate sensations, so that the second is simply substituted for the first. On the contrary, the first

* Especially *Principles*, vol. I, chap. V.

is transformed into the second, and they are connected by the identity which is implied when we say that something changes from one state into another. Both are apprehended as stages in the history of the same sensuous presentation. What, then, is the nature of the change?

According to James it can only be a change from simplicity to complexity. But this seems to yield no satisfactory explanation of the fact that, owing directly to the nature of the sense-experience itself, we are aware of the change as not being a change in the thing perceived, but merely in its sensible appearance. Why do we not apprehend the "objective quality" as itself changing from simple to complex? The most direct and natural explanation is furnished by the view that within the sense-experience itself there is a transition from undistinguished to distinguished complexity and that the differences we distinguish are apprehended by us not as new creations but as having existed previously. This, however, is only a presumption which could not be upheld if it were found to be at variance with fact. But if we may trust the testimony of the most expert and practised observers, the contrary is true. Stumpf, for instance, who has as strong a claim to be listened to on this point as any one could have, gave his own finding as follows: "In such cases we find ourselves in presence of an indefinable, unnameable total of feeling. And when, after successfully analysing this total, we call it back to memory as it was in its unanalysed state and compare it with the elements we have found, the latter (as it seems to me) may be recognised as real parts contained in the former, and the former seem to be their sum." To this I may add another consideration. There are cases in which I can detect in myself a tendency to substitute analysis of the features of the perceived thing for analysis of its sensible appearance. This happens, for instance, whenever I try to ascertain the nature of visual presentations belonging to the margin of the field of view. Here I am well aware of the difference between

analysing things and analysing sensations, and can guard against confusing the two processes. Why should I fail to find any trace of the same confusion in such instances as that of the peppermint?

### 6. *The Stumpf Argument from Weber's Law.*

Mr. Barker devotes some space to criticism of an argument used by Stumpf to prove the existence of undiscerned sensations, which seems to me quite cogent, provided that we grant the validity of Weber's law as it is generally understood.*

The reasoning is as follows: Suppose a stimulus S, *e.g.*, a weight on a man's hand, to be increased by successive increments so as to form the series S, $S+t$, $S+2t$, $S+3t$, etc. If the increments are small enough, the subject may fail to discern any difference between the sensation caused by S and that caused by $S+t$. The like holds for all immediately successive increments. Now consider what this must mean for the theory according to which no difference in sensation can exist without being *ipso facto* distinguished. It must mean that inasmuch as successive differences corresponding to each successive increment are not distinguished, they do not exist. It must mean, for example, that the sensation produced by $S+3t$ must be identical with that produced by $S+4t$ and by $S+2t$, and that the like must be true for all immediately successive members of the series. Further, by a simple application of formal logic we can infer that all the sensations of the series are identical with each other. There will, in fact, be throughout the same unchanged sensation. But if there is never any difference in sensation at all, it follows that there will not be any distinguished difference. This, however, is contrary to facts as recognised both by science and common sense. There arrives a stage at which the subject becomes

* Whether the law itself requires to be recast, I leave to experts to determine.

aware that the weight feels heavier than it felt in the past. In accordance with Weber's law, this stage is reached when the total increment of the original stimulus S is a certain fraction of S. Let us suppose this to occur at $S+4t$. It is useless to suggest that a difference is then distinguished because it then, for the first time, begins to exist. For if this were so, the difference would subsist between the sensible effect of $S+3t$ and $S+4t$, and would be appreciated as such. But this is not the case.

Mr. Barker urges that the difference cannot really be perceived, but is only "inferred" from some other change which is perceptible. I reply, in the first place, that this does not account for the supposed inference taking place according to Weber's law. In particular it supplies no reason why the inferred difference is not regarded as a difference between the present sense-experience and that which immediately preceded the perceptible change on which the inference is based. In the second place, if we are to trust the evidence of introspection, the subject is not inferring from extraneous data but comparing his present experience with what he remembers of his past experience. Memory is, of course, involved, but this holds for all successive comparisons, and nearly all comparisons are more or less successive.

Mr. Barker also contends that unperceived changes of sensation would not account for the occurrence of the perception of change when it does occur. This would still arise abruptly, "and might as well be ascribed to the merely physiological effect of changes in the stimulus as to the . . . . unperceived changes in sensation." I answer that although it is absurd to suppose a perceived difference where there is really no difference at all, it does not follow that it is absurd to suppose that a difference only becomes perceptible when it is sufficiently great. If we have before our eyes two groups of dots on paper so that every dot gives rise to sensation, then if one group contains 50 dots and the other 51, we may be unable, without counting, to say

which of them contains more than the other, or whether they are equal in this respect. But the case is altered if we are comparing groups of 50 and 60 dots.

## B. Implicit Thought.

I have devoted so much space to the question of implicit sensation that I am debarred by the limits of the present paper from dealing with implicit thought, which ought to receive at least an equally full discussion. I must here content myself with a brief indication of the nature of the problem. For this purpose, it will suffice to refer to the special cases of implicit recognition and latent assumption. Take as an example of the first, my recognition of my son as being a boy, and as being my son. If I formulate this in words, I can only say that whenever I see him I am aware of him as being a boy and as being my son. But this verbal description introduces distinctions which, for the most part, I do not myself make in the act of recognition. I do not, ordinarily, when I see my son distinguish between the class boys, and my son as one particular member of it among others. I have not the class *boys* separately before my mind, as I should require to have it in order to make it the subject of such judgment as "boys are playful," or "boys are different from men." Yet his being a boy is included in what I have in mind when I see him. The only explanation which I can discover of such recognition is that the class is really present to my mind, but without distinction between it and the particular instance, and without distinction between these two terms and the relation connecting them. The same holds good for my recognition of what I see, when I see my son, as being one particular phase in the life-history of a certain individual boy. Again, in recognising him as my son, I also recognise him as a boy. But I certainly do not always discriminate these two facts from each other so as to be aware of both separately. Mr. Barker would say, in such

a case, nothing is involved but the difference between reflective and unreflective consciousness. I am quite willing to accept this way of naming the difference. But the question is not "How are we to label it?" but "What is its nature?" Mr. Barker, I would submit, is clearly wrong in representing it as merely the difference between a wordless thought and the same thought otherwise unaltered except in having words tacked on to it as a sort of external appendage. The difference lies in the thought itself.

As a simple example of what I mean by a latent assumption I may take an experience which has fallen to the lot of many of us. We lift our water-jug in the morning on the assumption that it is full. But we only become aware that we are assuming this by the disconcerting behaviour of the jug when by chance it happens to be empty. The earth flattener, who takes for granted the analogy between bodies on the earth's surface and the earth, need not be separately aware of the principle on which he proceeds. Probably he is not. He simply applies the general rule in this case without distinguishing between the rule and its particular application. If he were reflective enough to make the distinction, there would be some hope of bringing him to see that he is begging the question at issue. Finally I again suggest that it must be because of some latent presupposition present either in Mr. Barker's mind or in mine, that he finds, and I do not find, the conception of implicit awareness to be evidently absurd. If we could disentangle this assumption and lay it on the table, we should be able to come to an agreement.*

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* I may here refer to the confluence and contrast which account for certain optical illusions as another instance of implicit consciousness. The subject is consciously intending, for example, to compare the length of two lines. But he is really comparing more than this without knowing it. The objects compared include something which he does not distinguish as forming part of them. *Cf.* Myers, *Text-book of Experimental Psychology*, p. 285.

## III.—*By* R. F. Alfred Hoernlé.

My contribution to this symposium can, fortunately, be brief, and this for two reasons. The first is that Mr. Barker and Professor Stout have both stated their views so fully, that the task of the third contributor has been very much simplified; and the other is that there exists already in Mitchell's *Structure and Growth of the Mind* (ch. xi, §§ 5–9) a discussion of the problem of the "Implicit" which, to my mind, is the clearest and most satisfactory anywhere to be found.

In what follows I propose, therefore, to offer first some comments on the points at issue between Mr. Barker and Professor Stout, and then briefly to draw attention to the merits of Mitchell's treatment of the question. The comments will be confined to two special problems on which the dispute between the two first contributors appears mainly to turn, viz., (1.) the problem how, for the purposes of this discussion, the "contents" of a state of mind are to be conceived; (2.) the problem whether and under what conditions a state of mind which discriminates, and one which does not, can be said to have the *same* content.

### 1. *What is meant by the "Contents" of a State of Mind?*

Anyone who carefully considers the arguments put forward by Mr. Barker and Professor Stout must, I submit, come to the conclusion that, to a large extent, their disagreement is due to the fact that they set out with different conceptions of what constitutes a state of mind.

(*a*) Mr. Barker opens with the question: "Have the distinctions of Clear and Obscure, Explicit and Implicit, any application to the contents of a mental state?" Professor Stout begins: "Unlike Mr. Barker, I hold that within the field of consciousness there are contents which are not separately discerned."

We shall presently have to ask whether the change from "state of mind" to "field of consciousness" imports a serious difference into the discussion. But the more important point is that, though both writers agree in using the term "content," they seem to attach widely different meanings to it.

It is worth observing that Mr. Barker, at any rate in all the passages in which he states his own view in the most careful language, drops the term "content" and uses "object." "Content" to him means "object," and this, I submit, is not a mere question of words but carries with it an important difference of meaning. For "content," I have always understood, is a term which has come into favour in Psychology just in order to avoid, for certain aspects of mental states, the term "object." Many Psychologists, and (unless I am much mistaken) Professor Stout is one of them, would deny that the whole "content" of a mental state is, or can be treated as, the "object" of that mental state. They would, I take it, distinguish in any mental state between those elements of its "content" which are made into "objects," *i.e.*, which are noticed, attended to, identified, discriminated, etc., and those which are not. And these latter, for all that they are not objectified, none the less contribute to the quality or character of the mental state as a whole. Some Psychologists, I understand, even hold that there are mental states in which no element of the content is elevated into an "object." Thus, it would seem, Psychologists generally recognise a distinction between contents of mental states which are also objects of those states, and contents which are not objects, though they may become so.

It makes, clearly, all the difference whether, in discussing the "Implicit," we accept or reject this distinction. For anyone who accepts it will also accept the distinction of Explicit and Implicit, whereas anyone who rejects the former will, *primâ facie*, have no use for the latter either.

This, as it seems to me, is the position as between Mr. Barker and Professor Stout. The former recognises no "contents" of

mental states except such as are "objects." A mental state, considered from the strictly psychological point of view, he says, "is that *actual experience of an object* [italics mine] which the individual in question himself has, considered strictly as he has it." Professor Stout, on the other hand, to judge, *e.g.*, from his examples in the section on "the Complexity of the Stimulus," admits aspects or features of the total state of mind which are not objectified.

Mr. Barker, in effect, as I understand him, says this: In any given state of mind, we can distinguish the experiencing or awareness from *what* is experienced or *what* we are aware of. This "what" is always *object*, and nothing but *object*. Psychologically speaking, the object, the what-I-am-conscious-of at any given moment, is always *explicitly* just what we experience it as. There is nothing implicit about it; and except by misleading metaphor we can hardly say even that there is anything obscure about it. The only distinction within the object-content of consciousness which, I understand, Mr. Barker accepts is that between objects in the focus and objects in the margin of consciousness.

(*b*) I pass to a further *ἀπορία* about "state of mind," which seems to me to have a bearing on this discussion. The term "state," taken strictly and thus distinguished from "process" or, again, from "act," would naturally refer to the condition of consciousness at any given *moment*. We get "states" of mind in this sense, if, by a fiction, we arrest the stream of consciousness at a given moment and take a cross-section. This is, I think, more or less what Professor Stout means by "field of consciousness" in the quotation above. With this conception of a "state of mind" we shall, of course, look for "implicit" elements not in the focus of attention, but in the "margin" or "background" or whatever other metaphor we happen to prefer for the more or less undifferentiated outer regions of the "field." But a "state of mind," thus conceived, is, of course, a most miscellaneous assemblage of psychical elements, many of

which have no connection with one another beyond the fact that they happen to occur together at this moment in this cross-section. On the other hand, "state" is also used, both by psychologists and in ordinary language, not for such a momentary cross-section of the total "stream," but as a general term for any definite psychical fact, *e.g.*, a thought, a volition, a feeling. That is, we find it used for that part of the stream which is dominant, stands out from the background, possesses our attention, absorbs our interest. Thus, to take Professor Stout's example of the botanist examining the structure of a flower, once in good health on a summer day in the woods, and again in bad health on a winter day in his dark study—we can take as the "state of mind" to be analysed either, as Professor Stout does, a cross-section with its miscellaneous content, or the special sensations and thoughts relevant to the examination of the flower. And, if we thus take as the mental fact to be studied the examination of the flower, we find at once that we cannot limit this fact within the four corners of any "present moment," but that it is really a mental series which at no single moment is "present" as a "whole." If you want to apprehend it as a whole, you must proceed not by cross-sections of the stream, but as it were by longitudinal sections. Try to seize it at any given moment, even though you make your moment a "specious present," and a large part of the whole fact will escape you because it refuses to be confined within these limits. To get the whole, you must include past and future stages in your survey. But, further, the past stages are not merely past and lost. Their results are, in a manner, carried along, enriching the present thought and determining its future course, without necessarily having even that kind of "presence" which consists in being distinctly recalled and separately thought of.

Surely, this point is important in discussing whether, and in what sense, anything is "implicit" in a state of mind. For, if we take the "state of mind" as a momentary cross-section of consciousness, the "implicit" will, as in many of

Professor Stout's examples, be identical with the "background" which remains undifferentiated largely just in so far as it is irrelevant to the matter on which the attention is concentrated. But that leaves out of sight the important question: Is not the distinction between explicit and implicit also applicable to experiences which are dominant and have the attention? Mr. Barker, I take it, would say "No." Professor Stout, as far as I can see, does not deal with the point, unless it is covered by his brief final section on "Implicit Thought." But it is just the point which, to me at least, seems most important of all, and which, as I shall try to show below, is admirably discussed by Mitchell.

(*c*) Lastly, I cannot leave this subject without noticing how all the points so far discussed are complicated by the distinction between attention and inattention, or focus and margin of attention. Mr. Barker accepts the distinction, but makes it fall within what he calls "object" and "explicit." Those who distinguish "content" and "object" (or non-objectified content and objectified content) naturally identify the object with what is attended to, and the "content" with the "background" which has no attention. To attend to something, in fact, is from this point of view to make an object of it, and this means to notice, identify, recognise it, to discriminate it as a whole from the context or background, to differentiate parts or aspects within it. And thus, what is obscure and implicit is what is not attended to and therefore not discriminated, as compared with what attention makes clear and explicit. But there is a source of trouble in that there are regions of experience for which this distinction will not work. Take, *e.g.*, a strong emotion like anger or fear. It will certainly make me attend to the object which rouses the emotion, but the emotion itself, though the dominant fact in my consciousness, can certainly not be said to be in focus of attention if that means that it is made an object. So, again, in a volition there are facts to which in the proper sense of the word

I attend, but the willing itself is, clearly, not an "object" of attention, and still less is it in the "background" of consciousness. The moral of this, I think, is that if we make the distinction between explicit and implicit turn on the presence or absence of objectifying attention, it becomes inapplicable to the ranges of experience indicated.

There are, of course, many Psychologists who are careful to define attention in a way which escapes this criticism, viz., as a purely theoretical or objectifying attitude or activity. But there are others who use the distinction of "background" and "foreground" of consciousness, "margin" and "focus," experiences "present *in*" and experiences "present *to*" consciousness without any such safeguard or qualification. In fact, the common identification (as in some of the phrases just quoted) of "consciousness" with "attention" would seem to lead inevitably to these mistakes. And the result is so much loose thinking in the name of the "science" of Psychology, that the average student may be forgiven if, at the end of his study, he finds himself in a thicker fog than before.

### 2. *Does Discrimination Destroy Identity of Content?*

Mr. Barker has two chief arguments against the "Implicit." The first, which I have discussed in the last section, consists in holding every kind of "content" to be "object," and every kind of object, whether attended to or not, to be from the "strict psychological standpoint" just what it appears to be. The second, which follows from the first and which we have now to consider, maintains that discrimination so changes and transforms the object that we get, in effect, a new and different object—so different that it becomes meaningless to say that the new object is the same as the old, being the old "explicitly" apprehended, or that the old is "implicitly" the new. This, if I have understood him correctly, is the burden of the concluding section of his argument. Thus

stated, the argument raises, as he says, an important question of psychological method. Now a method is tested by its success in application, and the appeal, therefore, on this argument lies to the actual facts of discrimination. In so far as it does so, Professor Stout's reply, on the basis of evidence drawn from the analysis of actual experiences, seems to me wholly on the right lines. But, on the other hand, there is, I think, an element of truth in Mr. Barker's view to which Professor Stout hardly does justice. Mr. Barker, I should say, has exaggerated this element of truth to the point of error, but reduced to its proper proportions it is worth recognising. Bearing in mind always that we are now dealing exclusively with the apprehension of "objects," the truth seems to me to be that in psychological analysis we must take every experience of an object in the first instance on its merits, as it were. We must ask simply: What is it just as it stands? And this analysis of the experience as we have it or find it must precede, and must not be confused with, any interpretation of it by comparison with other experiences such as might lead us to say, it is implicitly the same as this, or it is explicitly the same as that. This is important, for the experience in question may be the only one, or the completest, which a given type of mind can have of a given object. Thus, *e.g.*, if we assume, as I think we must, that all minds are aware of the same world, though each mind, and each type of mind, is aware of the world in its own characteristic way, it would be a mistake to take, *e.g.*, an adult's experience of an object as the standard and construe all other experiences, *e.g.*, of animals or children, as "implicitly" the same as the adult's, *if that leads us to neglect to study what these experiences are in themselves* or how the object is apprehended in them. But the exaggeration in Mr. Barker's statement is that he over-emphasizes the claim of every experience to be studied on its merits to a point at which he would, if he tried, have considerable difficulty in explaining to himself how one

experience of an object can develop and grow into another experience of the "same" object. He seems, in fact, to insist on the difference of experiences to the point of denying the possibility alike (*a*) of their identity through continuous development, and (*b*) of this identity through continuity being actually felt and experienced by the mind. For, clearly, it is not merely a question of whether a spectator (so to speak) comparing two experiences has a right to pronounce that, in spite of the difference between the objects of each, what is apprehended in the one is explicitly or implicitly the same as what was apprehended in the other, but the question is whether the experiencing mind itself, as it passes continuously from its initial apprehension of an object, say, at the beginning of a process of observation or reflection, to the fuller apprehension of the same object at the end of that process, has a right to pronounce identity in difference with the help of the distinction between "implicit" and "explicit." Granted that a given experience must be treated on its merits, must be taken, in the first instance, for what it is in itself, it surely does not follow that we need therefore neglect its continuity with others, its place in a developing movement of experience, our consciousness of its sameness (in spite of differences) with other experiences, in short our conscious identification of it with others.

It may be that I have misunderstood Mr. Barker in holding these consequences to follow from his view. But, in so far as they do follow, I should—to summarise my criticism—challenge his whole conception of the "strictly psychological standpoint" by urging that on Mr. Barker's view a Psychologist would seem to be precluded from dealing with the development of experiences at all. And I do not see how, in the end, we are going to describe a process of development, *i.e.*, a process of *this* growing into *that*, unless for certain aspects of the transformation we use the distinction of implicit and explicit. Or is Mr. Barker, perchance, prepared to join

Mr. Jacks* in contending that consciousness cannot develop at all?

After what I have urged, there is no need to say much about Mr. Barker's alternative argument to the effect that the conception of implicit awareness is self-contradictory. Professor Stout has replied to it with some ingenious dialectics which I have read with appreciation but also with some distrust in their efficacy. There need, surely, be no search for "lurking presuppositions" in Mr. Barker's mind. His "presupposition" in declaring the presence of undifferentiated contents in consciousness to be unthinkable is, I take it, simply this: that "to be present" = to be apprehended = to be distinguished. If in a given experience of an object we do not distinguish certain features, then these features are neither apprehended nor present. They may be apprehended by another mind, or by the same mind at another time, etc., but then we have another experience and, so far, a different object. The contradiction, therefore, is in saying that we apprehend *this* "implicitly" when, *de facto*, we apprehend *that*, which is different from this. To this I can only reply, as above, that it seems to me a truth mis-stated. I have agreed that to deal with each experience on its merits is half the psychologist's task, and, if Mr. Barker will have it so, the first half. But the other half of his task is to study the development of the experience of *this* into the experience of *that*, not forgetting that the development may be accompanied by the consciousness of continuous transition from *this* to *that*, resulting in the identification of *that* with *this* as respectively explicit and implicit forms of the *same*. In fact, the self-contradictoriness which Mr. Barker urges against the conception of implicit awareness is of exactly the same kind as that which has often

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* See his recent paper before this Society on "Does Consciousness Evolve?"

been urged against all forms of the conception of change, including that of development. So, once more, I ask: Does Mr. Barker propose to exclude also the conception of development from the methods of Psychology?

### 3. *The Discussion of the Implicit in Mitchell's* "Structure and Growth of the Mind."

There is another line of argument by which the right to apply the distinction of Implicit and Explicit to experiences may be defended, a line of argument which, incidentally, challenges the adequacy of Mr. Barker's conception of the "strictly psychological standpoint" on different grounds from those urged above. Why, we may ask, should the Psychologist abstract from what may be called the *function* of experiences, which consists in that a mind in and through its experiences adjusts itself to its world, masters it theoretically and practically? Now for the success of this functioning, a mind's power to grasp certain aspects of objects "implicitly" is often one of its most valuable possessions. Neither Mr. Barker, nor Professor Stout, has found space in his contribution to deal with this side of the matter. On the other hand, the full treatment of it is the chief merit of Mitchell's discussion of the Implicit. I cannot do better than summarise some of the main points of Mitchell's chapter, in order to draw attention to the value and importance of a statement, which, to my mind, is the best I have met with.

I will quote the opening passage (ch. xi, § 5) in full: "Every thought [= every apprehension of an object, whether in the way of sensation, perception, or conception] is a fact, and has a function. As a fact it, first, is a piece of experience that can be analysed and described; and, secondly, it has causal relations. As a function it, thirdly, is the performance of a task, the task of knowing; and, fourthly, it may claim to be true, no matter how or by whom it was made. The words

implicit and explicit have been used of a thought in all four respects. But we shall see that it is meaningless in the first sense, and erroneous in the second. The third sense is an appropriate one; it is the use in Psychology. The fourth sense is also appropriate; it is the use in Logic."

I do not venture to guess how far Mr. Barker would be prepared to accept this view. As far as I can judge, his "strictly psychological standpoint" corresponds to Mitchell's first sense above, but not to Mitchell's third. If so, of course, Mitchell agrees with Mr. Barker that the conception of Implicit is inapplicable to experiences taken in that first sense. But, then, Mitchell takes the third sense as the genuinely psychological one, and to experiences in that sense the application of the conception of the Implicit is, on his view, both possible and necessary.

To show this I will, in conclusion, mention briefly a few of the most interesting points of Mitchell's discussion, passing by both the two false applications of the Implicit and its legitimate use in the sense of logical implication.

(*a*) I note first Mitchell's emphasis (ch. xi, § 4, p. 249) on the fact that, though the real objects of different types of minds, or of different levels of experience and intelligence, are the same, yet the ways in which these objects are apprehended at different grades of intelligence are different. In other words, this view has room for the element of truth in Mr. Barker's contention, but supplements it by recognising the function of thoughts in dealing with the same object notwithstanding the differences in what each thought apprehends.

(*b*) I pass next to the main passage: "The thought of an object is implicit so far as the object is not distinguished and made an object on its own account, but is merely a factor in the total object as it is thought." (xi, § 6, p. 251.) And, again: "We distinguish thoughts as explicit and implicit according as their objects are attended to or not." (*Ibid.*, p. 253.) This is, of

course, the substance of Professor Stout's contention, though I think it worth noting that the phrase "total object as it is thought" does not mean the total "field of consciousness" at any given moment (a total cross-section of the stream of consciousness), but the total object as standing in the focus of attention. Consequently, the elements of the total object which are not attended to and not distinguished are not in the "background" in the same sense in which miscellaneous and irrelevant elements, having no connection with the object, may be said to be in the background. It is *within* the object as attended to that there are features which are not attended to, and, in that sense, are only "implicitly" apprehended.

(*c*) Thirdly, combining the points of view of function and development, Mitchell holds that "in considering the growth of intelligence . . . implicit precede explicit thoughts of the same real objects" (*ibid.*, p. 254), but recognises at the same time the difficulty which gives colour to Mr. Barker's argument about the self-contradictoriness of the Implicit, viz., how we can say "whether the real object that is meant in an implicit thought is the same as the real object that is meant in an explicit thought" (*ibid.*, p. 252).

(*d*) Lastly, he deals fully with one supremely important aspect of the matter which is too commonly neglected in discussions of the Implicit. I will again give it in Mitchell's own words (*ibid.*, p. 254): "Besides implicit thoughts which we cannot yet make into explicit thoughts of the same objects, there are the implicit thoughts which we can make explicit at will. We form them when we do not need to rethink our knowledge in order to use it. We are then said to take our knowledge for granted . . . It is a case of the general fact of economising in consciousness."

I will not enlarge on the importance of this kind of implicit apprehension, which Mitchell calls "taking for granted," both because it must seem obvious as soon as one's attention is drawn to it, and also because Mitchell has dealt with it

exhaustively. And so I will only repeat once more the recommendation to read his excellent contribution to the problem under discussion.

But, in conclusion, I cannot forbear to fire a parting shot, in the words of my much-quoted authority, "You cannot take too much exercise in these distinctions till they are familiar."

## XII.—MEMORY AND CONSCIOUSNESS.

*By* Arthur Robinson.

The purpose of this paper is to introduce a discussion on Memory, and this I shall essay to do by raising certain points which suggest themselves in the course of Bergson's argument in *Matter and Memory.** The precise points I wish to raise are: (*a*) the nature and adequacy of Bergson's analysis of memory; (*b*) the part played by consciousness in his theory; (*c*) the nature and *rôle* of "the unconscious," and finally, (*d*) to inquire in what sense, if any, the riddles which the "intelligence" finds or makes in the psychological study of memory are solved or transcended by intuition.

First then a few words as to some special difficulties which arise in connection with the discussion of any views maintained by Bergson, and which spring from his well-known attitude with regard to the intelligence. As everybody knows, the intellect, according to Bergson, arose as an instrument of action on the spatial world, and its procedure is throughout vitiated as an instrument of philosophy because of its practical and quasi-spatial infections. Our remote ancestors began by counting in real space; we still count in ideal space even when we number our aspirations and our failures, our sorrows and our joys. So the word fits the idea only like a loose overcoat which may be worn by almost anything human, and the idea in turn sits loosely on the psychic fact, or on any one of several considerably different psychic facts. The intelligence breaks up the continuous flow of reality, and replaces it by a schematism of bits which are not really parts, but

* All references are to the English translation.

symbols of reality. Hence, in psychology in particular, many difficulties arise from the very nature of the process of investigation which the intelligence can never solve, since its procedure inevitably creates them. How then shall we solve or even discuss them? Bergson's solution is of course found in his doctrine of intuition. As to the discussion of them, this is rendered possible because psychology is held to be a practical science, and intelligence, being practical, is so far adapted to it. But Bergson holds that the result of this intellectual procedure, which starts from intuition and goes away from reality, may be seized and absorbed by a further intuition which somehow transcends its contradictions and removes its inherent difficulties. So psychology may and should set questions to metaphysics, and in *Matter and Memory* we have a specimen of the process. This is rendered all the easier from Bergson's point of view, because, though all concepts are in the end inadequate to express psychical process, some are more adequate than others. Thus Bergson descends for a while to the conceptual level, and we may treat the discussion as not entirely excluding ordinary logical procedure, and the appeal to the inadequacy of reasoning is for the time suspended.

How can psychology set problems to metaphysics? How can metaphysics solve them? The answer to these questions clearly depends on what we mean by psychology and metaphysics, and in this discussion it depends in particular on Bergson's conception of them. Here an initial difficulty emerges. "Psychology has for its object the study of the human mind working for practical utility" (*M.M.*, XVI). "In psychological analysis we must never forget the utilitarian character of our mental functions, which are essentially turned towards action" (*M.M.*, XVII).

In psychology, therefore, we are in the region of the intelligence. In metaphysics, on the other hand, our effort is to transcend the limitations of useful action (*M.M.*, XVI); we

are then in the sphere of intuition. In the inquiry on which Bergson here enters the ordinary direction of thought will accordingly be reversed, it will proceed from the results of analysis to an integral experience. But it will not proceed by a merely intellectual synthesis; the bits will not be placed side by side, and related by external links, for, according to Bergson, we cannot reach an intuition by purely intellectual procedure. It appears, therefore, that the psychological problem will not be solved at the psychological level, but will somehow disappear at the level of metaphysics. The nature of this disappearance or solution will be more conveniently considered in the last section of this paper.

(*a*) In Chapter II of *Matter and Memory* Bergson distinguishes two forms of memory—memory habit and independent recollections. The former is illustrated by the repetition of a lesson learnt by heart, the latter by the recollection of any particular attempt to learn the lesson; the former repeats, the latter imagines. The acquired lesson is built up by repetition, and is stored in a motor-mechanism, and has all the marks of a habit. The recollection, on the other hand, springs from one imprint on the memory, it is dated, and so cannot be repeated, and must from the first be just what it always will be. "These are the two extreme forms of memory in their pure state" (p. 103). We generally meet with memory in impure or mixed forms which present, "on the one side, the aspect of a motor habit, and on the other, that of an image more or less consciously localized" (p. 103). Hence philosophers have erred and considered the phenomenon a simple one.

Taking Bergson's analysis as it stands, there appears to be some difficulty in his application of repetition, or its absence, as the distinguishing mark of the two types of memory. For if memory habit improves, it cannot be by bare identical repetition, repetition surely simply repeats and does not improve; and, again, memory proper, or recollection, on

Bergson's own showing, should be nothing but a repetition as bare and accurate as it can be.

But this is by no means all. Memory proper, the memory which imagines, is the type with which Bergson is concerned, for on it he relies to prove the reality of spirit; the reality of matter, as the scientist understands it, he takes for granted,—somewhat hastily, perhaps, for a philosopher. But memory does not merely imagine; it asserts, or, if you will, it is a judgment. Of this the final test is the fact that a memory can be true or false; to merely ask whether it is real or unreal is nonsense. We believe or disbelieve, trust or distrust, a memory; we cannot believe or disbelieve a mere brute fact. So long as memory claims to be true, we must regard it as an act of thought, and not as the bare recurrence of an image.

Again, we are told that in recollection "The image regarded in itself was necessarily at the outset what it always will be." In that case, when it emerges from the unconsciousness in which on Bergson's theory it lurks until lured forth by the possibilities of action, how will it be distinguished from what is simply present? According to Bergson it will not be recognized as a past image unless it is in the past that we seek it.

"Whenever we are trying to recover a recollection, to call up some period of our history, we become conscious of an act *sui generis* by which we detach ourselves from the present in order to replace ourselves, first in the past in general, then in a certain region of the past—a work of adjustment, something like the focussing of a camera. But our recollection still remains virtual; we simply prepare ourselves to receive it by adopting the appropriate attitude. Little by little it comes into view like a condensing cloud; from the virtual state it passes into the actual; and as its outlines become more distinct and its surface takes on colour, it tends to imitate perception. But it remains attached to the past by its deepest roots, and if, when once realized, it did not retain something of its original virtuality, if, being a present state, it were not always some-

thing which stands out distinct from the present, we should never know it for a memory" (*M.M.*, p. 171).

It would seem that in this account of recollection we have an instance of the difficulties which spring from Bergson's initial analysis of memory. Intelligence on his view must be largely credited to the side of matter, and so must be as far as possible excluded from the "Spirit" side of the account.

If memory proper be taken to be a form of assertion, there is no more mystery in our ability to think of the past, than of the future or the present. But if pure memory is taken to be something which excludes thinking, then "an act *sui generis*" must be told off to fetch up images and to constitute by its movement the recognition of their pastness.

In *Matter and Memory*, accordingly, the memory image in itself appears to be neither past nor present; there is an act of the mind *sui generis* by which it comes to be known as past, that is, to be known as a memory at all. This act must somehow differ in each case, for otherwise localisation in the past would be impossible. All that we could know would be that the image was past, not that it came from some particular part of the past, and all our memories would be brought to the same level; they would be memories of the past simply. If on the other hand, the localisation is effected because the act of the mind is in each case different, as indeed it must be if it is "a work of adjustment like the focussing of a camera," it becomes equally difficult to see why it is necessary to invoke an act *sui generis* for the purpose, and to see how such an act would do the business when invoked. If the past has "regions" then it has a structure, and we can think of it in the ordinary way of all thinking. Besides, memories do not always wait to be sought: they are there without our seeking: perhaps against our wish. They are present states, but they are also distinct from the present, and this distinction cannot be because it was in the past that we sought them, for we did not seek them anywhere. If it be admitted that memory is a sort of thinking,

the difficulties with which Bergson contends do not arise, but once exclude thought and meaning from the process of recollection, and there need be no end to the array of intermediaries and movements required to call up memories like "spirits from the vasty deep."

Why should Bergson split up memory in the way he has adopted?

It seems clear that on Bergson's view of psychology as a practical science he would naturally prefer to analyse memory on the basis of any differences which mark its various forms in their relation to action. And, indeed, there is no reason to object to an experimental analysis of anything psychic on any principle which may be preferred. But the analysis must justify itself in its results.

Any analysis on Bergson's view must result in contradictions, but these may be reduced to a minimum by the adoption of "fluid," or quasi-intuitive, concepts, which disfigure the flow of reality less than mere static concepts.

Now in the treatment of memory we find, in effect, that it is analysed into two forms, one of which at its extreme limit would contain all the similarities, the other all the differences. To meet an obvious criticism, we may acknowledge at once that Bergson expressly admits that neither form of memory ever occurs quite "pure"; he therefore separates the elements of identities and differences, in order first to see the consequences of each element separately and then the result of their interaction. But the difficulty is that on this method we find, in the end, memory hardened into two extreme forms which not only never exist, but, if they did, could never be of any use. For psychology, if a practical science, no analysis can be justifiable which leaves an instrument of action unable to do its work. While, if the analysis is a specimen of psychology setting questions to metaphysics, it is surely evident, on Bergson's principles, that these questions must be raised in the most concrete form to which psychology can attain, since

the more you analyse the further you go from reality, and so inevitably the longer must your journey back to it be.

If psychology, then, is to be a starting place for philosophy, the starting point will assuredly not be found at the lowest stage of psychological analysis. The origin of Bergson's method is, of course, quite clear, viz.: his view of the intelligence; and so much is this the case that it is, perhaps, quite impossible for those who differ on this vital point ever to come afterwards into even fighting contact with his doctrines.

Bergson's view that the intelligence pushed to its limit simply repeats is the source of his initial analysis of memory. We are told that a human being endowed only with memory proper "would keep before his eyes at each moment the infinite details of his past history"—"would never rise above the particular, or even above the individual; leaving to each image its date in time and its position in space, he would see wherein it differs from others and not how it resembles them." On the other hand, a man limited to habit memory "would only distinguish in any situation that aspect in which it practically *resembles* former situations" (*M.M.*, p. 201).

Thus, at the root of this psychological analysis there lies a logical principle, and on our acceptance or refusal of the logical principle depends our acceptance or refusal of the psychological analysis. So we seem to be brought to the unhappy conclusion that the decision of this point of our inquiry depends on a previous question, which cannot at present be discussed. But this is not entirely so. We have assumed that psychology is a practical science, and, even if we restrict (wrongly, I think) the practical function of thinking to the ordering of the movements of our body, we can never find a piece of concrete thinking which depends on resemblances only or on differences only. We must, therefore, conclude that psychology as a science of behaviour does not raise the question in the form in which Bergson raises it, and so the question of the two forms of memory is a question which psychology does not put to

metaphysics, for the simple reason that the two forms do not, in the way that they are distinguished, exist.

(*b*) If we assume that memory is an assertion, there is no difficulty in understanding its relation to practice; as an event it is a content of our present consciousness, it gives us information which serves some interest, while the more fully it enters clear consciousness, the more definite it becomes and so the more serviceable for a deliberate choice in which it may be a factor. But on Bergson's theory there is some difficulty in understanding the relation of recollection to consciousness, and this is complicated by the doctrine of *durée réelle*, in consequence of which Bergson seems entitled to speak sometimes as if there were a present, and sometimes as if there were not. In the former case, of course, he always means the concrete present which embosoms the immediate past and the immediate future; in the latter case, an abstract and imaginary cleavage between the past and future.

"Practically we perceive only the past, the pure present being the invisible progress of the past gnawing into the future." "Consciousness, then, illumines at each moment of time that immediate part of the past which, impending over the future, seeks to realize and to associate with it. Solely preoccupied in thus determining an undetermined future, consciousness may shed a little of its light on those of our states, more remote in the past, which can be usefully combined with our present state, that is to say, with our immediate past; the rest remains in the dark" (*M.M.*, p. 194).

"The psychical state, then, that I call 'my present,' must be both a perception of the immediate past and a determination of the immediate future." "My present is, in its essence, sensori-motor. This is to say that my present consists in the consciousness that I have of my body" (p. 177).

The present here spoken of is the "concrete live present," not the ideal present—"a pure conception, the indivisible limit which separates past from future" (p. 176).

Compare E. Le Roy: "Ce que nous appelons notre présent ne doit être conçu ni comme un point mathématique ni comme un segment aux limites précises; c'est le moment de notre histoire que détache notre attention à la vie, et rien, en droit, ne l'empêcherait de s'étendre à l'intégralité de cette histoire" (*Une Philosophie Nouvelle*, p. 177).

It appears then that the past is powerless (*M.M.*, p. 176), that consciousness illuminates the immediate past which impends over the future, and that my psychical present is sensori-motor, that is to say, is already determined (p. 178).

Now it is quite clear from many utterances of Bergson that he considers the primary business of consciousness to be *choice*. "We said, you will remember, that the function of consciousness seemed primarily to retain the past and to anticipate the future. That is quite natural if its function is to preside over actions which are *chosen*" ("Life and Consciousness," *Hibbert Journal*, vol. 10, p. 32).

"Consciousness in each of us, then, seems to express the amount of choice, or, if you will, of creation, at our disposal for movements and activity" (*H.*, 33).

The function of consciousness then is choice. Let us consider how memory on Bergson's theory comes into consciousness and becomes a factor in choice. The memory emerges from the unconscious and purely spiritual realm in which, as past, it is powerless, and passes through the image in a gradual and continuous process on its way to sensation and matter. The result appears to be that the more definite and clear it becomes, so much the more it becomes spatial and determined, and therefore the less useful for choice. My psychical present must be the particular region which consciousness most clearly illuminates, if the function of consciousness is choice. The difficulty is that the illumination comes too late. Freedom is pushed back into the shadows, and we should be most free when we are least clearly conscious. Thus we are left with the strange result that

intelligence, the instrument of action which at any rate *may* be chosen action, by its essential procedure stiffens up our choosing. The more we reflect and ponder the less free our choice inevitably becomes. So also our clearest consciousness is sensori-motor and already determined, though consciousness is the measure of indetermination.

If it be urged that the allegation that consciousness in its clearness comes too late for choice falls to the ground, because we cannot draw hard and fast lines on the continuous flow of real duration, the reply is that at any rate the illumination falls more on one stage of the process than on the other, and it is impossible to argue that this makes no difference. The difficulty remains, that, in the process of choosing, the memory material which is called up is further removed from indetermination the more clearly and precisely it is held in consciousness.

(*c*) Possibly the most important and certainly the most difficult part of Bergson's theory of memory is to be found in his treatment of the unconscious. It will be remembered that below the memory image, which is already partly sensation (p. 175), there is a region of pure memory which "manifests itself, as a rule, only in the coloured and living image which reveals it" (p. 170). Thought passes in a single movement from pure memory through the memory image to perception (p. 171). Bergson, in *L'Effort Intellectuel*, says that in the effort of intuition pure memories may be discerned as fleeting existences. The distinction between pure memory and memory image taken at their extreme points is definite enough. "Pure memory, being inextensive and powerless, does not in any degree share the nature of sensation" (p. 180). "Memory actualized in an image differs, then, profoundly from pure memory. The image is a present state, and its sole share in the past is the memory whence it arose. Memory, on the contrary, powerless as long as it remains without utility, is pure from all admixture of sensation, is without attachment to the present, and is consequently unextended" (p. 181).

Pure memory is therefore unconscious, and in it the past exists just as it happened,—Bergson speaks of "the plane of pure memory, where our mind retains in all its details the picture of our past life" (p. 322). "The whole series of our past images remains present with us" (p. 114). Most of our past is hidden from us because the necessities of present action inhibit it (p. 199), but "a human being who should *dream* his life instead of living it would no doubt thus keep before his eyes at each moment the infinite details of his past history" (p. 201).

Bergson discusses at some length the difficulties which surround the idea of an "unconscious representation" (p. 183). He urges that there is no more difficulty in the notion of unconscious psychical states than in that of unperceived material objects. Existence implies "two conditions taken together, (1) presentation in consciousness, and (2) the logical or causal connexion of that which is so presented with what precedes and what follows" (p. 189). These conditions may be unequally fulfilled.

It is not easy to see how these two conditions can be fulfilled, in any degree, by "unconscious memory" as it appears in *Matter and Memory*. The first—presentation in consciousness—obviously does not apply. The second—logical or causal connexion—can scarcely be found in the region of pure memory. For both logical and causal connexion are tainted with intellect, and so with the process of materialisation, and therefore cannot exist in the realm of spirit, where "unconscious memory" in Bergson's sense must be, if it is at all.

A further difficulty lies in wait for Bergson's argument. Pure memory on his showing is inaccessible to experience; it is neither conscious as subject nor known as object; it cannot be reached by intuition, for intuition is at any rate conscious. If known in any sense it must be known by inference, *i.e.*, by intelligence. But it cannot be so known on Bergson's theory. If memory is grasped by a present consciousness it is at once

tainted by the quasi-materiality of the "images." It cannot come out of the gloom without ceasing to be pure. But if so, how can intuition ever give the integral experience which is its function and its glory? Even if psychology needs to be rounded off by the hypothesis of a realm of unconscious memories whose nature is changed by the very act of knowing them, philosophy at any rate will be an image with a head of gold and feet of clay if we are to acknowledge the existence of any such region. But psychology suffers under no such necessity. If memory be thought, we no more need to suppose that memories exist when we are not remembering, than to suppose that thoughts exist when we are not thinking.

There is just as much and just as little mystery in our ability to think of the past as there is in our ability to think of the present or the future—that is to say the mystery that one part of our experience can and does mean another. Bergson, however, aims to show the existence of a memory untainted by the materiality of the intelligence, hence his theory of the unconscious.

(*d*) How does "intuition" solve the problems raised by psychology? And, first, what is intuition? In Bergson's philosophy it is the antithesis of intelligence. Intelligence is directed down stream towards matter and pure homogeneity, intuition faces up stream towards spirit and pure heterogeneity. In intuition there is neither subject nor object, neither attribute nor predicate; in intelligence there are subjects, objects, attributes, predicates, exterior to one another and hitched together by external relations. Again, intelligence gives us the outside of things, and this outside may be described from many points of view; intuition gives us the inside reality, which is and can be only one. Though, oddly enough, matter at its limit of pure homogeneity is, or would be, given by intuition, intelligence apparently having collapsed at the sight of the result of its own labours. "Pure intuition, external or internal, is that of an undivided continuity" (*M.M.*, p. 239). Lastly, intelligence

brings knowledge subtly coloured by the exigencies of action; intuition offers pure knowledge as an integral experience.

So far as I can discover, only one important characteristic is common to intuition and intelligence—when each is restricted to its proper sphere the act of knowing is identical with the act of generation. So, when the intelligence knows matter, it *is* matter; so, too, when it essays to know spirit it fails, because it cannot *be* spirit.

If intuition and intelligence are thus so sharply opposed, it becomes somewhat difficult to see how the problems of psychology can be solved by the Bergsonian metaphysics. For these problems will be in bits, and, stated in conceptual terms, they will smack of the interests of action. Intuition can only be of the continuous, concepts have no place in it, it turns its face from practice. The mind proceeds, in intuition, in a direction absolutely opposed to the direction of intelligence. But the result must be that intuition cannot know the questions which psychology raises; they cannot be judged in that court, because they cannot appear there; they are not solved, but "softly and silently vanish away."

But, it may be objected, may not the problems of psychology be solved by the substitution of "fluid" and quasi-intuitive concepts for the static and clean-cut terms in which they have been originally stated? Clearly not, for, if there is an initial mis-statement, then there is no real problem; if, however, the terms of the question were accurate, then the substituted terms will be either equivalent—in which case nothing is gained—or not equivalent, and in that case the problem is delicately conjured away. In effect, Bergson's position seems to be that the psychological question *is* mis-stated, save *for practice*. But if practice is an essential factor in the psychological situation, how can we leave it out and still state a psychological problem?

Nor is metaphysics in an entirely happy case. For though intuition may conceivably give an "integral experience," if we

understand by that an experience which is, within its limits, free from the supposed discontinuity of intellectual procedure, yet it must abstract from practice, and practice is, at any rate, part of reality. It cannot, I think, be maintained that the preceding statement introduces a sharper distinction between intuition and intelligence than is made by Bergson himself; his language on this point is as precise as possible. So the difficulty remains—how to get a truly integral experience if consciousness is split into two opposed and mutually exclusive movements.

In conclusion, how are the points I have endeavoured to raise connected with the object of *Matter and Memory*? Bergson's thesis is the reality of spirit and the reality of matter. His method is to discover some characters in experience which cannot be assigned to matter as he defines it. Such characters cannot be found in intelligence, for intelligence is held to be identity, and identity is matter. The attempt is accordingly made to find a basis in memory proper, the memory which imagines. The contentions I submit for discussion are:—

(1) Bergson's treatment of memory neglects the fact that it is an assertion, does not do justice to the function of meaning in remembering, and falls into serious difficulties through an analysis which rests on the presupposition that everything which can be called structure falls to the side of matter.

(2) If recollection is to minister to choice, it must be possible for the situation, while still fluid, to be clearly illuminated by consciousness. But on Bergson's theory, in proportion as we are more intelligent we are less free. And we cannot fall back on intuition, for that is divorced from action.

(3) Unconscious memory, in which our past exists just as it happened, is not necessary to explain the fact that we can think of the past. It is, moreover, difficult to see how the past can exist just as it happened in a universe which is essentially continuous change.

(4) If intuition and intelligence are not somehow inclusively related, and if the instrument of philosophy is intuition, and the instrument of psychology intelligence, then psychology and philosophy can never reach hands of help to one another. Psychology cannot ignore practice, which is of its essence, philosophy cannot touch practice, for that is to deny itself.

# XIII.—THE PHILOSOPHY OF PROBABILITY.

*By* A. Wolf.



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## I. Introduction.

### § 1. *Probability in Science and in Philosophy.*

Probability, although it is commonly flattered as the very guide of life, is not an exciting subject, and has consequently failed to arouse general interest. Until comparatively recently mathematicians were almost the only people who devoted serious attention to the subject. Latterly, however, there has been an awakening of a wider interest in it, partly because of its growing importance in the sciences, and partly because of its apparent connection with certain tendencies in recent philosophy. As

regards science, statistical methods are playing a very important rôle in the physical, biological, and human sciences—and statistical methods constitute, of course, the most important department of the study of probability. Moreover, with the spread of diffidence in the reality of causation and law in nature* there is an increasing tendency among men of science to treat scientific results as mere matters of probability rather than as ascertained knowledge. With regard to philosophy, the insistence of Pragmatism on the plasticity of the universe, and the stress which the philosophy of Creative Evolution has laid on its spontaneity and unforeseeable originality, may well give a new stimulus to reflections on probability. They certainly seem to encourage man's inclination to be sanguine about desired possibilities, and his general proneness to move in worlds unrealised. The purpose of the present paper, however, is a modest one. It is, not to overhaul the whole theory of probability, but barely to sketch the outlines of a general orientation of its fundamental problems.

## § 2. *A Group of Problems.*

Probability, Possibility, Chance, and Contingency constitute a group of intimately connected topics; the discussion of any one of them involves the rest. Each of these terms, moreover, is also used in different senses. It is certainly desirable to have the mutual relations of those terms, and their ambiguities cleared up. But this cannot be done adequately without reference to fundamental differences in the conception of reality. Writers on the subject commonly treat Probability and Possibility as synonyms; and this usage is more convenient than the popular restriction of the term probability to the higher degrees only of possibility. Similarly, Chance and Contingency are commonly employed as though they were synonymous, although perhaps with less justification. But, in any case, what one means by Possibility and Chance is naturally influenced by the kind of Possibility and Chance that he believes in; and this, again,

* See the writer's "Natural Realism, etc.," in *Proc. Arist. Soc.*, vol. ix., pp. 141 ff.

is determined by his general philosophic outlook. It is, of course, just on account of the intimate dependence of one's conception of Probability, etc., on one's conception of the ultimate nature of reality, that the subject of this paper is also a philosophical problem; apart from this consideration the problem pertains to mathematics rather than to logic or philosophy. At the same time, it is Probability that it is proposed to discuss on this occasion, and not the merits of any particular philosophy of nature. The plan I propose to follow accordingly is this: I propose to start in turn from each of several views of the nature of reality in so far as they are relevant to our problem. Each of these views will be treated as an hypothesis only—so as to prevent irrelevant discussions about their several merits—and our only concern will be to show how the acceptance of any particular hypothesis affects our attitude towards Probability, etc.

## II. Probability and Complete Indeterminism.

### § 3. *A World of Chance.*

To begin with, let us suppose a world so constituted that the Principle of Sufficient Reason does not hold good in it. Or, to put it otherwise, let us suppose that Causality and Uniformity do not obtain in it. In such a world anything might happen; anything might coexist with, or follow, anything else. No event would need any specific conditions for its occurrence; and similar antecedents would be followed by very different consequences on different occasions. Such a world would be a world of Chance—a world of indetermination and anomism. Everything conceivable would be possible, and so form a legitimate subject of a problematic judgment. Nothing would be impossible. We should only require two of the three modal categories, the actual, and the possible (or the actual, and the not-yet-actual). But while the realm of possibility would thus be unlimited, there would, for that very reason, be no scope for definite estimates of probability, and there would be no justification for anticipating the future on the basis of such estimates of

probability. For, where an infinity of conceivable things are equally likely, the likelihood of anything in particular must be incalculable, or at all events too slender to warrant a definite forecast. In such a world knowledge would be strictly confined to actual observations ; the unobserved would be quite unknown. If every occurrence were different from every other, if, in other words, there were no repetitions of any kind, then indeed it would go hard with *homo sapiens*. But, assuming that Reality restrained her creative originality so as to leave room for a sufficiency of repetitions, then man might survive to live on his memories of the past, and indulge in unlimited hopes for the future. Reasoning, as some of us understand it now, would be impossible. But there might still be scope for reckoning. One might spend his leisure in recording and tabulating past observations, and devising ingenious graphical representations of partial correlations, which should, of course, excite no little wonder in a world of Chance. The assumed repetitions, however, would not be regarded as (logically) justifying anticipations of similar recurrences. In fact, the sage inhabitants of such a Chance world would not even regard such repetitions as (psychically) exciting the expectation of like events, because that would be to read causality into reality. They would simply record the number of cases in which the observation of certain repetitions was followed by the expectation of similar occurrences, just in the same way as they would record any other chance conjunction of events, but would themselves entertain no such expectations.

The conception of a world of pure Chance is no doubt very difficult to get hold of, or to take very seriously. But I am only putting it forward as a vague supposition to consider its bearing on our special problem, or group of problems. And it seems to me quite clear that in such a world Chance would be strictly objective, so would Possibility. "Impossibility" would not be thought of. The "possible" would be co-extensive with the "conceivable" (or would be even more comprehensive), and could only be contrasted with the "actual,"

as the "not yet" with the "already." But there would be no scope for distinguishing degrees of possibility, and no ground for elaborating a calculus of probability.

Moreover, although anybody who behaved as though he believed that the world was characterised by such indetermination as that sketched above would very soon land himself in a lunatic asylum, or in some such predicament, yet in abstract theory it rather looks as though the views entertained by certain of the more sceptical scientists really approximate more or less to such a conception of a world of Chance. At least, so far as our present problem is concerned, I can see little difference between a world of Chance, such as was outlined above, and a "routine of perceptions" in which there is no inherent necessity, and which, even as a routine, is only a sort of concession to rational beings who could not think without it. If variation is conceived to be the fundamental factor in phenomena (as Professor Karl Pearson and others conceive it to be) and causation and determination are regarded as only conceptual limits of correlation created by human need for economy of thought, and not as inherent in phenomena, then there is little or nothing to choose between such a view and the above hypothesis of indetermination. No doubt Professor Karl Pearson, and those who think like him, would regard the above outline of a world of Chance as too dogmatic a statement of their fundamental views, which are really more agnostic. But so far as our present problem is concerned this difference is of no real consequence. In either case all that the scientist can legitimately do is to observe, to describe, to tabulate, and to plot graphical diagrams of observed associations; but he has no justification for going beyond actual observations, even to the extent of making a single forecast on the basis of past observations. Anything may be conceived to be possible; but nothing has any determinable probability.

It may appear strange that the mere refusal to postulate causation and uniformity in Nature in the absence of conclusive evidence should in some respects lead to results so like those

that follow from the definite denial of their validity. But the reason is not far to seek. Human insight and experience are so limited in character and range that they cannot conclusively prove any uniformity, nor, except perhaps in the case of our own actions, any causal connection. If we start by postulating causality and uniformity in general, then experience is sufficient in many cases to verify (that is, to confirm) particular causal connections and particular uniformities; but experience can never prove them absolutely and independently of such postulates.

### § 4. *Probability and Uniformity.*

It would appear then, that the supposition of Indetermination and Anomism affords no basis for calculating probabilities. If, therefore, a calculus of probability is to be possible it will have to be on the basis of some form of determinism and uniformity of nature. The truth of this will have to be examined in due course. But it may be as well to examine at once the view that probability is really the logical basis of uniformity (in so far as uniformity can be proved at all), instead of uniformity being the ground of probability. The view referred to rests for its justification on Laplace's *Law of Succession.* According to this law the odds in favour of $n$ recurrences of an event (or a conjunction of events) already observed $m$ times are $m + 1$ to $n$. For example, if we know nothing about the contents of a certain bag except that a white ball has been drawn from it $m$ times, then the odds in favour of a white ball coming out on the next drawing are $m + 1$ to 1. On this principle, uncontradicted experience steadily increases the probability of a uniformity. But on this principle it can also be readily shown (and this is what chiefly concerns us here) that it is really unwise, because unnecessarily risky, to trouble about establishing uniformities at all. Instead of reasoning from observations to a law colligating that whole class of phenomena, and then applying the law to unobserved cases, it would be much safer and simpler to reason directly from the

observed cases to the unobserved case or cases, and omit altogether the extravagant search after a uniformity. For, if our uncontradicted experience extends to $m$ observations, then the odds in favour of one more recurrence will be $m + 1$ to 1 ; of two repetitions, $m + 1$ to 2, and so on. In other words, while the probability increases with the number of past observations, it diminishes with the number of anticipated recurrences. Now, to suppose a uniformity is to anticipate an infinite or indefinite number of repetitions, and the odds in favour of it would therefore be $m + 1$ to infinity ; and since $m$, the number of actual observations, is a finite number, the odds in its favour can never be anything like so great as the odds in favour of one more repetition, or a limited number of repetitions. But I fail to see any logical justification for such reasoning. If it is not assumed that similar conditions determine similar results, then no number of past observations of a certain conjunction or association of events can afford any warranty for anticipating even a single recurrence. If, on the other hand, it is assumed that similar conditions do determine similar results, then once we have ascertained what the conditions are we are justified in anticipating not only one such repetition, or a limited number of repetitions, but we are justified in regarding the conjunction as a uniform connection, to be anticipated in an endless number of recurrences.

Perhaps it will be retorted that, strictly speaking, there is really no logical justification for basing even a single anticipation on past observations, but that there is still far less justification for inferring a law from past observations, because a law involves an indefinite number of such anticipations. This is another matter. It really amounts to an admission of what was maintained above, namely, that from the point of view now under consideration all science is confined to past observations. So far as theory is concerned, I do not see how one can prove the inaccuracy of such a sceptical or agnostic view. In practice one would find it impossible to act up to it—he would inevitably find himself acting as though he believed in causal and uniform

connections, and he would unavoidably find himself anticipating all sorts of future events in the light of past experiences. In pure theory, however, he may maintain with impunity that the business of science is to look back, and to take no speculative risks. He may even turn to Scripture for inspiration, and take Lot's wife for his patron saint. But, if past observations offer no logical warrant for anticipations of the future, what virtue is there in recommending even one anticipation as something more probable than many similar anticipations? If it is simply a matter of taking risks, then no doubt it is safer, or at least less unsafe, to bluff once than to bluff often. Only it may be wiser still not to bluff at all. In any case, to reduce science to a game of bluff is to remove it altogether from the realm of rational pursuits. The frequency with which anticipations are realised, the numerous successes of what, from the present standpoint, is mere bluff, would presumably have to be regarded as mere chance coincidences. They could not even be ascribed to the sheer power of bluff without assuming the validity of the principle of causality, and assuming moreover that causality is something more than a mere bluff-postulate.

### § 5. *Correlation and Causality.*

One of the things that has helped to encourage the tendency to repudiate the validity of causality and law is the growing appreciation of partial associations or incomplete correlations. Causation and uniformity seem to present but two alternatives —events (or attributes) are either completely associated or not at all. As against this "all or none" method, it seems wiser and more useful to take into account all degrees of correlation, and to treat complete association and complete dissociation (or independence) as merely special cases, or opposite limits, of a graduated scale of correlations. This method has obvious advantages, and its adoption in recent times has been hailed as epoch-making. Now, it seems to me indisputable that it is perfectly right that all the most diverse degrees of association should be carefully studied. But this is quite compatible with

the principles of causality and of uniformity, as will be shown in due course, and does not warrant the complete displacement of the categories of causality and universality by that of contingency. In fact, I cannot see how in a world of mere Chance any use can be made of partial correlations. In a world of pure Chance, even when observation has revealed complete correlation between two events (or complete association of two attributes), even then there is no logical ground for anticipating such association in the future (or in any unobserved cases). How much less can incomplete correlation afford a logical basis for judging about unobserved cases. The full consequences of insisting on pure contingency are perhaps not sufficiently realised by those who so readily deny the objective validity of laws of nature. To deny these laws coercive force and ultimate explanatory value is one thing, to deny their validity altogether is quite another thing, although the two seem to be confused sometimes.

### § 6. *Indeterminism and Capricious Volition.*

Before leaving the hypothesis of Indeterminism or Chance it may be necessary to consider briefly a possible objection against the whole supposition. Following Bergson's treatment of "Disorder" (in *Creative Evolution*, chapter III), it may be urged that what has here been described as Indeterminism is not, and cannot be, complete Indeterminism. Such a thing can neither be, nor be conceived. The fact is that there are two kinds of determinism, namely, mechanical and volitional determinism. Both of them are never absent together, nor can they be conceived to be absent together. The absence of either really means the presence of the other. Just as all literature must be either prose or verse, so that "not prose" really means "verse," and "not verse" means "prose," only we say "not verse" when looking for verse we find prose, and we say "not prose" when looking for prose we find verse, so likewise every event is really determined either mechanically or by a will, and whenever we speak of "indeterminism," or

chance, all that is really meant is that one of the two kinds of determinism was found when the other was expected. The "indeterminism" assumed in this section would, from this point of view, not really be complete indeterminism, but only the absence of mechanical determinism, or the absence of what Bergson calls the "automatic order"; volitional determinism would still be operative, there would still be a "willed order." In other words, when we conceive, or imagine that we conceive, a world of pure Chance, what we are really thinking of is a *capricious* world; physical causation and natural laws are simply replaced by a multitude of wills. Now, I believe that Bergson's insistence on the relative meaning of the term "disorder" contains a great deal of truth. The term no doubt is frequently used in that way, as his illustrations show (though the way he interprets some of his illustrations is not convincing). But I seem to find no insuperable difficulty in conceiving a world of Chance such as I have briefly described above—a world in which anything is followed by anything without any sort of determinism or uniformity. Moreover, so far as our present problem is concerned, it makes no conceivable difference whether we suppose that one event merely follows another somehow, or whether we say that any sort of phenomenon might capriciously *will* any other sort of phenomenon. The world would be a world of pure Chance, all the same—unless we ascribe some objective limitations to the caprices of the multitude of elementary wills, in which case we pass beyond the bounds of the present hypothesis, and enter upon another supposition that will be considered later.

## III. Probability and Thoroughgoing Determinism.

### § 7. *Determinism, Impossibility, and Possibility.*

Having considered the bearing of the hypothesis of complete indeterminism on the subject of probability, let us consider next the contrary supposition, namely, that of thoroughgoing determinism in its relation to probability. This assumption

represents, of course, the view of the more orthodox men of science. True, it was considered a great scientific novelty, as well as a dangerous religious heresy, when it was first propounded by the classical writers on mechanics—the older, Aristotelian physics having accepted a sub-lunary world of contingency as well as a world of immutable, necessary being. But then, whereas in theology the heresy of one age becomes the orthodoxy of a subsequent age, in science, on the contrary, novelties of one generation are apt to become antiquated in the next. Anyhow, the subject of probability has really been developed in modern times on the assumption of objective determinism—as is obvious from almost any text-book on the subject. Hence the prevalent notions that probability and contingency are purely subjective, the result of subjective ignorance, rather than of objective fickleness. Still, writers who start from a strictly determinist standpoint seem to betray occasionally traces of the indeterminist point of view, so that the full bearings of the determinist supposition on the problems before us must be carefully examined instead of being taken for granted.

One important consequence of the determinist conception of the world is the notion of "impossibility." In a world of indeterminism nothing is impossible. But in a world in which certain consequences can only result from certain conditions, in a world the elements of which stand in certain uniform relations, called natural laws, in such a world anything the conditions of which are entirely lacking, anything inconsistent with the laws of nature, is impossible.

Of greater significance, though intimately connected with the same considerations, is the fact that the term "possible" must, on our present supposition, mean something more definite than it can or need mean from the standpoint of indeterminism. In a world of indeterminism whatever is conceivable is also possible; this is not the case in a world of determinism, where the conceivable may be impossible. From the indeterminist point of view the "possible," if it is to have any antithesis at

all, can only have for its antithesis the "actual"—hence the occasional use of the term "possible" as equivalent to the *merely* possible or conceivable. From the determinist point of view, on the other hand, the important antithesis is between the "possible" and the "impossible"— hence the frequent use of "possible" as inclusive also of the "actual," since the actual is certainly "not-impossible." The ambiguity of the term "possible" is the result of a confusion of two different standpoints. But it may be asked, what exactly does or should the term "possible" mean in a world of determinism? This question deserves careful consideration.

In a determinist world each event happens, and can only happen, on the completion of a certain totality of conditions. If none of these conditions is present, then the event is impossible; but the presence of some of the requisite conditions renders the event possible, though not yet actual—and the greater the number of conditions present the greater is the possibility or probability of that event, in the absence of counteracting causes. In this sense "possibility" is strictly objective. It refers to an actual condition or group of conditions, which when supplemented by some other condition or conditions will realise the "possible" result. Thus, for example, an escape of gas is a potential explosion, because it is an important condition, though not the only condition of an explosion. Similarly, a chrysalis is a possible butterfly, and an intelligent, hard-working undergraduate is a potential first-class graduate. The presence, then, of some of the conditions of a certain result constitutes (in the absence of counteracting causes) the possibility of that result. Conversely, the problematic judgment, *S may be P*, should be confined to those cases in which some of the conditions of S being P are actually known to be present.

### § 8. *The Problematic Judgment.*

Owing to the above-mentioned ambiguity of "possible," the problematic judgment is often used on the slender ground that it is conceivable that S may be P, or that no specific reason

is known why S should not be P. But this usage, on the part of those who admit the categories of causation and law seems to me to be quite unwarranted, although it has the sanction of Kant. If nothing definite is known about S being P, even if nothing is known to make it impossible for S to be P, that is no justification for asserting that *S may be P*. Such circumstances, in fact, warrant no assertion whatever, except perhaps the assertion, "I do not know of anything that would make it impossible for S to be P"—an assertion that, strictly speaking, tells you something about the speaker, but is not a judgment about S at all. The use of the problematic judgment as a substitute for a confession of ignorance is, I think, a confusion easily accounted for. For some purposes the two statements *S is P* and *I know that S is P* mean the same thing. So do the corresponding denials, *S is not P* and *I know that S is not P*. The same is true of the statements *S cannot be P* and *I know that S cannot be P*. Now the contradictory of *S cannot be P* is *S may be P*, and it is not altogether unnaturally supposed that the contradictory of *I know that S cannot be P* is also *S may be P*. And since of two contradictories one must be true, it is implicitly assumed that if one cannot assert *I know that S cannot be P*, then one is justified in asserting *S may be P*. In this way the limbo of footless fancies is overcrowded with all sorts of phantastic possibilities. In reality, of course, the assertion *I know that S cannot be P* may be denied in two different ways, between which one must carefully choose according to circumstances—the two denials being *I know that S may be P* and *I do not know that S cannot be P*. Sometimes, indeed, one cannot assert *I know that S cannot be P* because one actually knows that *S may be P;* but at other times the reason is simply that one does not know enough about S, in which case the right thing to say is *I do not know that S cannot be P*, which is, or ought to be, a very different thing from asserting *S may be P*. This confusion of the possible with the merely conceivable, or with what is simply not known to be impossible, is naturally encouraged by certain familiar psychical

tendencies. Whatever we think, as Spinoza has long ago remarked, we think of as though it were real. And it is a commonplace of the psychology of belief that the human mind is by nature credulous, doubt and suspicion being an acquired taste. At first we readily accept as true almost any suggestion that does not conflict with past experience. And even after we have learned the need of greater circumspection we are still prone to regard whatever is not known to be impossible as at least possible. I have dwelt rather long on this confusion, partly because it appears to me that the mathematical treatment of probability is vitiated to some extent by the failure to discriminate between merely conceivable combinations of imaginary events and possible combinations of possible events. The two are by no means the same. And this may account for the apparent barrenness of so many calculations of probability.

### § 9. *Logical Possibility.*

Possibility, then, it is here maintained, is strictly objective, on the hypothesis of determinism. The possibility of an occurrence is simply the actuality of one or more of its conditions. A word must be added on the possibility of truths, as distinguished from events. What I mean is, the possibility that a belief or hypothesis is true. Some beliefs or hypotheses are dismissed as impossible, while others are considered to be possible, that is to say, to be possibly true. What is meant by "possible" in such cases? Certainly not quite the same as when the term is applied to an event. We are dealing now with what may be called "logical" possibility, as distinguished from objective (or ontological) possibility. But *mutatis mutandis* the same general description applies to both. The establishment of an hypothesis requires the fulfilment of certain logical conditions—consistency with established laws, verification, etc. If all these conditions are fulfilled then the hypothesis is accepted as true; but so long as only some of the conditions have been satisfied, and nothing definite is known against it, then the hypothesis is considered possible. Or, to put it otherwise,

the " possibility " of truths is closely analogous to the " possibility " of events ; only we must bear in mind that in the case of truths we are dealing with logical grounds and consequences, whereas in the case of events we are dealing with objective conditions and results. In some cases the possibility of truths may be described as a kind of " inverse " possibility, as compared with the possibility of events, because whereas the possibility of an event consists in the actuality of certain conditions, the possibility of an hypothesis may consist in the actuality of certain results (verification) that would follow from the hypothetical conditions, but which (so long as the hypothesis is not established) might also follow from other conditions (plurality of causes).

### § 10. *Chance and Contingency.*

A world of thoroughgoing determinism leaves ample scope, then, for possibility, not only logical but also objective possibility, as already explained. On the other hand, there is no room for chance in such a world. Whatever happens happens in accordance with certain laws, and is determined by certain conditions ; and such a mode of occurrence is the very antithesis of chance occurrence. The nearest approximation to objective chance that such a world could show would take the form of contingency, in the strict sense of the term. By contingency I mean the concurrence of two or more events that are not directly dependent on each other, but each of which may be a link in its own causal series ; for example, the concurrence of two such events as the appearance of a new moon and the birth of some kittens. Now, such contingency is very different from chance. If we could only trace back far enough the several causal series of the contingent events we should arrive at a collocation of circumstances which determined not only the occurrence of the several events, but also their concurrence. Contingency, accordingly, if it is to be regarded as a form of chance, can only be a form of subjective, not of objective, chance. We may not be able, or we may not care, to trace back far enough the causes of two

apparently independent yet concurrent events. Their concurrence will then be regarded as an accident, or as a matter of chance, though objectively (in a world of thoroughgoing determinism) their concurrence will really have been definitely determined, their contingency not being a matter of chance at all. That, for example, the *Titanic* should have arrived at a certain spot just when an iceberg was there, was certainly a misfortune, and may be regarded as a contingency, but, consistently with the view of thoroughgoing determinism, it cannot be regarded as an "accident" in the sense of being a chance concurrence. It can only be termed an "accident," or chance occurrence, on the assumption that it was possible so to steer the boat as to avoid the collision. The assumption of such a possibility may be (as I think it is) perfectly legitimate, but it is beyond the bounds of our present hypothesis of thoroughgoing determinism.

### § 11. *Alternative Possibilities.*

This brings me back again to the subject of possibility. I have already explained in what sense precisely possibility may be regarded as strictly objective in a determinist world. Frequently, however, people associate with the notion of possibility another notion that we did not consider at all in connection with it. I mean the notion of vicarious alternatives. That is to say, when a collocation of circumstances is looked upon as the possibility of something more, it is often not simply regarded as the possibility of one definite result, but as the possibility of alternative results. If, as usually happens, we are especially interested in a particular result, then all the other alternatives will be lumped together as "not that result," that is to say, as a negative result. Now, strictly speaking, an objective possibility in a determinist world is always the possibility of one definite result, namely, the result that will actually follow. Alternative possibilities, the "either—or" frequently associated with possibilities, are objective only with reference to *classes* or kinds of conditions. In a determinist world there

is no objective "either—or" attaching to any *particular* set of conditions. In each particular case the "either—or" is subjective, the outcome of our ignorance of other operative conditions. An illustration may make all this clear. Given a certain kind of chrysalis, we have a potential butterfly. But the same kind of pupæ develop into differently coloured butterflies according to the different temperature conditions under which they evolve. So long as we think of that kind of pupa as a kind or class, it is correct to regard it as a common nature embodying the objective possibility of a variety of results. To this extent alternative possibilities may be considered objective. But as regards any individual chrysalis, in a determinist world, it can only evolve in some one way according to the temperature that will actually prevail in its environment, and that temperature is already predetermined by existing conditions. It is only from the point of view of an onlooker who knows that different individuals of the same kind of chrysalis have developed into different kinds of butterflies, but does not know what temperature conditions are going to be operative, that the same pupa appears to be a centre of alternative possibilities. In other words, every actual condition is an objective possibility of a certain result that will follow when that condition is supplemented by certain complementary conditions. In as far as one and the same *kind* of condition produces different results according to the different kinds of complementary conditions that co-operate with it on different occasions, in so far the same *kind* of condition constitutes an objective centre of alternative possibilities. But, in a determinist world, no *particular* condition presents alternative possibilities, except subjectively to one who does not know what the complementary conditions are going to be in that particular instance. Of course, even such a particular case can be regarded as an objective centre of alternative possibilities, if the person judging is capable of determining which of the alternative sets of complementary conditions shall be operative—if, for example, he can voluntarily determine in what temperature exactly a

given chrysalis shall evolve. Only such freedom takes us beyond the strictly deterministic scheme we are now considering.

### § 12. *Determinism and the Calculus of Probability.*

Now that we have seen the bearing of the assumption of thoroughgoing determinism on Chance, Contingency, Possibility, and Impossibility, it only remains for us to consider its effect on Probability. Estimates of probability depend for their possibility and validity on our ability to differentiate between different degrees of possibility. It has already been shown that the hypothesis of complete Indeterminism affords no basis for a calculus of probability, because according to it all things conceivable are equally likely, and there is no reason for judging anything to be more or less possible than anything else. In a determinist system, on the other hand, there is ample scope for discriminating various degrees of possibility, ranging from zero to one. Anything incompatible with existing natural laws, any results the conditions of which are entirely absent, are simply impossible—they belong to the zero end of the scale of possibility. At the opposite end of the scale are all results the totality of whose conditions (positive and negative) is realised. Between these two limits come all kinds of possible results according to the number and importance of the realised conditions, where these are greater than nought but fall short of the whole. Such a scale would not be purely subjective ; it would represent what might be described as different intensities of objective potentialities. In so far, however, as this is the case it could only supply a basis for the rougher, or inexact, estimates of probability. And even so, the more probable would simply represent a result more nearly realised than the less probable ; but even the less probable, in so far as it is based on an objective possibility, would be realised sooner or later—otherwise, there is really no objective possibility (in the sense described above), and the anticipation is simply mistaken. The only opportunity for exact, or numerical, estimates of

probability would be furnished by those cases where there are alternative possibilities. Thus, for example, if (to revert to a previous illustration) a certain kind of pupæ develop into $n$ different types of butterfly, according to different temperatures or other conditions, then the probability of any particular chrysalis evolving into a particular type may be estimated at $1\ n$. But this kind of estimate, though certainly grounded on objective facts, is really subjective, or (more correctly) logical in character. Strictly speaking, as has already been pointed out, the particular chrysalis presents (on the determinist assumption) no such alternative possibilities. The alternative possibilities (that is to say, the sum of them) are found in that *kind* of chrysalis as a whole. To predicate them of any particular pupa is to commit the fallacy of division. For, in a strictly deterministic scheme, the given pupa is already predetermined to develop in a particular way. All this is, of course, quite in keeping with the ordinary theory of probability, which lays great stress on the subjective character of all probable estimates (as being the outcome of our ignorance of some of the determining causes), and admits that calculations of probability hold good only "in the long run" (that is to say, of a long series or of a class of cases, not of a particular case as such). This was to be expected, because, as already remarked, the theory of probability has been developed mainly on a deterministic basis.

## § 13. *Determinism and Indeterminism Compared.*

If now we compare the completely determinist with the completely indeterminist supposition in relation to probability, certain points stand out very clearly. In the first place, although there is ample scope for the notion of possibility in both schemes (and in the indeterminist scheme, in fact, even more so than in the determinist scheme) yet, strictly speaking, "possibility" has greater objectivity in a world of determinism than in a world of thoroughgoing indeterminism. For in the latter case the real distinction is between the actual and the non-actual (or

not-yet-actual), only since nothing determines anything else, it can also hinder nothing else, and consequently anything conceivable is possible in that sense. But in a determinist world the possible means the actual presence of a helpful condition. Far more important than this, however, is the fact that a determinist world renders possible the distinction of different degrees of possibility, and even furnishes a basis for numerically exact estimates of probability. No doubt, even in an indeterminist scheme, some conceivable results might be anticipated with greater confidence than others. But such differences would be purely subjective and capricious. In a determinist scheme such differences can be justified on objective grounds; they need not be capricious, or purely subjective, but *logical*. Again, as regards partial correlations, these are no less consistent with the one hypothesis than with the other, but whereas they afford no basis for future anticipations on the indeterminist assumption, they do offer some reliable guidance on the determinist assumption. For example, let us suppose that it has been observed that $m$ per cent. of a certain kind of pupæ have developed into one variety of butterflies, $B_1$, that $n$ per cent. have developed into another variety, $B_2$, and so forth. Now on the indeterminist hypothesis, as already remarked, such observed correlation can throw no light on unobserved cases; it constitutes no logical justification for basing any anticipations upon it. But on a determinist hypothesis, the variety of results would naturally be regarded as the effect of different complementary conditions operating in the different cases (for instance, different temperature conditions), and, so long as there is some reason for supposing that the totality of relevant conditions was not changing rapidly, we should be justified in anticipating approximately similar results. Such, at all events, is the assumption on which the most important estimates of probability are based—I mean all forms of insurance business. If the partial correlations of the events insured remain sufficiently constant over a considerable period, it is assumed that the conditions have remained approximately

constant, and the rates of premiums remain the same ; but if it is known that some of the important conditions have changed (for instance, improvement in general hygienic conditions, or in conditions of employment, in connection with life and invalidity insurance) then the premiums will be re-adjusted accordingly. In fact the whole practice of statisticians, as distinguished from the theories of knowledge of some of them, is altogether on the side of the determinist as against the completely indeterminist standpoint. The statistician is not a mere calculating machine that is indifferent to everything but figures. He counts, but he does not count anything and everything that comes to hand. He selects carefully what he shall count and correlate ; and his choice is generally guided by some hypothesis concerning a direct or indirect causal relationship between the phenomena counted and compared. And when the importance of statistical work is urged as a claim on the support of the government or the community, a great deal is usually made of the services that social statistics can render in the guidance of practical reform. On the hypothesis of indeterminism the correlation of one pair of phenomena would be just as significant, or rather insignificant, as any other correlation—the selection of the terms of comparison would be, and could only be, purely arbitrary, capricious, or accidental ; and, of course, it would be nonsense to suggest that the study of correlation could afford any practical help in a world in which nothing is really determined, and therefore nothing really controlled. But, granting the validity of all the adverse criticism of complete indeterminism as a basis for a calculus of probabilities, have not the merits of complete determinism been exaggerated in the foregoing comparison ? Undoubtedly *determinism*, and determinism alone, affords a logical ground for estimating probabilities. But we are considering now the hypothesis of *thoroughgoing* determinism. And in a world of complete determinism of what help could such calculations be ? In such a world we should have no freedom to interfere with actual conditions ; we could not prevent results the conditions of which were already operative,

and we could not bring about results the conditions of which were not already there. All would be pre-determined—even our calculations of probability and our subsequent action or inaction!

### § 14. *Logical and Teleological Determination.*

Before leaving the present hypothesis, it may be necessary to explain one or two points intimately connected with it. First, it will have been observed that I have used the term determinism in an objective sense, in the sense of efficient causality. I have also recognised a form of logical determinism, in so far as the knowledge of a causal relationship constitutes a logical ground of inference. Mr. Russell, if I understand him rightly, would only admit logical determinism. In this sense, of course, the future "determines" the past, as well as the past the future. But I cannot see how there can be any really *logical* determinism (that is to say, valid or legitimate inference, as distinguished from mere bluff, or mere hazard) except on the supposition of objective determinism. And the two are not the same (though Mr. Russell's language does seem to mix them up somehow), for objectively the future cannot determine the past, but only the past can determine the future. No doubt, it is very difficult to elucidate the notion of efficient causality, and there would be no great harm done if one simply substituted for it the principle of the uniformity of nature, or the principle of the permanence of laws. The principal objection would be that there may be uniformities that are not causal, and there may be unique causal determinations that are not uniform except in a hypothetical sense. For the purpose of the present paper it did not appear to me necessary to discriminate very strictly between causality and uniformity, and I have simply lumped them together. But what is of real importance for the problem under consideration is that the logical should not be confused with, or substituted for, the objective. Just as in the case of "determinism" it seems to me that there can be no logical determinism without objective determinism, so in the case of

"law" it seems to me that there can be logically no scientific law except on the basis of objective uniformity. And here again I am not quite sure which of the two Mr. Russell means when he speaks of the permanence of laws. And in any case I cannot see how the permanence of laws can be based on inductive grounds or on principles of probability.

The second point I want to touch on is determination by final causes. This need not detain us long. As I conceive the matter, it is not the final causes (or unrealised purposes) themselves, but only someone's ideas of them that determine anything —these ideas acting as efficient causes. Our problem, therefore, is not appreciably affected by the consideration of final as well as efficient causes. Professor Hobhouse, on the other hand, conceives of final causes as themselves operating retrospectively. But even this view does not necessarily make any difference to the solution of the problem before us. In whichever way the operation of final causes is conceived, what alone matters to us at present is whether the ends are settled once for all, or whether there is freedom to change and modify them. If the ends are immutably settled, then we get to all intents and purposes a system of thoroughgoing determinism, and it matters little, if at all, whether the system of determining conditions is a *vis a tergo*, or *vis a fronte*, or partly the one and partly the other. And we have already discussed the effect of such a completely deterministic supposition on the subject of probability. But if, on the other hand, the ends are not immutable, and there are free agents who can change or modify them, then again we either get complete indeterminism, which has also been discussed already, or else we get a mixed system of partial determinism and partial indeterminism (or freedom), which is what we proceed to consider now.

## IV. Partial Determinism.

### § 15. *A Compromise.*

Complete determinism and indeterminism having failed to afford a logical justification, or basis, for the estimation of probabilities, it remains to consider some sort of compromise between the two, namely, incomplete determinism, or, what amounts to the same thing, incomplete indeterminism. Let us suppose, in other words, that some parts of reality (all inorganic things, for example) embody the principle of determinism, while others (say, all living organisms) are possessed of a certain amount of indeterminism, or spontaneity. Such an hypothesis would, I think, combine the advantages of both preceding hypotheses without the drawbacks of either, so far as probability is concerned. We need not go over the whole ground again; those parts of the foregoing discussions on indeterminism and determinism that are relevant to our present hypothesis will be sufficiently obvious. Briefly, as in the case of complete indeterminism, chance and contingency will be objective on our present supposition; though they will not have the same scope; and alternative possibilities too will be objective. But, like the hypothesis of complete determinism, it will also permit of a legitimate differentiation of various degrees of possibility, and so furnish a basis for an adequate calculus of probabilities. Moreover, only on this supposition can estimates of probability be of any real service. If, therefore, calculations of probability are to have any logical justification, we must postulate the principle of partial determinism. This alone, of course, constitutes no adequate proof that reality is partly deterministic and partly spontaneous; but the full consideration of this problem is outside the scope of this paper.

### § 16. *Postulates of Common Sense.*

The supposition that we are now considering is really the one on which practical life implicitly proceeds, and which may

consequently be described as implicit in Common Sense. It is usually taken for granted that events are the results of operative conditions; that similar conditions produce similar results; that uniform connections cannot be disturbed by human volition; but that, nevertheless, human volition, though limited by physical conditions, is often free to choose between several alternative ends, or to pursue the same end along any one of several alternative paths that are physically possible. For example, to take one of the stock illustrations of probability, it is commonly assumed that a man may choose either to play dice, or to play some other game, or no game whatever. And when he has decided to play dice he may still choose to try to throw the dice in the same way on each occasion, or to vary his mode of throwing each time, or not to think at all about the way in which he throws them. To this extent he is credited with spontaneity. On the other hand, his spontaneity is obviously limited by the physical properties of the dice, and the limited number of alternatives that are physically possible. Similarly, to revert to a former illustration, if I find a certain kind of chrysalis I may choose between terminating its existence, letting it alone, or looking after it. And if I decide on the last course, I may still choose between various temperature conditions each of which will severally enable it to grow into a butterfly, only into a different sort of butterfly. There would consequently be, as the result of my assumed freedom, certain real alternative possibilities for the pupa; but only a limited number of them, because, although I am free to choose the temperature conditions, I cannot alter the uniform consequences of the several conditions. Similarly, if we credit the pupa itself with spontaneity. In all these and similar cases the presence of an element of indeterminism carries with it a certain amount of real, objective chance, possibility, and the kind of alternative possibilities required for estimates of probability; while, on the other hand, the element of determinism supplies those limitations to indeterminism that enable us to dismiss some conceivable things as impossible, to attach higher degrees of probability to some

possibilities than to others, and to determine the precise number of alternative possibilities in the way required for the exact *a priori* calculation of probabilities.

The reality of a certain amount of chance, moreover, is assumed not only in everyday life, but even in some of the sciences, notably in Biology. Whereas in Physics there is still a tendency to sympathise with Hegel's dictum, "Where Chance begins philosophy [or science] ends," Biology appears to be frankly unable to dispense with the notion of chance variation in order to explain the evolution of new species. And the historian scarcely dreams of questioning the divine right of "His Majesty Chance," though he insists on sufficient determinism to conceive of Chance as a sort of constitutional monarch, rather than as an irresponsible and capricious tyrant.

## V. Summary and Conclusion.

### § 17. *The Three Views.*

The principal results of our examination of the several conceptions of reality in relation to the notions of Chance, Contingency, Possibility, and Probability may now be briefly summarised.

(*a*) In a world of pure indeterminism Chance would be strictly objective, and everything would be a matter of chance. Contingency too would (*a fortiori*) be objective—no concurrent (or immediately succeeding) events could be causally connected in a world in which nothing is the cause of anything else. Nothing would be impossible, since in the absence of causation nothing could hinder anything else ; so that everything conceivable would be possible. But all things would be equally possible, so that there would be no objective or logical ground for differentiating various degrees of possibility. And this very superabundance of equally likely possibilities would produce a sort of *embarras de richesses*. Confronted by an infinity of

equally possible alternatives, the reason for anticipating one particular alternative must be infinitesimal. No calculus of probability can be based on such a theory.

(*b*) In a world of thoroughgoing determinism there would be no such thing as objective Chance. Contingency would still be real, though not quite in the same sense as on the foregoing assumption. Things or events would still coexist, or occur simultaneously, or in immediate succession, without either of them being the cause of the other. But ultimately there would always be a cause for their coexistence or concurrence; so that the element of chance in this contingency would be apparent rather than real. Possibility would be strictly objective, being in fact the actuality of one or more of the conditions of the anticipated event. There would also be real alternative possibilities, but only for *kinds* or classes of things or events, not for particulars—particulars could only *appear* to present alternative possibilities, because of our ignorance of the totality of relevant conditions then operative. Impossibility would be objective—being, in fact, either the actuality of conditions that hinder the imagined result, or the total absence of the conditions of its occurrence. Degrees of possibility would also vary objectively according to the number of conditions realised. Many kinds of things or events would, moreover, present a definite number of alternative possibilities, and so afford a basis for exact estimates of probability. Such estimates would not be merely subjective, but logical, because grounded on objective facts and consequently having inter-subjective validity. But such calculations of probability could have no real significance, and serve no real purpose, since, in a world of thoroughgoing determinism, all our calculations, indeed, our whole conduct, would be predetermined.

(*c*) Lastly, in a world partly determinist and partly spontaneous, there would be a certain amount of real Chance and Contingency. Possibility, impossibility, and different degrees of possibility, would still be objective. So would alternative possibilities, which would, moreover, hold good not only of

general kinds, but also of particulars. The possibilities, however, would not be endless: some conceivable alternatives would be impossible, and the possible ones would be limited by objective conditions. This view, therefore, affords a solid basis for estimates of probability, even for numerically exact estimates. Moreover, it is also the common sense view, implicit in daily conduct; and only on this view can real significance be attached to calculations of probability. We may conclude, accordingly, that this postulate of partial determinism and partial indeterminism forms the logical basis of Probability.

### § 18. *Why Postulate Anything?*

Perhaps it will be asked, Why trouble about postulates at all, why not simply note and use correlations as you find them, without inquiring into their ultimate philosophical justification? As a matter of fact, the statistician usually pays little or no heed to this kind of problem. And, indeed, there is much to be said for the statistician who rests content with merely empirical verifications of his formulæ. It is certainly wiser not to commit himself to any philosophical theory whatever than to adopt or invent one which, if true, would stultify all his statistical labours and render them of no account. But such a non-committal attitude is not altogether satisfactory. It changes so easily into the view of complete indeterminism, or something essentially like it. In any case, however, we are justified in asking, What assumption about the nature of reality is implicit in the procedure of the statistician, although he does not explicitly formulate it, or even trouble about it? What postulate, in other words, would logically legitimatise most of the usually recognised uses of the calculus of probability, or give to this calculus validity and value? The principal object of this paper has been to answer this question; and the point to which I attach considerable importance is my contention that it is logically impossible to dispense with the postulate of the uniformity of nature, or to put probability in its place, or to apply calculations of probability without assuming it.

### § 19. *Causation, Contingency, and the Cosmos.*

In conclusion, it may be as well to point out explicitly that throughout this paper the notions causality, contingency, etc., have been considered only with reference to the constituent *parts* of the universe and their temporary changes, not with reference to the *whole* cosmos or its origin (if any). The group of problems here considered is concerned solely with the relations of coexisting things and attributes, and with concurrent or successive events. As regards the universe in its entirety, there are no things or events outside it to be related to it whether by way of causation or by way of chance contingency. Causation and contingency are, therefore, terms that can only be applied to the parts of reality, not to the whole of it. At all events they cannot be applied to the whole in the same sense in which they are usually applied to the parts. The universe as a whole must simply be accepted as an ultimate datum.

It is sometimes urged against Spinoza that he misapplied the terms causation and freedom in predicating them of God or Substance. But the criticism is largely the outcome of paying more heed to his words than to the meaning in which he used them. For, although he applied the then current term *causa sui* to God, he nevertheless ridiculed its usual meaning, which implied, he remarked, that "before a thing existed it had already arranged that it should exist" [see the writer's edition of Spinoza's *Short Treatise*, pp. 171 f., etc.]. The very fact that Spinoza predicated *both* freedom and necessity of Substance shows (what he himself fully realised) that he used neither term in its ordinary meaning. For, as usually applied to finite things and events, they are incompatible terms, and cannot both be predicated of the same subject. Perhaps it comes to pretty much the same thing in the end whether we say that the Cosmos as a whole is in some sense both necessary and spontaneous, or whether we say that it is neither.

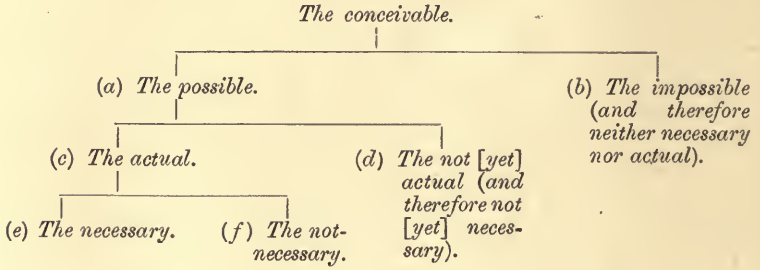
## VI. Appendix.

### § 20. *The Terms "Possible" and "Contingent."*

In dealing with a problem like the one discussed in the present paper one is particularly liable to be misunderstood, partly because it presents special difficulties for the due discrimination between objective conditions and our thoughts of them, partly because the terminology is so rich in ambiguities. As regards the first of these difficulties, it is to be remembered that things may *be* possible, or contingent, etc., without being *known* to be such; while, conversely, something *conceived* to be contingent, or possible, etc., may not *be* so at all. Hence objective possibility, contingency, etc., must be distinguished as far as possible from the subjective conditions of judging about possibility, contingency, etc. It is, of course, impossible to discuss anything without introducing a subjective element. But this need not prevent us from distinguishing the objective facts from our ideas of them—from distinguishing, for instance, the objective conditions constituting the possibility of a result not yet realised, from our recognition of its possibility. Similarly with regard to verbal ambiguities. Philosophical discussions are only too frequently made barren because what is debated is not what the writer really meant, but what his words might conceivably have meant. I have tried in this paper to deal as directly as possible with certain facts and the related concepts, rather than with the names signifying them. Only incidentally I have pointed out here and there how it is that such a word as "possible," for example, has come to have different meanings. If my principal object had been to unfold the ambiguities of the vocabulary of probability I should have included a number of considerations that I have omitted. But I wanted to discuss the real problem of probability, not its verbal subtleties. Still, having considered the main problem, it may be advisable to add a few remarks on the terms "possible" and "contingent," and to comment briefly on Bergson's interpretation of some cases of contingency, in the hope that

these additional notes may help to throw a little more light on some aspects of our principal theme.

*Possible.*—The ambiguities of the word "possible" may be best exhibited by means of the following table :—




The most important antithesis (and the one mostly used in this paper) is that between the "possible" and the "impossible" [(*a*) and (*b*)]. In this antithesis the "possible" includes the "actual" and the "necessary," as well as certain forms of the "not-actual" and the "not-necessary," for it simply means "whatever is not impossible." Sometimes, however, "possible" is used in antithesis to "actual" [(*c*) and (*d*)], and then means "possible, but not actual, and therefore not necessary." At other times it is used in antithesis to "necessary," [(*e*) and (*f*) and (*d*)], in which case it means "possible, and it may be actual, but not necessary." As already remarked, the differences in the use of the term are largely influenced by differences in point of view. It may be noted that, if we regard the above table as a scheme of compartments only (after the manner of Symbolic Logic), then the consequences of the three views discussed in this paper may be stated thus. In a world of complete indeterminism compartments (*b*) and (*e*) would be empty; in a world of complete determinism compartment (*f*) would be unoccupied, and compartment (*d*) would only contain what is *not yet* but *will be* actual; while in a world of partial determinism all the compartments would be occupied. It might be urged that, even on the view of complete indeterminism, some things would be impossible—for example,

it would, *ex hypothesi*, be impossible for one thing to determine another. In reality all that would happen is that compartment (*e*) would be unoccupied, not that compartment (*b*) would be occupied. For, as already explained, the objective condition of the "impossible" consists either in the total absence of the conditions required to help to realise the result in question, or in the presence of counteracting causes. But neither of these would happen in a world of complete indeterminism, where nothing would help or hinder anything else. The objection results from our reading into a chance world a notion acquired under very different conditions. At the same time, I have already admitted the difficulty of clearly conceiving a chance world and taking it seriously.

*Contingent.*—The term "contingent" is also used in different senses. Sometimes it is used in antithesis to "necessary," so as to include even the "actual" to some extent [see (*f*) in the above table]. This is the sense in which the term is used in Aristotelian philosophy; and even Spinoza used it in this meaning, though he denied the validity of the conception. At other times it is used in the sense of "dependent on" something else, and so seems to imply necessary connection. It may be interesting to trace the origin of these inconsistent meanings, and to suggest a more consistent usage. The Latin *contingo* is sometimes equivalent to our verb "happen," which is quite neutral, giving no indication as to whether the event is believed to have happened necessarily or only by chance. But just because of this neutrality it was often used of what were believed to be chance events. Hence the association of contingency with chance. Again, the same verb is also used sometimes in the sense of "adjoin," which is, in fact, the literal meaning of *contingo*. Now in this sense it is also comprehensive or neutral—like our word "conjunction" or "conjuncture," which may denote a chance conjuncture of things or events, as well as a necessary one. In this sense also its neutrality made it specially suitable for use whenever the conjuncture was regarded as a chance conjuncture; and so the word became

still more suggestive of chance. At the same time there is nothing in the etymology of the word "contingent" to prevent its application to necessary conjunctions of things or events; and the word is sometimes so applied. Hence occasional confusions, as, for instance, when "contingency" is first taken as a denial of necessity and then treated as implying necessity—a feat rendered possible by the ambiguity of the term (see Prof. James Ward's *Realm of Ends*, p. 226). The way in which I have used the terms "contingency" and "contingent" is best explained as follows. Given a conjuncture of two things, attributes or events, there are three conceivable relations between them :—(i) one of them may be a proximate condition or cause of the other; (ii) both may be the effects of the same remote causes, though neither determines the other; (iii) neither may be causally connected with the other, whether immediately or remotely. Now, I think that "contingency" should not be applied to cases coming under (i). Nor should "chance" be predicated of cases coming under (i) or (ii). But "contingency" might be conveniently used as a generic term for (ii) and (iii). The most important differences in the conception of contingency, as in the conception of possibility, will be the result mainly of differences in our conceptions of the universe. In a world of complete indeterminism cases (i) and (ii) would not arise; in a world of complete determinism case (iii) would not occur; only in a world of partial determinism would all three types of cases exist.

*Bergson's Illustrations.*—Reference was made in § 6 to Bergson's conception of chance or "disorder." Some of his illustrations might be considered now, because they are good examples of contingency, though misinterpreted by him. "When the wholly mechanical play of the causes which stop the wheel on a number makes me win, and consequently acts like a good genius, careful of my interests, or when the wholly mechanical force of the wind tears a tile off the roof and throws it on to my head, that is to say, acts like a bad genius, conspiring against my person; in both cases I find mechanism where I

should have looked for, where indeed it seems as if I ought to have found, an intention. That is what I express in speaking of *chance.*"* This passage reads like mythology. The illustrations are really simple cases of contingency, in the sense explained above. That the wheel should stop at a particular number may have its sufficient cause ; that I should have staked money on a certain number may or may not have its sufficient reason. But that the number at which the wheel stopped should be the very number on which I staked my money is a case of contingency, that is to say, a concurrence or conjunction of two events neither of which is the cause of the other ; for my choice of the number did not determine the stopping of the wheel there, nor did the stopping of the wheel there predetermine my choice. Similarly with the tile. Its fall from the roof in that particular direction was determined by obvious causes; my presence at that particular spot may also have had its good reasons. But that the tile should have fallen just where I was (or just when I was there) was a contingency ; for my presence was not the cause of the fall of the tile, nor was the fall of the tile the cause of my presence there. And this is all that is meant when such cases are called " chance " occurrences or accidents—though it would certainly be better to use the terms " chance " and " contingency " more exactly, in the manner suggested above. Suppose, on the other hand, that somebody deliberately hurls a tile at my head and injures me. This would still be a misfortune, but (unless the man is an exceptionally bad shot) it would no longer be an accident—that is to say, it would not be a case of chance or of contingency. For, in the instance now supposed, my presence would have helped to determine the throw, inasmuch as the missile would not have been thrown then and there but for my presence.

* *Creative Evolution*, ch. iii., pp. 246 f.

# ABSTRACT OF THE MINUTES OF THE PROCEEDINGS OF THE ARISTOTELIAN SOCIETY FOR THE THIRTY-FOURTH SESSION.

November 4th, 1912. Hon. Bertrand Russell, President, in the Chair.—The President delivered the Inaugural Address on "The Notion of Cause." A discussion followed in which Mr. Carr, Dr. Nunn, Mr. Carlile, Dr. Silberstein, Mr. Worsley, Mr. Shelton, Dr. Tudor Jones, Dr. Stanton Coit, and Miss Oakeley took part. The President replied.

November 18th, 1912. The President in the Chair.—Dr. Dawes Hicks read a paper on "The Nature of Willing." The discussion was opened by the President and continued by Dr. Wolf, Dr. Nunn, Mr. Shelton, Mr. Carlile, Mr. Carr, Dr. Tudor Jones, and Mr. Worsley. Dr. Dawes Hicks replied.

December 2nd, 1912. Dr. Dawes Hicks, Vice-President, in the Chair.—Mr. Arthur Lynch read a paper on "Purpose and Evolution." The discussion was opened by the Chairman and continued by Mr. Benecke, Mr. Carr, Mr. Worsley, Miss Oakeley, Sir Francis Younghusband, Miss Shields, and Dr. Tudor Jones. Mr. Lynch replied.

December 16th, 1912. The President in the Chair.—Miss Constance Jones read a paper on "A new Logic." A discussion was opened by the President and continued by Dr. Mercier, Dr. Schiller, Mr. Benecke, and Dr. Nunn. Miss Jones replied.

January 6th, 1913. Dr. G. Dawes Hicks, Vice-President, in the Chair.—Prof. Frank Granger read a paper on "Intuitional Thinking." The discussion was opened by the Chairman and continued by Prof. Brough, Mr. Benecke, Mr. Shelton, and Mr. Worsley, and Prof. Granger replied.

February 3rd, 1913. The President in the Chair.—Miss Karin Costelloe read a paper on "What Bergson means by 'Interpenetration.'" The discussion was opened by the President and continued by Mr. Carr, Dr. Wolf, Mr. Moore, Dr. Dawes Hicks, Mr. Wright, Dr. Nunn, and others. Miss Costelloe replied.

February 17th, 1913. The President in the Chair.—Prof. R. F. A. Hoernlé read a paper on "The Analysis of Volition: treated as a Study of Psychological Principles and Methods." The discussion was opened by the President and continued by Dr. Dawes Hicks, Dr. Brough, Dr. Caldecott, Mr. Worsley, Mr. Carr, Mr. Carlile, Dr. Wolf, and Mr. Roy. Prof. Hoernlé replied.

March 3rd, 1913. Dr. G. Dawes Hicks, Vice-President, in the Chair.—Dr. L. P. Jacks read a paper on "Does Consciousness Evolve?" The discussion was opened by the Chairman and continued by Mr. Carr, Dr. Nunn, Mr. Worsley, Dr. Tudor Jones, and Mrs. White. Dr. Jacks replied.

April 7th, 1913. Dr. G. Dawes Hicks, Vice-President, in the Chair.—On the nomination of the Committee Prof. Royce was unanimously elected a Corresponding Member. Mr. W. W. Carlile read a paper on "Kant's Transcendental Æsthetic, with some of its ulterior Bearings." The discussion was opened by the Chairman and continued by Mr. Carr, Mr. Worsley, Mr. Shelton, Dr. Leeson, and Dr. Tudor Jones. Mr. Carlile replied.

May 5th, 1913. Mr. H. Wildon Carr, Honorary Secretary, in the Chair.—Miss L. S. Stebbing read a paper on "The Notion of Truth in Bergson's Theory of Knowledge." The discussion was opened by the Chairman and continued by Dr. Leeson, Miss Costelloe, Mr. Shelton, Dr. Tudor Jones, Mr. Carlile, Dr. Wolf, Mr. Benecke, Miss Oakeley, and Dr. Caldecott. Miss Stebbing replied.

July 7th, 1913. Dr. G. Dawes Hicks, Vice-President, in the Chair. —The Report of the Executive Committee for the Thirty-Fourth Session and the Treasurer's Financial Statement were read and adopted. A ballot was taken for the election of Officers for the ensuing Session and the following were elected :—President, Dr. G. Dawes Hicks; Vice-Presidents, Mr. G. E. Moore, Dr. F. C. S. Schiller, and Prof. W. R. Sorley; Honorary Treasurer, Dr. T. P. Nunn; Honorary Secretary, Mr. H. Wildon Carr; Dr. Goldsbrough and Dr. Shearman were re-appointed Auditors.

Dr. A. Wolf read a paper on "The Philosophy of Probability." The discussion was opened by the Chairman and continued by Mr. Benecke, Mr. Carr, Prof. Hoernlé, Mr. Worsley, Dr. Schiller, Prof. Caldwell, Prof. Brough, Mr. Shelton, and Dr. Goldsbrough, and Dr. Wolf replied.

# ABSTRACT OF MINUTES OF THE JOINT SESSION OF THE ARISTOTELIAN SOCIETY, THE BRITISH PSYCHOLOGICAL SOCIETY, AND THE MIND ASSOCIATION.

June 7th, 1913. University College, London. At 4.30.

Prof. C. Spearman in the Chair.—A Symposium on "Are the Intensity Differences of Sensations Quantitative?" was discussed. The papers by Dr. C. S. Myers, Dr. Dawes Hicks, Dr. H. J. Watt, and Dr. Wm. Brown, were taken as read, and the writers opened the discussion by replying each to the criticisms of the others. The Chairman then opened the general discussion, which was continued by Prof. Granger, Mr. Shand, Mr. Carr, Mr. Carlile, Mr. Shelton, Dr. Goldsbrough, Prof. Alexander, and Prof. Stout. The writers of the papers then replied on the general discussion.

The Session adjourned at 7 o'clock for Dinner and resumed at 9 o'clock. Hon. Bertrand Russell in the Chair.—A discussion on "Memory and Consciousness" was opened by Prof. Arthur Robinson, his paper being taken as read. The discussion was continued by the Chairman and Mr. Carr, Dr. Wolf, Dr. Beatrice Edgell, Prof. Alexander, Miss Costelloe, Mr. Dainow, and Prof. Hoernlé. Prof. Robinson replied.

June 8th, 1913. Crosby Hall, Chelsea. At 2.30.

Hon. Bertrand Russell in the Chair.—A Symposium on "Can there be anything Obscure or Implicit in a Mental State?" by Mr. H. Barker, Prof. Stout, and Prof. Hoernlé, was discussed. The discussion was opened by the writers of the papers and continued by the Chairman, and by Mr. Watt, Mr. Carlile, Prof. Alexander, Mr. Shand, Mr. Cock, Prof. Brough, Dr. Goldsbrough, Mr. Moore, Mr. Shelton, Mr. Carr, Mr. Flügel, and Mr. Dainow. The openers replied on the general discussion.

# REPORT OF THE EXECUTIVE COMMITTEE FOR THE THIRTY-FOURTH SESSION, 1912—13.

There have been eleven ordinary meetings during the Session. The papers read will form Vol. XIII of the *Proceedings*. One paper on "Does Consciousness Evolve?" by Prof. L. P. Jacks, has been already published in the *Hibbert Journal*, April, 1913, and will therefore be included in an abstract only.

The Society joined with the Mind Association and the British Psychological Society in a Session of three meetings held on the afternoon and evening of June 7th and the afternoon of June 8th. At the first of these a Symposium on "Are the Intensity Differences of Sensation Quantitative?" by Dr. C. S. Myers, Prof. G. Dawes Hicks, Dr. H. J. Watt, and Dr. Wm. Brown, was discussed, and will be published in the *British Journal of Psychology*. At the second meeting a paper by Prof. Arthur Robinson was discussed, and at the third meeting a Symposium, both of which will be included in the *Proceedings*.

The membership of the Society has increased, and now consists of 114 Ordinary, 4 Honorary, and 7 Corresponding Members.

# FINANCIAL STATEMENT—34TH SESSION, 1912-1913.

## RECEIPTS.

| | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| Balance brought forward from last Session .. .. | | | | 219 | 4 | 10 |
| Members' subscriptions— | | | | | | |
| Current Session .. .. .. | 103 | 19 | 0 | | | |
| Arrears.. .. .. .. .. | 5 | 5 | 0 | | | |
| In advance .. .. .. .. | 4 | 4 | 0 | | | |
| | | | | 113 | 8 | 0 |
| Sale of *Proceedings* (nett) to June 30th, 1912 .. | | | | 41 | 13 | 9 |
| Interest on amount on deposit in London Joint Stock Bank .. .. .. .. .. .. .. | | | | 0 | 15 | 0 |
| | | | | £375 | 1 | 7 |

## EXPENDITURE.

| | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| Royal Asiatic Society, for use of rooms .. .. | | | | 11 | 11 | 0 |
| Harrison and Sons for printing— | | | | | | |
| *Proceedings*, Vol. XII .. .. | 90 | 6 | 9 | | | |
| Proofs of Papers sent out, Notices of Meetings, etc. .. .. .. | 39 | 2 | 8 | | | |
| | | | | 129 | 9 | 5 |
| Advertisement in *Athenæum* .. .. | | | | 0 | 6 | 8 |
| Expenses of Joint Meeting .. .. | | | | 2 | 10 | 9 |
| Gratuities .. .. .. .. | | | | 1 | 2 | 6 |
| Charges on Scotch cheques .. .. | 0 | 1 | 2 | | | |
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| Treasurer's postage and stationery .. | | | | 0 | 6 | 9 |
| Balance in hand— | | | | | | |
| On deposit in Post Office Savings Bank | 43 | 5 | 5 | | | |
| At London Joint Stock Bank (Deposit Account) .. .. .. .. | 100 | 0 | 0 | | | |
| At London Joint Stock Bank (Current Account) .. .. .. .. | 86 | 8 | 2 | | | |
| | | | | 229 | 13 | 7 |
| | | | | £375 | 1 | 7 |

Examined and found correct, June 20th, 1913—

(Signed) T. PERCY NUNN,
*Treasurer.*

(Signed) GILES F. GOLDSBROUGH
A. T. SHEARMAN
} *Auditors.*

# RULES OF THE ARISTOTELIAN SOCIETY.

## Name.

I.—This Society shall be called "The Aristotelian Society for the Systematic Study of Philosophy," or, for a short title, "The Aristotelian Society."

## Objects.

II.—The object of this Society shall be the systematic study of Philosophy; 1st, as to its historic development; 2nd, as to its methods and problems.

## Constitution.

III.—This Society shall consist of a President, Vice-Presidents, a Treasurer, a Secretary, and Members. The Officers shall constitute an Executive Committee. Every Ex-President shall be a Vice-President.

## Subscription.

IV.—The annual subscription shall be one guinea, due at the first meeting in each session.

## Admission of Members.

V.—Any person desirous of becoming a member of the Aristotelian Society shall apply to the Secretary or other officer of the Society, who shall lay the application before the Executive Committee, and the Executive Committee, if they think fit, shall admit the candidate to membership.

### Corresponding Members.

VI.—Foreigners may be elected as corresponding members of the Society. They shall be nominated by the Executive Committee, and notice having been given at one ordinary meeting, their nomination shall be voted upon at the next meeting, when two-thirds of the votes cast shall be required for their election. Corresponding members shall not be liable to the annual subscription, and shall not vote.

### Election of Officers.

VII.—The President, three Vice-Presidents, Treasurer, and Secretary shall be elected by ballot at the last meeting in each session. Should a vacancy occur at any other time, the Society shall ballot at the earliest meeting to fill such vacancy, notice having been given to all the members.

### Sessions and Meetings.

VIII.—The ordinary meetings of the Society shall be on the first Monday in every month from November to June, unless otherwise ordered by the Committee. Such a course shall constitute a session. Special meetings may be ordered by resolution of the Society or shall be called by the President whenever requested in writing by four or more members.

### Business of Sessions.

IX.—At the last meeting in each session the Executive Committee shall report and the Treasurer shall make a financial statement, and present his accounts audited by two members appointed by the Society at a previous meeting.

### Business of Meetings.

X.—Except at the first meeting in each session, when the President or a Vice-President shall deliver an address, the study of Philosophy in both departments shall be pursued by means of discussion, so that every member may take an active part in the work of the Society.

### Proceedings.

XI.—The Executive Committee are entrusted with the care of publishing or providing for the publication of a selection of the papers read each session before the Society.

### Business Resolutions.

XII.—No resolution affecting the general conduct of the Society and not already provided for by Rule XIV shall be put unless notice has been given and the resolution read at the previous meeting, and unless a quorum of five members be present.

### Visitors.

XIII.—Visitors may be introduced to the meetings by members.

### Amendments.

XIV.—Notices to amend these rules shall be in writing and must be signed by two members. Amendments must be announced at an ordinary meeting, and notice having been given to all the members, they shall be voted upon at the next ordinary meeting, when they shall not be carried unless two-thirds of the votes cast are in their favour.

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