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SCIENCE CAUSE & GOD.

BY
J. B. FREEMAN.

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A book for all those interested in modern philosophical speculations. It will set men thinking and is itself full of thought.

The Author is abreast with the most recent advances in SCIENCE, which he discusses and utilizes in his analysis of the concept of CAUSE, which leads on to that of GOD.

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PREFACE.

WHENEVER one embarks on a philosophical disquisition and dares to present it to the public, one must justify it in the eyes of one's readers as an original contribution to thought, or at least as a compendium of some special use to them. The present writer has tried his best to put together the notions of cause-effect of philosophers from the XVII century onwards. In this at least he claims to be of some use. However, this was not his primary purpose. He believes—and it is this belief that has induced him to set down his thoughts in writing—that he has something original to say on a subject that has been agitating the minds of men from the earliest ages when philosophical thought began to take definite shape, and which is still a source of anxiety and conflict.

The divergence of views on this topic is not a mere matter of words, it is something deeper. The very bases of philosophy are brought into question. In the more common views held in our days the concept of cause is either explained away or placed merely on psychological foundations. That the psychological need for cause is itself a causal fact is overlooked.

I have not tried in my essay to give a new theory of causation or a new notion of cause. I firmly believe that new concepts should have new labels, and that there should be no resort to the device of modifying a thing out of all recognition and then arguing apparently from the new notion but with a subtle appeal to the old one.

In what follows I have taken the traditional, i. e. Aristotelian, view of causation, and I have set out to analyse it in an open common-sense way. I believe that the analysis is entirely original, I do not take entire credit for the critical notes in the course of the text, but I claim originality for some of them and for the mode of presentation.

Of course, it is impossible to mention all the books and articles from which I have derived some knowledge of the subject, having gone through in the course of many years several philosophical writings either in the original or in translations, the usual text-books for my studies, and several Histories of Philosophy, and relying ultimately on notes of my own compiled from them.

I must acknowledge, however, particular indebtedness to a few, not as being the most important but as directing the lines of thought and of approach to the subject. In particular Prof. E. I. Watkin's "*The Philosophy of Form*", has been of immense use. It has helped the writer to get over the thorny point of the INITIATION of a causation by the idea of a dynamic equilibrium in bodies. It has helped towards an understanding also of the causal relation.

I may also mention Dr. Taube's recent book: "CAUSATION, FREEDOM AND INDETERMINISM", which has been most useful in the historical and critical parts of the thesis. In this connection I should not omit to mention Rev. D. J. B. Hawkins' "Causality and Implication".

My analysis of cause can be represented summarily as follows:—

(1) A, the CAUSE, MANIFESTING ITSELF EXTERNALLY and communicating being or exerting pressure outside itself.

(2) B', an external entity, manifesting itself and responsive to or potentially able to receive being from A.

(3) The actual CONTACT between A and B', enabling the communication —reception to take place.

(4) B, the terminus of the change of B' by the reception of being from A.

(5) B'-B the change called the effect.

(6) The actual communication-reception is the *causation*.

(7) The relations are of the giver-taker kind. Prior to causation it is of the kind : able-to-give-to——able-to take-from.

(8) Cause and effect are not exactly correlative terms.

(9) The causal IMPLICATION rests in the relation mentioned.

(10) The fundamental characteristic of cause-effect phenomena is *reactivity*.

(11) The basis of reactivity is the *dynamic equilibrium* that holds in entities and between entities.

With all due thanks and respects to my own professors who taught me many years ago and to all those from whom I have culled information, in writing the thesis itself and in those parts claimed as original I must say that I have worked quite independently. In fact, as no philosopher of note lives anywhere near by, I regret that I have not been able to consult anyone or to get aid in any way.

That the present thesis will be a contribution to philosophical literature is my hope; and as it has given me some satisfaction I believe that this my hope is not ill-founded.

With the conviction that on the one hand no philosophical training is sound without an adequate knowledge of the humanities and sciences, enough at least to appreciate the value of modern discoveries and tendencies; and that on the other a deep knowledge of the latter without a solid equipment of philosophy, will easily lead one astray, I have sought to equip myself adequately for the task. In this I have been singularly fortunate owing to my mathematical equipment, my interest in modern atomic physics, and my training in philosophy and the social sciences.

I hope that my readers will not be disappointed.

J. B. Freeman.

Science, Cause and God.

CHAPTER I.

The Axiom of Realism.

It is claimed that Science does not deal with causes in the traditional sense; and that we have no experience of such causes, not even of secondary much less of primary causes. "Scientifically, cause, as originating or enforcing a particular sequence of perceptions, is meaningless we—have no experience of anything which originates or enforces something else. Cause, however, used to mark a stage in a routine, is a clear and valuable conception, which throws the idea of cause entirely into the field of sense impressions, into the sphere where we can reason and can reach knowledge. Cause, in this sense, is a stage in routine of experience, and not one in a routine of inherent necessity." (Karl Pearson in the GRAMMAR OF SCIENCE Ch. IV.) I claim, however, that Science does deal with the natures of things and particularly with that manifestation called causality.

It is true that Science "describes" Nature and does not "explain" it, in the sense that Pearson understands the word, i. e. point out a physical necessity or compulsion. It is indeed impossible to do so, i. e. to "see" that A follows B because B is physically connected with A in such a manner that the connection itself is perceptible to us. Knowledge is of the mind and in the mind, and any "must" that can be known is only a mental apprehension

of compulsion but not necessarily of the technique of compulsion. Of this we are sufficiently convinced. Granted the axioms of a geometry, we accept its conclusions, and we must do so. Even here if we ask " WHY " we are forced to acknowledge that the mind is so constituted ; It is in the " nature " of mind. There can be a logical compulsion, but we fail to be convinced that this is only a mental habit due to heredity, training, environment, etc.

How can we " see " a physical compulsion ? The physical world is translated into a mental world by knowledge, and to the physical necessity there can only correspond a logical necessity. What we can strive for is to subject the mind to a logical necessity ; and this we do in our search for concepts, generalisations, laws. Without these the mind is bewildered by particularities. It craves for a unification of its ideas, and any little unification gives it some measure of quiescence. This is generally acknowledged, whether by those who identify the mind with its ideas, or by those who hold that there are ready-made compartments in the mind into which any percept must go that it may cease to be troublesome ; or by those who assert that an idea is nothing more than a physical movement forming a groove or indentation in the brain-matter. Each of these sets of philosophers can give a beautiful simile to describe the process of unification of ideas and the quiescence of the mind in it. A certain scientist declared that he would not believe in creation untill the human appendix was " explained ".

The point I wish to bring out is that we do not and cannot "see" any physical necessity binding together cause and effect. The "seeing" is only metaphorical—by the mind; and the necessity is only a logical one. This does not, however, mean that we are free to deny a physical necessity, or to deny "causation". It seems to me that METAPHYSICS is not the branch of study of things beyond or above physics or the observational sciences; but that it is the branch of study dealing with what is underneath all science, the basis of all the sciences. The whole question turns about the fundamental one which is the parting of the ways at the very start, namely that of the objectivity of knowledge.

The concrete sciences are, no doubt, concerned with behaviour, but they describe the behaviour of OBJECTS; they do not deal with mere abstractions, nor do we translate actual experience into mathematical language in any way we like.

The question "why?" so often propounded by man right from the age of the "enfant terrible" to his death-bed, means not only "on what grounds?" but also "to what end or purpose?". Scientists sometimes eschew the question in the latter sense. Others do admit this sense, but their study of history and sociology is permeated with the answer that they in the first place accept. A statesman does not wish to know only how a mob behaves but also why, so that he can anticipate its attitude. That in this case we cannot go beyond a vague probability is clear; still less is it possible to predict the behaviour of

an individual. Perhaps in course of time a greater degree of probability may be attained. The end or purpose of the mob or the individual can be found, and the various factors influencing the individual or the social will can certainly be studied. In biology and in the humanities we have indeed attempts to formulate general "laws" in terms of tendencies, e. g. the Darwinian Law of the Survival of the Fittest, the Evolution Theory, the Mendelian Laws of Heredity; the Laws of Supply and Demand and of Exchange and Currency. We have also Laws of Progress stating the tendency of the individual and of the race to attain "ideal" perfection. This is an assumption underlying the philosophy of several of our modern popular philosophers, who even go so far as to **WORSHIP** in anticipation these ideals.

The question **WHY?** taken in the other sense: **ON WHAT GROUNDS?** can only refer to logical grounds, as we have made clear. If there are physical grounds, then we **KNOW** them only as logical grounds. We may ask: are there physical grounds corresponding to our logical grounds? Is there a physical reality underlying our mental experiences not only of objects but also of their relations **INTER SE?** So we come back to the fundamental question, and with this, it is obvious, Science cannot deal, as it refers to the very basis of Science.

Some one has wisely remarked that Science does not tell us why a stone unsupported falls to the ground? Even if the question is framed more exactly, Science does not

tell us the WHY but only the HOW or the manner in which a stone and the earth appear to an observer supposed to be extrinsic to both to approach each other. But do we exclude the WHY altogether? That we do not is clear from the fact that we have always, like the ENFANT TERRIBLE, sought for logical grounds in the form of "laws", and have been satisfied by considering these as PERTAINING TO THE VERY NATURE OF THINGS, the restricted application of each law to a particular set of things being determined by the things themselves and not by the mind. The Laws of Heredity are not applied to the behaviour of electrons in an electric field etc. Again the laws are not only statements of modes of behaviour, but they are also statements of TENDENCIES. The PURPOSE or END is at least the setting up of an equilibrium. The framing of a LAW is an acknowledgement of the intelligibility of the world of experience. When we ask WHY, we seek for logical grounds, for tendencies, and for ENDS, so that the mind may be satisfied with its own content and with its place in the world of reality. Thus we have the Newtonian Law of Gravitation, the Laws of Relativity which substitute a gravitational field for Newton's FORCE, the molecular, atomic and kinetic theories, to account for the OBSERVED laws of Definite and Multiple Proportions and for the gas-laws of Gay Lussac, Boyle and Chasles etc. Laws do not merely describe behaviour, but they also give reasons for them. Perhaps we ought to distinguish between a law which states only an observed mode of behaviour, and a law which gives a

reason for a particular mode of behaviour. The latter may be called a THEORY. But even in the former the universality put into the law gives us the logical ground sought for. A law is not only a resume of past experiences, but it is also an anticipation of the future; not by mere probability but as a sincere attempt to understand the very natures of things. It has not merely a mnemonic value, and its criterion of validity is not simplicity or logical harmony; nor will scientists allow personal or racial prejudice to weigh in the matter. Simplicity and harmony are points in their favour from the subjective point of view.

In the subatomic world it is claimed that the laws of probability hold sway, the expectations being perfectly verified in the mass. This may be true, but probability is itself based on certainty, and the degree of expectation is not calculated from the knowledge of the electron or of systems of electrons, but from our knowledge of the mass. No wonder then that the verification is perfect. Does the Indeterminacy Theory state that elemental matter ONLY PROBABLY obeys the laws of probability? The electron is indeterminate and to the same extent unintelligible. Its indeterminacy is evident from a certain differential equation, into which our whole knowledge of the electron is condensed. One scientist has defined the electron as this differential equation; another - to obtain perhaps a pretence to reality - has defined it as a system of waves - of what? - of probability! According to these views, an electron is only a law of behaviour; but the behaviour is one not of direct observation but of supposi-

tion by analogy only. We strive to apprehend directly or by perception the physical reality corresponding to the concept. When this is done the theory stage of knowledge is over. The behaviour is of SOMETHING, and we are forced to postulate an ETHER. Thus hypothesis goes from molecule to atom, from atom to electron, from electron to ether.

External reality exists in the mind in the manner conditioned by the mind, as percepts, concepts, ideas, etc., not as they exist in themselves. This is impossible, they would not be what they are, and the mind would not be what it is. We cannot PROVE a realism: that things objectively exist and affect the mind; any proof is a mental operation with mental entities only. We may have SUASIONS only and nothing more. Are our concepts and laws and hypotheses merely creations of the mind? In theory there may be idealists and solipsists, but in practice there is none. There is a great clamour now-a-days for realistic statesmen. "Whatever you do," said Masaryk, "stick to reality." It is not that the professional idealist does not see facts, but he ignores those that prove rather troublesome. We CANNOT PROVE FACTS. We apprehend them AS SUCH. I cannot prove that I am looking at this paper and writing on it. Nor can I prove that I exist, in spite of the Cartesian slogan. Objectivity is the primordial datum of experience. Again I cannot prove that another mind as such exists except by analogy, but the evidence is so subjectively convincing that I accept it without grudge. I infer a reason and a will just like

mine. Communication between minds is generally by external symbols, though there are telepathic and psychic phenomena not yet properly investigated. These, however, are rare.

It must be admitted that solipsism can logically hold; all things may be a dream. Perhaps it is the simplest hypothesis; but hypotheses are meant to satisfy the mind in the Simplest way, and first and foremost to cover facts; and, if the basic fact be shelved, then all facts are automatically shelved also, and the primary purpose of hypotheses is lost. Science itself claims objectivity even in its theorising. Thus from the chemical substance to the molecule, from the molecule to the atom, from the atom to the electron, theory has proceeded, each in its turn being put on an objective footing. It has always been the aim of science to remove the subjective elements—of the individual at least—from observations and judgments. From the diversity of views in different matters, I infer the individuality of men; and from the great amount of agreement that can be had, e.g. in Mathematics, I deduce that human minds are constituted on the same plan. The Relativity Theory points out that spatio-temporal phenomena are only relative to an observer, although they can be described by laws framed in the same way for all. In no way is the objectivity of the knowable world impugned; it is in fact throughout assumed.

We should therefore accept Realism as granted, and a RELATIVE Realism as most SUASIVE. By this I

mean the acknowledgement of reality independent of the mind of any individual and of all human beings. We have no reason for an absolute Realism, as if the world were independent altogether of Mind. Indeed the intelligibility of the world is taken by many to be an indication of its dependence on a Mind similar to but by far transcending the human mind.

To consider then the question: can there be such a thing as a cause and correlatively an effect? This question is intimately bound up with that of the objectivity of the world. In fact, to acknowledge the objectivity of knowledge is to acknowledge that the external world is the cause of the mental world. If Realism be not granted - at least a relative realism - no further discussion is of any value. The same difficulties against cause will recur again and again, and the discussion will revert to the fundamental point. Science cannot answer the WHY of Realism: why does an external object affect the mind? As regards the manner in which it does so, some knowledge has been attained. This comes under the heading of Psychology. To apprehend a physico-psychical connection is impossible. The only answer to our WHY is that the intelligibility of the world is a FACT; the intellect of man does apprehend external reality. But this answer is Realism itself.

Before we attempt an analysis of the notion of Cause we must accept Realism as an axiom fundamental to the discussion.

Indeed, I myself am made up of matter and spirit in intimate contact, in such an union that matter is vivified by spirit and spirit manifests itself through matter.

One may bring forward some recent experiments such as making a blind person "see" by a series of electric shocks or mechanical stimuli given to the optic nerve or the optical centres, by which the person may distinguish colours and perhaps forms. This does not, however, prove anything against the objectivity of knowledge or the causal theory of perception, which we are going to use in the following. On the other hand it confirms the fact of receptivity from outside and reaction within.

CHAPTER II.

An Analysis of Cause

There is **CHANGE** all around us. In fact the persistence of change has caused a great deal of confusion in the mind of man. It enters into the more subtle concept of **TIME**. Change is evident in experience.

The first thing that strikes me is a change in myself. Any sense-experience is a change in me. So is every act in which the intellect plays a greater part. There is an awareness of an identity as well as of a difference in the subject. There is also, in every experience of objects, a real though not always fully apprehended awareness of a distinction between subject and object. This distinction grows up more markedly with the development of the material on which the mind acts, and with this becomes clearer the consciousness of the **EGO**, that which undergoes the changes. It is the continual recipient of new being, though it retains its identity.

The mind receives something in a perception, and that reception is from something. Thus in our mental experience we apprehend a change, something that changes, a reception from outside, and the relation communicant-recipient between the external object and the mind. There is also a contact, which in this case we may call a physico-psychical contact, of the object with the mind. There is the capacity to give in the communicant, and the capacity to receive in the recipient,

and these correspond. The contact does not necessarily take place. Granted, however, the object AS communicant, the subject AS recipient, and the contact, then there is a change in the subject, and the communication-reception takes place. The communicant is called the CAUSE, the change in the recipient is called the EFFECT, and communication-reception is called the CAUSATION.

The mere CONSIDERATION of two different objective states of an entity is not what we mean by a change, but the PROCESS of EVOLUTION from one state to the other. The change is a FACT, a dynamic fact, an event. Owing to the discreteness or non-continuity of changes, it is impossible to perceive directly the process itself.

Let us go further into this analysis of cause-effect. What does "A causes B" mean?

A is in the position of a communicant, a transmitter of some being. It may be constantly transmitting, whether there be a recipient or not, or its actual transmission may be dependent on the existence of a recipient and of a contact with it or on certain favourable circumstances. The ability to communicate, however, must be in A, and this must PERTAIN TO THE VERY NATURE OF A. Moreover, A itself undergoes change in the process, though this may not in most cases be obvious.

Also in the recipient there must be a capacity and a readiness to receive, so that given the contact there will be actual reception. The ability to receive must **PERTAIN TO THE VERY NATURE OF THE RECIPIENT**. The reception is one into the being of the recipient. The recipient in its new being is sometimes called the **EFFECT**. Generally the term is reserved for the change itself, and it is in this sense that we shall take it. In what follows we shall denote a change by a short dash. Thus the change of the entity B' to the entity B will be shown as B' - B.

The contact between communicant and recipient is such that the give-take occurs, i. e. such as to make the communication available to and availed of by the recipient. Given the communicant and the recipient, a contact does not necessarily take place. That some sort of contact is necessary for causation, is a **PRIMARY POSTULATE**. In the case of acquiring knowledge of the outside world, we have called the contact a physico-psychical one. We assume some such contact, and this is implied in the axiom of Realism. In the case of an external reaction to a psychic motion we shall call the contact a psycho-physical one. In the case of two external entities there is some sort of physical contact. The two physical bodies may not visibly touch each other. It may be that an emanation from one reaches the other. Whatever it is, there is an extension of the being of one to the other; the being of one is made available to the other. We have an adage: "**Ubi ens agit ibi est**", and another: "**Actio in distans**

repugnat". These are different statements of what we may call the CONTACT POSTULATE. Action presupposes existence. This postulate merely affirms that there is action beyond the centre of unity. Let it not be supposed that the contact Postulate is a mental fiction or something—like a Kantian Category—entirely of the mind. When we apprehend action beyond the centre of unity we apprehend the extension of being itself, for action is the manifestation of being.

In the modern Wave Theory action at a distance is got over, and purposely so; and we all somehow fail to be convinced otherwise. Some mental unity is given to two terms by a mental contact between them; or rather we should say that the contact is a SINE QUA NON for any possible unity between two ideas. By the Axiom of Realism a physical contact is demanded between two objects as the basis for any possible unity. An electron has been described as filling the whole of space although its nucleus or most intense portion of wave-activity is for practical purposes a geometrical point. Thus there is actually a physical contact between any one body and every other. The Contact Postulate cannot be proved; *it is itself implied in the Axiom of Realism.*

A coming into contact is itself an event. There are degrees of contact, and ONLY WHEN THE CONTACT IS SUFFICIENT will there be causation.

An external object need not be in my mind in its physical entity; and it cannot be so, for the spiritual mind is not a physical container. The object is in my

sense organs in some way, by some pressure on them (which can perhaps be measured quantitatively). These again are present by a physical pressure in my whole body, in which physiological reactions take place. My body then with its vital reactions is in its turn present in the intellect in some way which we do not and perhaps can never understand. Here we have a series of cause-effects. In such a series: A causes B'-B causes C' - C causes D'-D, how A can be considered as cause of D' - D we shall consider below.

The relation between cause and effect is of the giver-taker kind. The relationship is non-mutual, as is clear. The relation of B to A is a real one of participant in the being of A. The relation of A to B is a real one of contributor to the being of B. It may be that A is changed by the process or even that the whole being of A is communicated to B. The term CAUSE is confined to A, the communicator *as* such; and the term EFFECT is allotted to the change. Thus CAUSE and EFFECT are not exactly correlative terms. This peculiarity has not, I believe, been pointed out before. The cause is the communicant, the effect is the change by the reception. CAUSATION is the process communication-reception. Sometimes the word CAUSE is taken to mean some change in the communicant, and "effect" to mean the changed recipient itself. To avoid confusion we shall restrict the senses to those given.

Time does not *per se* enter into the notion of cause but only *per accidens*. (See Chapter III). In a series of cause-effects time would come in also *per accidens* for an

added reason. Although changes are discrete or discontinuous (as is generally acknowledged) the several entities **ENDURE** between the changes. Moreover, material bodies occupy space, and communication and reception take place in steps. Thus actually the causal process takes place in time. For this reason the word "cause" is applied to A as *communicant*, not to A as *having communicated*. Thus cause is ontologically prior to effect. It is also temporally prior, but only *per accidens*. During the causation or causal process *cause and effect necessarily co-exist in some way*. We shall revert to this point again when we deal with Cause-Series.

The reason why the word Cause is applied to A as it existed before the actual causation, is because we are dealing with something referring to the very nature of A; not altogether abstractly considered but as a particular kind of communicant. Moreover, we are, for the moment, not concerned with what happens to A, with the change which it has certainly undergone in the process, with its new state or the modification of its being, or even with its entire loss of being as A. The new existent B holds within itself, together with an added being from A, its own former being or part of it.

That we cannot consider the modification in A as the effect of B' (the pre-existent being of B) is clear, because we are dealing with a *positive* communication and reception. B' receives of the being of A, which becomes A'. But, when there is no positive communication on the part of B' to A, we do not say that B'

causes the change A-A'; but it may be that B' *conditions* it. The relation between cause and effect is, as we stated, a non-mutual one. Causation by A does not take place unless there is an actual contact and an actual reception by B'. Prior to this, A is the cause only **POTENTIALLY**.

Causation is not merely a thing of the mind, a mental association of contiguities arousing an expectation of a habitual kind. J. S. MILL defined causation as such. The uniformity is understood by some to belong to the perceptual, as opposed to the real, world. Karl Pearson gives as a "scientific" definition of cause: "Whenever a sequence of perceptions D, E, F, G, is invariably preceded by the perception C, or the perceptions C, D, E, F, G, always occur in this order, that is, form a routine of experience, C is said to be a CAUSE of D, E, F, G, which are then described as its effects." I have turned on a tap a great number of times, and I have always found water to flow out. True, this arouses an expectation in my mind when I turn on the next tap. But the expectation is not only due to force of habit; it can also be due to reasoning. And it does not require a very "scientific" man to see that I was not the cause of the flow of water! The above so-called definition is very far from being "scientific". It would only point out certain characteristics of a cause-effect system, which would aid us in finding out a cause. Cause is in a sense temporally prior to effect, as we have noted above, but not all uniform antecedence is causational. However, the very fact that there is uniform antecedence in the

perceptual world is the basis of our accepting uniform antecedence in the ontological world also. Here again we crop up against the problem of Realism. If the Axiom of Realism is granted, then any associationist definition of cause-effect fails to satisfy us.

It may be asked : If there is uniform antecedence in the ontological world due to an ontological connection between cause and effect, what is the nature of this connection ?

We have already observed that external physical entities and their physical connections do not exist as such in the mind. The objects exist there only as ideas. The mind participates in their being in some way. The ideas can be analysed into "essences" and "natures" of things ; but the essence or nature is an abstraction in which WE ISOLATE THE CONCEPT EVEN FROM ITS CONCEPTUAL RELATIONS TO OTHER CONCEPTS. There can be also LAWS and AXIOMS in which some mental relation is tacked on to a set of concepts. They are not arbitrary and they are not purely subjective. Appealing then to the Axiom of Realism we assert an ontological relation between the objective entities, a relation which does not exist in the one of them ontologically out of contact with the other, but which in the contacted system does really exist in the one referred to the other. What can exist in each separately is a tendency and a potentiality to give or to take. ESSENCES ABSTRACT EVEN FROM THESE.

Moreover, while some philosophers declare that there is no ontological connection between A and B', they take for granted that there is none also between A and B. The reason for this attitude is that they have not distinguished between the two systems A, B' and the cause-effect system: A, change in B'. The LAWS and HYPOTHESES of the conceptual world also do not refer to the true cause-effect system, but to the system of conceptual entities PRIOR TO THE CAUSATION. The relation between A and B' is that of ABLE TO GIVE TO-ABLE TO TAKE FROM, and *it is this relation that we seek to express as a law.* By the latter we express only potentially a cause, while B as such is non-existent. B' is in potency to the new mode of existence B. The tendency of A to give belongs to its very nature and the giving is in its own way. The tendency of B' to receive is of its own nature and the taking is in its own way. When however "natures" are considered in the most abstract way, we prescind from these tendencies.

That there is an ontological connection between A and B, follows from the fact that some of the being of A is absorbed in that of B. Our analysis of Cause-effect admits easily of this conclusion.

The potentialities ABLE TO GIVE TO,—ABLE TO TAKE FROM, and the tendencies TO STRIVE TO GIVE, TO STRIVE TO TAKE, PERTAIN TO THE VERY NATURES OF A AND B', THOUGH THEY ARE NOT FORMALLY INCLUDED IN THE

ABSTRACT CONCEPTS, THE RELATIONS ARE REAL AND INHERE IN THEIR SUBJECTS. Thus by LAWS we EXTEND the concepts of A and B'. We considered each as belonging to the system of both, and not in isolation from each other. It is not necessary to extend further, to consider an object with all its relations to every other being in the universe. This is not only impossible, but it is also undesirable. We study the nature of an object by apprehending its relations one by one. Relations are not apprehended by an IMMEDIATE apprehension.

When speaking of the communication-reception, somebody may ask what it is that is communicated and received. It is BEING—positive being. It may be apprehended as heat, light, sound etc., or in general as ENERGY, by which FORM manifests itself. We do not in the least intend to identify being with physical energy, which is the manifestation of a physical object, in its actual being. Physical energy can even be measured quantitatively. There are also psychical energies not subject to measurement. For the present we shall concern ourselves with physical objects.

We know that such a communication does go on, and that there is an ability to communicate in every physical object. The shape that this energy takes, depends on the nature of the object, and is conditioned by its ambient and other circumstances. Thus the Sun emits light, and the light-energy is absorbed by a plant. The energy as existing in the radiation is different in

form from that as it existed in the Sun and from the energy as absorbed in the plant. The recipient receives the communicated energy into its own being, where it exists in a new mode of being.

We cannot ask: What is the cause of *B*? unless we consider *B* as a change, i. e. as a modification, by access of being, of a preexistent entity *B'*, or as an altogether new entity in which the change is one from non-existence as such to existence. Creation does not come within the scope of the empirical sciences, and so we shall leave this point alone.

CONDITIONS. Our definition of cause is sufficient to distinguish it from a **CONDITION**, which is a relevant circumstance in which a causation takes place or tends to take place. A **NEGATIVE CONDITION** is a circumstance the removal of which is necessary for the causal actuation. A **POSITIVE CONDITION** is a circumstance the positing of which is required for the actuation. A condition may prevent a contact or ensure it. It may retard or accelerate the communication or reception. Even the contact may be permitted in different degrees, and there is **A MINIMUM OF CONTACT REQUIRED FOR ACTUAL CAUSATION**. Moreover, circumstances may bring into play other bodies with causal action; in studying a particular cause-effect system, **ISOLATION** must be made as much as possible from irrelevant circumstances. The methodology of science must itself provide facility for distinguishing in practice relevant from non-relevant circumstances, causes from conditions.

Again when the entity A communicates energy outside itself, only that energy which is relevant to the change of B' to B concerns us, and only the circumstances affecting the contact or the communication—reception are the conditions. The changes in an ordinary photographic plate are not due to sound emissions, although the object photographed may emit energy in this manner. The movement of the shutter is a condition. Hence in the sciences we consider ISOLATED SYSTEMS wherever possible, and the circumstances of an experiment (including the presence of bodies) which have no relevance to the effect are left out of consideration in the judgements that we may form. (See Prof. H. LEVY in "The Universe of Science".)

It is possible, however, to make mistakes, both in the recognition of what are the relevant conditions and in the pointing out of the causes. So many mistakes made in the past have been brought to our notice recently, that scientists have become nervous about hypotheses. This nervousness is reflected in the very notion of an hypotheses. "Actually the Newtonian Law or, as I prefer to call it," says Dr. Levy, "this particular method of isolation, is known to break down at the two extremes, molecular and nebular distances. This does not mean that the predictions already verified have become invalidated. It merely means that some other mode of expression is required in these altered circumstances. If the whole scheme could be unified, one law for all ranges, the aesthetic sense of the scientist would be profoundly stirred."

(Whether it is the stirring of the aesthetic sense alone and not the satisfying of the perpetual craving for truth and for the acquiescence of the bewildered mind in its objective ambient, that is the object of the scientific framing of hypotheses, is, however, a question that may well be asked.)

A hypothesis, if at all its claim to be reasonable is justified, does partially enunciate a truth. Its specific function is to bring order and harmony in the world of ideas. In order and harmony does the mind find rest. But not merely in the psychological plane; the mind seeks for a harmony of itself with the external world. Even a partial truth such as "heat expands bodies", "light travels in straight lines", may bring about some harmony, and result in a mental satisfaction. The latter partial truth "explains," e. g., why the image of an object in a pinhole camera is inverted; and the mind can acquiesce in it. The mind, in fact, craves for a unification of its ideas, and this unification is effected by a statement which is nothing less than an attempt to describe the very natures of things in their relations to one another.

No law can be expected to enunciate the whole truth and nothing but the truth. Karl Pearson has compared, in an apparently convincing manner, the formulation of a hypothesis to the formulation of a mathematical formula (or "function") for the formation of the terms of a series where the first few terms have been proposed by someone. The formula found agrees with all the

given terms and can be used to anticipate any particular term not yet given by the proposer. If another term be given then perhaps a new formula may be needed. But, observes Pearson, we do not know for certain what the proposer will put down as the next term, and the formula obtained from the terms already given can only be said to have a degree of probability. Whether Pearson takes "probability" in the mathematical sense or only as a moral expectancy, is not clear; but it is evident here that he does not see that he is contradicting himself; for elsewhere he denies what is known as Free-will, so that, for him, the next term that the proposer will put down is determined by parentage, heredity, education, environment, etc., and these can be subjected to study. If he had given another example where a free agent is not brought into the question we might accept the comparison; all the same, causal connections will not be brought into question. We grant, of course, that the next term is not fixed by the terms that have been put down; but this does not show that they and it are not all fixed by something else or that they are not all fixed by causal relations.

It is true that a hypothesis is only tentative; its universality is also tentative. But IT IS INTENDED TO CORESPOND TO REALITY, and as much should be VERIFIABLE. Again, there is no proportion between probability and certainty, between the number of recorded cases and the number of possible cases of experience. Hence the mathematical probability obtained can only be a very meagre one, almost infinitesimal.

Still some scientists propound DOGMAS, more universal and exacting in their demands than mere laws and hypotheses! For example, they say that the will is determined by measurable factors, of which, however, we have not at present sufficient knowledge. Ignorant sleeping witnesses are called up for evidence! Again a whole theory is built up on only one term, e. g. the jaw-bone of a Pliocene "man". Further, physicists who dabble in sub-atomic theories would interpret the whole world in terms of the electron, and—in spite of admitting to an insufficient mathematical equipment to deal with a system of half-a-dozen electrons—would extend their inference of probability and indeterminacy to physical entities of human and terrestrial and even nebular magnitudes. Physical astronomy has not made such great strides recently as sub-atomic physics, or we should perhaps have astronomers again, like Laplace, who would interpret everything with the aid of nebular theories. They would be nebular in more senses than one! Such are the intellectual atrocities perpetrated in the name of Science. At the present day we are confronted with theories of Race, which are anything but scientific. Racial groupings based on the cephalic index theory are misleading. The index is found to vary between its maximum and its minimum even in a small community. Add to all this the perversion of Science for the destruction of Man!

By acknowledging that laws are only probable, some concede that they do not even answer the HOW, let alone the WHY of things. But even in the HOW, we

are concerned with the WHAT. We study behaviour, because it is the behaviour of THINGS. We are concerned with causes, secondary if you will, and the concentration of this deep concern of ours gave birth to Science.

Man has gone backwards and forwards in the search for truth. He has on the one hand anthropomorphised the physical world, and on the other he has mechanised man; he has idealised the physical world and he has "materialised" the psychical one. If he had moved his eyes both upwards and downwards he might have arrived at a greater measure of truth and certainty than he has actually done. It is the scientist who is the greatest offender in attempting to "explain" or "interpret" the world. Pearson's complaint against "explanations" may well be borne in mind. When we attempt to find a harmony in the world we must take into account all the experiences of man, even those which cannot be expressed in quantitative terms.

Let us return to the consideration of relevant circumstances. A circumstance impeding a contact is an OBSTACLE to the causation. The removal of an obstacle is a CONDITION. The necessity for an effect to follow inevitably from the cause is a RELATIVE NECESSITY. Lord Russell considers a penny-in-the-slot machine, and says that an earthquake occurring just after the penny is pushed in would bring the effect to nought. There is no need to postulate a Russellian catastrophe to see that a cause does not unalterably produce its effect or that they are not so rigidly connec-

ted that positing the one, the other **MUST** follow. Moreover, the example offered is of a cause-series in which the time-element plays a greater part than in the single two-term system. There is scope for obstacles at the different stages. We shall come back to this point again later.

When we photographed a star which burst into brilliancy and disappeared in a few days and reckon that it was a hundred light-years away, we realise that the nova was not in existence as such when the photographic plate recorded the phenomenon. However, although the star ceased to exist long before its effect came into being, still some part of the being of the star outlived it and co-existed with the plate at the moment of contact. In view of the Conservation Laws there should be little difficulty in this. The light energy was absorbed into the plate in some way, and the photograph demonstrated the fact. So many things could have come in between cause and effect: a cloud, a person walking in front of the camera, etc., that it is clear that causation is dependent on conditions positive and negative. The nova is called the cause, as it was part of its being that was communicated to and received by the plate. There may be communication of being by an entity in various ways: by sound, light, heat, electrical or magnetic or gravitational energy, and also by non-quantitative forms; but not all the modes of communication are relevant to a case in hand. Relevancy is discoverable by methods, such as are used in the modern research laboratory, of forming isolated systems,

In studying the world some attend only to quantitative observations, and the formulation of laws has reference only to these. It is true that such laws find greater acceptance, and that there is more agreement in the sciences which frame their laws in mathematical terms than in the other sciences. This is not to say that only quantitative observations are of any value. There are many phenomena not yet subjected to quantitative analysis. There are many also which cannot be so subjected. Other modes of analysis may be applied or devised for such experiences. There are psychical and mystical experiences, and to shut our eyes to them just because we have no suitable method of dealing with them is just as "unscientific" an attitude of mind as superstition. If Science cannot deal with them it must at least examine the reasons for its own limitations and the obstacles that are in the way.

CHAPTER III

An Analysis of Cause. (Contd.)

Cause - Series.

Let us proceed further in our analysis of cause-effect. If A is the cause of B' - B, and B the cause of C'-C, in what sense can A be called the cause of C'-C?

We have seen that B contains in its being that part of the being of A absorbed by it, so that A exists, or partially exists in some way in B. The acquisition may not be a permanent one, but it does endure for a certain period of time. Thus A can act in B when B causes. Since then B exists in C in some way, A exists in C also. A has taken part in two causations, and is a cause of C'-C. We thus have a transitive relation of giver-taker. The relation of A to C is also a giver-taker one. Time enters into the causation to a greater extent than in the single cause-effect system, firstly because there are two changes and nextly because B may endure for some time before entering into the second causation. What has happened to A when C actually came into existence is not taken into account when we apply to A the term "cause of C'-C". A may itself have changed in its essential nature even before C came into being. Part of the being of A, however, is embodied in C. Since the being of A exists in some form in every term of the series, we sometimes speak of A as THE cause of the final effect. In a lengthy cause-series it is sufficient if this be recognised. *It is not necessary that we should*

know all the terms of the series in order to apprehend the first as the cause of the last.

B may be the cause of C'-C in virtue of its participation in the being of A or not. In the former case the causation is more transitive, if we may say so, and we have what is called a **STRICTLY SUBORDINATED** series of causes. In the latter case the causation by A of C'-C is **ACCIDENTAL** and the series is said to be **ACCIDENTALLY** sub-ordinated. (Generally speaking causation takes time, for although a change within the atom may be instantaneous, * yet changes in the mass are not, as the atoms in it are changed successively and not all together; also conditions in the mass are continually changing.) A machine is a good example of a strictly subordinated cause-series. A machine is a system of tools in series; each tool in operation moves the next in the series. If any one tool P ceases to function, the remainder in the series automatically cease also; Q, R, S etc., stop working. (In safety devices it may be that the ones prior to P stop also; but then the working of P is a **CONDITION** for their efficiency.) As an example of a series of causes not strictly sub-ordinated we may consider a number of cigarettes lit successively one from the other, the first being lit from a match.

AUTO - CAUSATION.

We shall next consider whether a body can ever be said to be the cause of change in itself. It is clear that,

* When an electron jumps from one orbit to another, or when a quantum of energy is absorbed, the change is instantaneous,

if it were so, the entity as cause will not be identical in all respects with the new entity, the terminus of the change. There will be a difference in the mode of being. There cannot be a single two-term system of cause-effect, as if A is the cause of CHANGE IN A. There must be a real distinction between cause and the first term of the effect. The basis for causation is absent; the relations, which were non-mutual, the tendencies, the potentialities. The Principle of Contradiction will be violated; A cannot be in potency to receive something in A, as it already pertains to A.

We can, however, have a mediate causation. In the cause-series A, B'-B, C'-C, substituting A' for C' we get, say, A, B'-B, A'-A'', so that A is the cause of B'-B, and B of A'-A''; thus A can mediate be the cause of A'-A'', where A' is supposed to be what A has become by the first communication. The final A'', is not identical with the original A, as it has some of the being of B in it which includes the being of B'. In this way we can have also what has been called MOTUS AB INTRINSECO. In NUTRITION the entity A absorbs B into its being. A gives new being to B, and B in its turn gives being to A. We may perhaps compare perception with nutrition; the mind gives physico-psychical being to a physical entity, which in turn gives new being, a percept, to the mind.

In practice it may not be possible to follow out a train of cause-effects. It is sufficient if we recognise

that the last entity received being by a positive though mediate communication from the first, in order to apprehend the first as the cause. We may assume intermediate entities and steps, and speculate as to their natures. This is often done in the sciences. Molecules, atoms, and electrons were arrived at in this way.

Action on oneself or "reflection" is generally mediative, i. e. by an intermediate step involving another entity. Again one integral part of an entity may cause a change in another integral part of it, so that there is a change in the whole. In this way there is external action in me arising from an intrinsic principle. The mind acts on matter and matter acts on the mind. These are facts of experience. It may be that thoughts do not wholly depend on words or word-images; and that abstract concepts can be had without corresponding mental images of the concrete. But this is not the point. According to Mr. E. J. WATKIN there can be purely spiritual activity without any corresponding physiological one. It is reasonable to suppose that the human spirit can come into DIRECT contact with spiritual beings, and physiological states are only conditional to the reactions. This, however, is not our point just now. Our point is that there is a REAL DISTINCTION between the cause and the termini of the effects.

*Thus when A causes the change B'-B these are the elements in the causation: There is a positive communication by an entity A of being outside itself. There is a contact of the communicated being with another distinct entity B'. There is a reception of the being into the

being of B', by which a change is obtained resulting in the entity B. All changes are manifest in phenomena, and can be known in consciousness by the element of identity and difference apprehended. As there is no absolute continuity in nature, the process of the jump from one state to another cannot be experienced but only inferred. There is no stage midway between every two stages. A itself must have undergone some change in the process. Also B' itself might have communicated part of its being externally, and possibly to A; in which case we have two distinct causations. The final entity B has some of the being of B' together with the absorbed being of A. The being of A absorbed in B exists in B not in the same way in which it existed before the absorption. A pre-exists B'-B, but it also co-exists, at least in an extension of itself, with B', and in a sense it exists in B. We can extend the analysis to a causal series.

Let us now give the following definitions:—

“A CAUSE is an entity which positively communicates being in some way to another being.”

“The change in being of the recipient, or the coming into being of it, is the EFFECT.”

“The communication-reception is the CAUSATION.”

In common speech the word “cause” is used so loosely that a great deal of confusion follows when we attempt to analyse the notion. A hot brass plate was in

contact with a cold copper plate. The brass fell and the copper rose in temperature. In ordinary speech the brass "caused" the rise in temperature of the copper; and copper "caused" the fall in temperature of the brass. Such usage may lead us to consider causation as only a mental attitude, and causality only a thing of the mind. Scientifically we should say only that the brass was the cause of the change of state of the copper. It must be conceded, however, that when we look out for the cause of a change it is only a particular change that we have in mind. This is only a mode of isolation, and does not signify that causality is only a mental figment.

That we adduce examples of communication of being in terms of energy, must not be taken to mean that we identify being with energy or mass-energy. An attribute of being is activity, and its manifestation is apprehended as energy. Moreover, several forms of energy are measurable, and these are the most easily studied.

JOINT - CAUSATION.

We shall now consider when two entities can both be considered as causes of the same effect. Suppose there is a positive communication of being by both A and B and a reception by C'. We can have three cases :—

1. The causations may be successive. Thus A may cause the change C'-C'' and then B the change C''-C. This case may be analysed into two distinct cases of causation.

2. The causations may be simultaneous but independent of one another. For example in "shooting" a Talkie film, the film is affected by sight and sound impressions together but independently of each other. Strictly speaking the causation can take place successively and in any order. This case can therefore also be split up into two distinct cases of causation.

3. The causations may be simultaneous and dependent on one another. In this case each causation is a **CONDITION** for the other. The contact between two entities may be a condition for the communication or for the reception by the third. We shall restrict the term **JOINT CAUSATION** to a case like this.

It is clear that, as in the case of single causes, there can be conditions for the efficiency of **JOINT CAUSES**. These conditions may be positive and negative, or essentially necessary (e. g. for the **CONTACT**) and not necessary, or obstructing, accelerating and retarding. The difficulty in practice is to distinguish between a necessary condition and a cause. Again we sometimes speak of one of the Joint Causes as **THE** cause—a habit which also leads to confusion.

JOINT EFFECTS.

When, according to the definition, A causes the change of the entity B into two new entities C and D, each with its own individuality, then we have a case of **Joint EFFECTS**, B-C and B-D. If the entities themselves C and D be considered as effects, then B is itself a Joint Cause (**Material Cause**) with A.

MUTUAL CAUSES.

We have **MUTUAL CAUSATION** when there is an exchange of being between two entities and corresponding changes in both, A' changing to A and B' to B by the actual communication-reception in each. Here there are two causes and two effects, A' the cause of B'-B, and B' the cause of A'-A. There are many examples of mutual causation. We should be careful, however, to examine whether there is real causation according to the definition given.

FIRST CAUSE.

We have already noted that, for certain purposes, in order to recognise one entity as a cause of a given effect, it is not necessary to trace a strictly subordinated series of cause-effects term by term; it is sufficient to apprehend the terminus of the effect as having participated in the being of the entity, even if the intermediate stages be not known. Thus we may form a strictly subordinated series of Cause-effects with *lacunae*. The first term in the series formed in whose being all the other terms participate is the First Cause of the series. Causation, as the manifestation of the ability to Cause, is a manifestation of being; and this virtue of being is communicated in a series of strictly subordinated cause-effects. Proceeding then to the **ABSOLUTELY FIRST** term of the series of real cause-effects, we must acknowledge the existence of the **FIRST CAUSE** of all, in whose causal efficacy the other terms of the series participate, which is the cause of all

the terms, and in whose being they participate by causation. It is the being which is itself UNCAUSED, whose being is not participated from another, and which is, therefore, BY ITS OWN NATURE such a being, having its being and its virtue by its own right. We may proceed in the same way with any other transcendental perfection and arrive at the FIRST PERFECTION, which has that perfection by its own permanent nature unparticipated, by participation in which the other terms derive their perfections, and in which it is consequently unlimited or IN ITS FULLNESS. Such a being is PURE FORM, i. e. with no lower forms or energies subordinated, co-ordinated and unified by it. This FIRST CAUSE UNCAUSED, this FIRST PERFECTION UNPERFECTED, this PURE FORM, we call *GOD*.

CHAPTER IV. THE WILL.

We have already spoken about AUTO-CAUSATION, where a thing can be said to be a cause producing an effect in itself. We have shown that the causation is a mediate one, the cause and the termini of the effect retaining identity of individuality, i. e., the changes involved being only accidental. (According to our notion of causation it must be noted that a distintegration, a loss of being, is not an effect. Any change is an effect only when we recognise in it a positive addition of being. In general, however, if the terminus B of the change is itself, like B', an integral unity, it has a form, either an outer form or a substantial form, which it did not have before ; and so there is an acquisition of being. In our restricted sense death is not caused, except morally by a person, even by the one who takes his own life. But even in this case there is a medium by which the result is obtained). Ordinarily the mind acts on itself *via* matter in the living human being. The preparedness to receive and to communicate, however, is determined by the mind itself, and the faculty of the spiritual soul for this determination is called the Will. The tendency is to pursue and to keep a hold on the GOOD.

Sir Arthur Eddington, in a broadcast address on Science and Religion, March 23rd, 1930, said: "So far as we have yet gone in our probing of the material universe, we cannot find a particle of evidence in favour of Determinism. There is no need any longer to doubt our intuition of FREE WILL." Science has gone through

such a glorious record of achievement only to arrive at what every Jack, Tom and Harry acknowledges and has always acknowledged. The latter would probably call it a **FACT OF EXPERIENCE**, and not a mere "**INTUITION**", nor, as Sir James Jeans would say, an "**INNATE CONVICTION**". Some scientists ignored the **FACT**, and now their successors have lighted on an indeterminacy in the underworld of electrons and a plausible theory of **Probability** and **STATISTICAL BEHAVIOUR** in the place of **Determinism** to enable us to anticipate or predict the future with tolerable certainty, and so to build up our **World-Picture**. So at last they are willing to admit **Free-Will**. Note that it is not because of our continual experience of it, but because an elusive thing like the electron is unpredictable in its behaviour, and further because our agnostic and materialist friends will not grumble, for we do not attribute to the will anything more than a property of elemental matter! Whether it will remain where it is or shoot off in one direction or another, we do not know. Nor would it matter, as the **Theory of Probability** can deal with its behaviour in the mass. This may give some consolation to the student of the humanities. Some of our **DICTATORS**, perhaps, are already acquainted with the laws of mass behaviour. Unfortunately the masses also enjoy a great deal of indeterminacy, or, shall we say, **Fickleness**! As we have already remarked, some scientists think of the given world only in terms of their simplified abstract concepts, or in terms of electrons. It is like stripping a tree to get at the fibres and then trying to reconstruct the tree from the fibres alone. Prof. H. **LEVY** in an admirable chapter

entitled "Unpicking the Threads", ("The Universe of Science") explains the characteristic method of Science as one of isolation, which is only the "search for permanence in a fluctuating and changing environment." The formation of experimental isolates is a necessary condition for the practice of quantitative science. The whole experiment must be neutral to its environment; this is the ideal condition in which an experiment should be performed. The experimenter seeks to separate out measurable isolates. We shall not repeat what is explained with great clarity in the chapter quoted. By isolation the experimenter *seeks to trap the cause*, to let everything, as it were, escape but the cause and the effect. By this practical aid to the mental process the cause is apprehended. Mathematics comes to the aid of these sciences in an abstract manner. An observational generalisation or theory is put into mathematical terms, and with this as a prime principle mathematics can proceed. Wherever the mathematical results can be re-interpreted in physical terms, contact is again established with the physical world. Thus it is possible to "verify" the theory or to discard it in favour of another. In dealing with the properties of matter mathematics begins a rung lower in the ladder of physical existence, i. e. in an abstract entity whose property is the mathematical "FUNCTION". The molecular kinetic theory of gases is applied to the study of gas in the mass; atoms are postulated in the study of the structure of molecules, and electrons in that of the structure of atoms. Perhaps the evidence in favour of the physical existence of the electron as a PARTICLE (e. g. photo-

graphs of moisture-condensation on electronic nuclei) is strong. But when we come to the structure of the electron we go a step further and postulate an "ETHER", which is nothing more then THAT whose behaviour in mathematical terms gives us a basis for the understanding of the electron. What the ether is, we cannot say; if we could do so we should be able to go a step lower still. But there is a limit to the scale of being, and this limitation arises from two sides, from that of the object as well as that of the subject, or from the technical as well as the theoretical point of view. Technically the elemental matter will be subject to a physical indeterminacy for want of individuation and the almost practical impossibility of isolation, while our apprehension of it is an indirect one, by inference from results obtained with the utmost refinements of our apparatus at the limits of aided visibility. Theoretically it will be expressed in equations of motion of some ultimate abstraction postulating only existence, such as the ether. The process of physical isolation necessarily breaks down at this stage, the limits of the dissection of matter. As Prof. LEVY points out: "It is a state of affairs that follows from the method of forming isolates, from the nature of scientific explanation." Again the very dissection of matter is the cause of a great deal of trouble. "We kill to dissect." The mathematical rebuilding up of the atom, the molecule, the substance in the mass, is like attempting to reform a plant from the fibres we have extracted out of it. We have already noted that a thing exists in the mind not in its concrete being but in an abstract being proper to the mind.

It will be observed that although we have accepted the CAUSAL THEORY OF PERCEPTION, we reject at the same time the Correspondence theory of Perception, and the theory according to which the thing in the mind is the thing in itself. This would be absurd, not to say uncalled for; the mind is NOT A PHYSICAL CONTAINER, and in every causation there is a transformation of being received into the being of the recipient. The being received by the manifestation of forms of the object exist in the mind as (accidental) forms or complex ideas, which need splitting up into simpler ones and then being synthesized again into a whole. Our "windows of knowledge" are limited to only a few senses, and each is very limited. The corresponding synthesised concept will certainly correspond (as having been caused) to the object, but not in the sense that it is the object *in se*. In the physical sciences we abstract from the analysed concept only the simplest, the quantitative, concepts, and the reconstructed concept does not even tally with the whole complex notion that we set out with at the start. Again in the process of analysis (or mental sub-isolation) we easily lose sight of relations, of subordinations, of co-ordinations, and of *unifying forms*; and if we should do so we cannot even reconstruct the original complex notions, as we have, as it were, lost the plan as well as ruined the mortar for again putting together the bricks of our brokendown edifice.

"All the king's horses, all the king's men,
Cannot put Humpty Dumpty together again."

That the whole is greater than the sum of its parts, is an adage more often true than not. Mathematicians are loth to acknowledge it, as is quite natural. Physicists, not obsessed with Mathematics, are beginning to recognise it. Biologists, having got out of the material morass of the last century, recognise that a living being is more than a physico-chemical entity. Students of human behaviour can make no headway with only materialistic assumptions; they often say: "If we knew this and that and that, we should be able to predict every action of a man." They would found a dogma on the basis of ignorance.

The mind has faculties. It is not the mere sum of its ideas. These are accidental forms, adjuncts or contents. You may call the faculties by the name of tendencies; but they are active strivings. The mind is itself a source of activity and is not merely receptive. ITS VERY RECEPTIVITY IS BROUGHT INTO PLAY BY ITSELF. It is the mind that effects the contact between matter and mind, and the more free it is in this respect the more independent of matter is it, and the more control also can it exercise over matter. The world can be a closed system not in contact with the human mind, as, e. g. when no human beings existed. So also can a human mind be a closed system not in contact with the world. (Memory, however, and imagination are dependent on matter; but there can be spiritual mystical and psychical activity not dependent on these. That is why we are able to consider the world as unaffected by the mind of man, though the latter may be affected by it in the very consideration. In this sense all science claims to

be objective. That is why also we can make the mistake of pure Materialism as well as of out-and-out Idealism. The contact of mind and matter is effected somehow. No biologist need take exception to this statement. It is at the root of all knowledge. Such are the potentialities of mind and matter. It is a question of FACT and EXPERIENCE. The mind itself determines the contact with the physical world, and the phenomenon is ATTENTION, the state of the mind being CONSCIOUSNESS. (Even in the case of Memory and Imagination it is the mind that can call them into play—and even turn them out—by getting into contact with its store of sense-images: sight-, sound-, touch-, and word-images.)

In the process of attention there is freedom to such an extent that man has always been conscious of it. This conviction is reflected in our language also. Any grudging recognition by some modern philosophers is belated, to say the least. Sometimes when tracing out causes we come to a full-stop at the human mind. If the mind is accepted as spiritual, then the break in the chain of reasoning would occur even before that; for we cannot explain the communication-reception between matter and mind, though we must accept the FACT; and even in the manifestation of the intellect the difficulty crops up, not only in that of the will. We cannot explain choice, and that freedom we experience. These would convince us that there is no object of experience that would so fully satisfy our cravings that they will quiesce completely and permanently in it. The cravings and strivings

remain the same, though their immediate particular objects may vary. Some one has said that there can be a **FEELING** of freedom without any actual independence of the will. But the **FACT** of the universal conviction itself would require explanation; and, moreover, a universal illusion on this point alone is not to be admitted.

There are external forms, and the mind can receive them in its own way into its own being, giving them an ideal being accidental to itself. The evolution of these forms within the mind is by that faculty called the **INTELLECT**, while the striving and the direction of the intellect is by the faculty called the **WILL**. By the will also these intellectual forms can be manifested externally by an outward communication. The living corporeal body is the efficient instrument in these processes.

There is no comparison between the kind of indeterminacy attributed to the electron and the freedom of the will. The indeterminacy of the electron is that of elemental matter susceptible of receiving higher forms by which it may be informed in a higher plane. The tendency of the mind is an active striving to receive forms which it may inform into its own plane as accidental to itself. In the electron there is indeterminacy, a lack of **MOTIVE** in itself, an absolute dependency in its fate on the rest of the physical world. In the mind there is deliberation, a motive within itself, a certain amount of **INDEPENDENCE IN ITS ORIENTATION** from the rest of the physical world.

The will follows the intellect, but at the same time directs the intellect. Everything in this world is good in its way, and the will can direct the intellect to attend to the goodness in one rather than to that in another. Moreover, it can withhold attention ; for REST itself has some goodness, as the concomitant physiological reactions to mental activity involve a strain.

Physical restraint and compulsion may force a subject's external behaviour, but the mind cannot be forced internally. The very propaganda that is so extensively used now-a-days to further Party designs is a recognition of this fact. Force alone will not do. The intellect must be trained ; i. e, brought up in an ambient where the material for the operations of the mind is of one particular kind. But even with traditions, customs, habits, prejudices, propaganda, **THE WILL REMAINS FREE.**

That there can be a determinacy in the physical world in spite of an ACTUAL freedom of the will is clear. For though the will can move matter, Physical Nature may still remain determinate. (Whether the indeterminacy of the microscopic world attaches to the macroscopic world remains to be proved.) The will does not give material things any of its freedom or spiritual nature. They act according to their own natures and the laws by which they are governed. That is why in tracing out a series of events according to their causal connections, we sometimes have a fixed starting point in the will of an individual ; " This is the house that Jack built." Or

tracing it backwards we come to a full-stop there. A pail of milk was upset. It had been struck by a stone. Jim had thrown the stone.

Moral Causation and Responsibility.

When we speak of MORAL CAUSATION, the notion of cause is not exactly the same as that of EFFICIENT cause, which we have been considering so long. What does the will communicate to the physical recipient—in the above instance, the stone? It is clear that the stone received energy from the whole Jim, will included. Jim is the efficient cause, but the change in Jim himself is not an effect in the same sense. The physical movement of the subject was an intrinsic one arising from an INNER principle. The subject was conscious and attentive to it, and the movement was deliberate. What being does the will communicate to the physiological Jim? It is not spiritual being, nor is it physical being. We can only call it a quasi—spiritual or MORAL being. It gives also a SIGNIFICANCE to the act, which is a quasi-spiritual form that can be apprehended by an intelligent observer. In the example adduced, while the whole Jim is the efficient cause, the will is the moral cause. Just as efficient causation can be transitive, moral causation can also be transitive, so that preceding the series of efficient cause-effects is a moral cause from which every term in the series derives a certain amount of moral being and significance, at least those terms foreseen and intended by the will.

The soul being spiritual is contacted through its faculty, the will, with matter. We may distinguish between the contact of mind and matter when the mind is receptive and generative of ideas, and the contact when the mind is communicative externally. The former we have called a "physico-psychical" contact; the latter we shall call a "psycho-physical" one.

The will is a faculty of the soul which gives substantial intellectual being, or formal being, to the subject. We shall refer to this point again when we speak of material and formal cause in the chapter on Kinds of Causes. We cannot speak of the soul as something distinct from the subject. It is an essential part of the subject, and the WHOLE subject acts as a living human being. A communication by the whole subject to the external physical world is one of physical being and of moral being, but not of spiritual being. A reception by the subject from the external physical world is also one of physical being in the first instance, from which forms are abstracted into the spiritual being of the subject and are given an ideal or abstract being accidental to the spirit. That spirit can affect matter and vice versa, are facts the explanation of which are not forthcoming. Hence our Axiom of Realism.

The flying stone bears no spiritual being in it. We have mentioned the MORAL BEING and SIGNIFICANCE communicated to it by the spirit *via* body. These arise from KNOWLEDGE and PURPOSE. The moral being is RELATIVE to the mind of Jim. The

upset pail also has no physical being derived from the spirit of Jim, but only a moral being and a significance. This gives greater point to our observation that there is no "interference" by the will in the determinacy of Nature. Again the transitive character of an intermediate cause by which it receives and transmits some of the real being of another does not hold for the will. Thus it produces a hiatus or break in our chain of reasoning. While the individual as a whole may be considered the EFFICIENT cause, the will taken separately is the First Cause in a series, not belonging to the series in the same way as the other terms. It is an efficient cause in a higher sense, namely that by its own free nature it initiates and sets in motion a system of efficient causes giving to them a moral being and significance.

The subject is held to be RESPONSIBLE for every effect in the series when he is the moral cause of it. But he is held responsible also when, as a necessary CONDITION to a causation, he KNOWS and PURPOSES to play this part. Even in this case the WILL is loosely spoken of as the cause, although there can be no question now of efficient causation. Thus by withdrawing my hand as a support I may let a stone drop on to someone's toes. I chop down a tree which falls on my neighbour's house. A watchman is "responsible" for the loss of articles committed to his care if, when he fell asleep, burglars made away with the goods. A railway company is "responsible" for the proper state of its permanent way. A treasurer is responsible for the monies left in his care. It bears repetition to say that

we must not confound causes with conditions, especially when dealing with efficient causation.

Freedom is not the same as indeterminacy. If there is a determinacy in the physical world it is not inconsistent with an actual freedom in the mental world.

"Like most other people, I suppose," says Sir Arthur Eddington, "I think it incredible that the wider scheme of Nature which includes life and consciousness can be completely predetermined; yet I have not been able to form a satisfactory conception of any kind of law or causal sequence which shall be other than deterministic. It seems contrary to our feeling of the dignity of the mind to suppose that it merely registers a dictated sequence of thoughts and emotions; but it seems equally contrary to its dignity to put it at the mercy of impulses with no causal antecedents. I shall not deal with this dilemma." ("The Nature of the Physical World.") The dilemma does not really exist when it is borne in mind that generalizations by analogy or induction from the physical world may not include the mind and that the operations of any entity are proportional to its own being. (Sir Arthur seems here to take the term "causal" in the traditional sense and not in the sense of Hume or of Mill which he elsewhere accepts. This emphasises the dilemma for him.)

DETERMINISM is the doctrine contained in these well-known lines:—

"Yea, the first Morning of Creation wrote
What the Last Dawn of Reckoning shall read."

This doctrine is akin to that of FATALISM in human destinies and to PREDESTINATION. The former is a tenet of Islam ; the latter is due to Calvin, who also thought that the doctrine of Free-will was not consonant with the Omnipotence and Omniscience of the Deity. Man *has* interfered with the operations of natural forces ; he has changed the courses of rivers, he has denuded forests and thus affected rainfall ; he has joined together oceans etc. Events in which the operation of man's will enter, can certainly not be predicted in the same way as those in which it does not enter. An absolute Determinism is certainly a gratuitous assumption, altogether unjustified, and raising up great difficulties. Now-a-days, as Sir Arthur observes, as a consequence of the advent of the Quantum Theory and of the acceptance of Heisenberg's Principle of Indeterminacy, PHYSICS IS NO LONGER PLEDGED TO A SCHEME OF DETERMINISTIC LAW. These theories are, however, mathematical abstractions and the statement should be taken with a grain of salt. Mathematical abstractions and " functions " cannot " put Humpty Dumpty together again." (See also what Prof. H. LEVY has to say in his " The Universe of Science " on this point. Ch. IV.)

The concept of human freedom is not necessarily opposed to that of divine Omnipotence. On the other hand it is consonant with it and would make us appreciate God's omnipotence and Goodness to a greater degree. Human freedom is by no means absolute ; it is not a freedom from any constraint whatever, an immunity from all external and internal antecedent conditions and

limitations. It is a freedom within limits—limits of its own nature and environment. It is a liberty of exercise to do this particular thing or not to do it, the particular thing being POSSIBLE TO ITSELF; it is not a liberty to act or absolutely refrain from acting. Again, it is a liberty of specification: to do this or to do that, either one or the other being possible to the nature of man itself. That God can impart such a freedom to a creature is by no means absurd. It does not import any absolute independence from God in the creature; the creature itself being in essence and existence dependent on God. Moreover, as we have seen, the *will as a cause* communicates no real being to its effects.

CHAPTER V. INTELLIGIBILITY.

That the world is intelligible is in a sense a restatement of the Axiom of Realism. That the world CAN be known and that I CAN know the world, follows from the FACT that I do experience the world and apprehend it—something of it at least. It exists in its own way in itself; and it exists in the mind in a special way, with an ideal being. It is the basis of my actual knowledge: it is able to offer me more knowledge of itself through my sense-organs and my senses. Thus my ideas are fundamentally, potentially, and remotely existing as forms in external physical things; and these exist ideally, virtually, and mediately in my mind. Not only am I conscious of external things, but I also apprehend their forms, and the forms as apprehended can be subjected to analysis and synthesis by me. In every perception abstraction is called into play, and the more the abstraction the clearer the perception. I am saved a confusion and perplexity not only by the selective action of my sense-organs, but also by that of my intellect and will. I attend, I am aware of, I distinguish, I recognise, I isolate, I classify, I split up complex ideas and I rebuild them. Thus when listening to a classical musical composition, I can follow out each particular part, the counterpoint, the harmony and progressions, the figures and movements, the structure etc. Science itself is an acknowledgement of the intelligibility of the physical world.

The intelligibility of the world is not merely that of the external world of matter, but also one of my world

of ideas. The mind **ACQUIESCES** in the results of certain operations, be they perceptions or conceptions or assumptions or ratiocinations. It finds some unity. It seeks for this quiescence in a harmony within itself, and in a harmony of itself with the external world. That complete harmony is truth and goodness, two aspects of our complete world of mind and matter expressing the active tendencies of the intellect and the will.

Again, the self is not fully intelligible when **ALL** our actions are taken into account. There is consciousness of a **PURPOSE** in many of our conscious actions; a **SIGNIFICANCE** is apprehended, a **MORAL UNITY** detected; all the same we are aware of an intrinsic moral freedom. The will is not indeterminate, but it is free. It follows the intellect, but it can direct while following, like a coachman driving a horse before him. Everything in this world is good, but only in a limited way; and our knowledge is true, but only partially so. Hence the intellect, which is in itself not free, is indeterminate **PER ACCIDENS**, because there is no particular object of experience that would inexorably attract it and fully satisfy it. Hence also the will can direct the intellect to pay attention to the goodness of one thing rather than to that of another, or even to ignore any one thing. Even a particular partial truth can be acquiesced in by the mind on the showing of a particular partial truth by the intellect.

Thus Intelligibility means much more than that the world of reality can be known. It signifies a unification

of the world of reality with the mind—and APPREHENSION is nothing less than this—a unification of the internal contents of the mind by an interconnectedness and harmony of ideas; a unification of our external acts with the subject and with each other by a moral purpose running through them and stringing them together and by a moral being derived from the conscious finis or end in view.

Motive or PURPOSE makes the subject's own conscious actions intelligible; and, by analogy, also the external actions of another intellectual being.

Motive is a conscious direction of our actions towards a known end or finis or goal. Motive characterises human actions QUA human. Actions are ordered in view of the finis; they are put into a relation with the end as well as with each other. A detective of crime seeks for a motive in order to understand the deed and to find a method of investigation. A lack of knowledge of the finis and a failure to apprehend an order in a series of events would cause perplexity. If an order be recognised, then at the same time a common trait is found to string together the events and point out to a finis providing the motive. On the other hand, if the finis or motive be known, it is easier to recognise an order in the events, according to their tendencies or orientations towards the end. Although a tendency in a thing does not imply a motive in it, it may yet imply a motive in the intelligent being who is the cause of the state of that thing. It is not necessary to apprehend the finis directly; we may apprehend the end by recognising the order.

If a real order be recognised in a system of physical entities, then there is a MOTIVE in an intelligent being outside the system, to which being the ordering is due ; and there is a finis also in the mind of that being. Order is moral and intellectual being given to a system of entities or events by the intellect and will. It has been well defined as AN APT DISPOSITION OF MEANS TO AN END.

A plurality is said to be INTELLIGIBLE when there is an order in it ; for order can be apprehended by an intellectual being. Moreover, it is obvious that this order is not created by the intellect of the subject knowing, nor is it a form of the mind apprehending. Rather, the order in his ideas is the effect of an ordered world. (We appeal again to the Axiom of Realism.) The motive is not found in the subject, the finis is not in the subject; the world is too great a problem for the individual mind to set in order even ideally. Nor is order in the world the effect of the collective mind of man. No one will be convinced of this. On the other hand the mind of man is relieved when it recognises some order, and he strives to grasp its SIGNIFICANCE. With a great deal of trouble and collaboration, and with many set-backs, some scientific knowledge has been attained, i. e. ordered knowledge of an ordered world. The recognition of order gives the scientist a method in his work. SIGNIFICANCE is the orientation of the means towards the end, and the end may be tangentially or asymptotically apprehended.

In any intellectualistic system of philosophy the intelligibility of the objective world is recognised. In Kant's system experience itself is the work of reason ; its structure is ideal. Idealism is in a way an exaggerated intellectualism. On the other hand the mind of man struggles because its natural tendencies are not satisfied. It seeks for PERMANENCE of any single concept and of a system of concepts. It seeks for a unity in its contents, *which are got from outside it*. And it will quiesce only when a permanent harmony is established. Thus the mind constructs the edifice of objective knowledge. If only I had a single concept which would unify all the concepts in my mind, then with that one concept in the focus of consciousness I should be all-knowing and all-comprehending ! This state would be a sort of "Nirvana",—according to Miss Betty Heimann's interpretation—, my present actual perplexity being a state of "Maya". (See the article "Nirvana" in the "New Review" Dec. 1938.)

The intelligibility of the world, therefore, means that we can apprehend external reality, not only as the most simple or elementary concepts but also in its real relations and connections and as a unified whole—though we have not gone very far in the process. We can apprehend EFFICIENT-causal connections and FINAL-causal connections ; we can apprehend ORDER and SIGNIFICANCE and PURPOSE and END.

CHAPTER VI. KINDS OF CAUSES.

So long we have been dealing with the notion of "Efficient Cause". Reference was also made to Formal Cause and to Material Cause, and we also touched upon the *Finis* or End. This is Aristotle's scheme of causes.

The general notion of cause is that of an entity which contributes to the being of another entity; it is a principle of the being of an entity. Between cause and effect there is a real distinction.

The Material Cause or MATTER is "that out of which and in which something comes to be." It gives material being to an object. The Formal Cause or FORM is that which gives the mode of being, "that by which a thing comes to be what it is, the character which it acquires." Matter and Form are intrinsic positive principles of every physical body. Their functions in the being of a body are different. Besides these positive principles there is also a negative principle, which is PRIVATION or a lack of some form which the body can receive. Isomerism, polymerism and allotropy are chemical phenomena which show that the same matter—chemical substance—is susceptible of many forms. Any body is matter to a form which would structure it in a new mode of being. The energy-object as made up of its subordinate energies, coordinated, structured and unified by its supreme form, is called matter to that form, and the body itself is potentially matter to another form. In recent years we have actually transmutations of chemical elements and the phenomenon of Isotropy;

these have pointed out the existence of lower matter, matter to all the higher chemical forms. Even this is not formless. Matter cannot exist without some form or another. If that part of being by which an integral unity is given to an energy-object A, is got rid of, then the un-unified or disintegrated net result is said to be or to hold the matter of A. On the other hand if an entity passes from one integral specific mode of existence to another, it has acquired a new supreme form, and we may speak of it as providing matter to this form. It must be emphasized, however, that no matter can exist without form and that material bodies are not mere matter. Matter, AS SUCH, therefore, cannot be an efficient cause, though actual material bodies may be efficient. Matter and Form are dual intrinsic essential causes, i. e. together placing the body in its specific being.

An old Scholastic dictum was: "Corporeal bodies arise by generation, not creation; they perish by corruption not annihilation." Another: "The corruption of one body is the generation of another." These correspond to the modern saying: "Rien ne se cree, rien ne se perd," expressing the Conservation Laws of Chemistry and Physics. These laws must nowadays be considered in a new light, as we admit that the energy of the universe is gradually being rendered unfit for further efficiency.

Matter and Form are intrinsic causes; Efficient and Final causes are extrinsic ones. Matter gives material being to a body: its THISNESS. Form gives formal

or specific being to it: its **THUSNESS**. The Efficient Cause gives ontological being to a body. The Final Cause gives moral being and significance.

Form is not a mere spatio-temporal structure of matter, but something much more complicated and not so easily dealt with by abstraction. This is conceded in biology, where the mechanical explanation of life and consciousness and will is being discarded. A Living Being may be defined as a substance moving itself from within, i. e. striving by an active manifestation to keep its equilibrium or to achieve a greater stability, always in favour of its substantial form. The Principle of Life is the substantial form of the living being, which strives to a more perfect manifestation of itself by subordinating the complex of energies to itself.

Corresponding to privation there are **TENDENCIES** in every body to acquire a new form. The more elemental the body, the greater the privation and the more the tendencies. Thus in the most elemental being, the electron, we can expect an indeterminacy, as it would be in potency to innumerable higher forms. (The reader interested in these points may profitably go through Mr. E. J WATKIN'S "The Philosophy of Form", published by Messrs. Sheed and Ward, London.) Thus an indeterminacy must be expected in the limit of being.

The **FINIS**, or Final Cause, is that mode of being **FOR THE SAKE OF WHICH SOME ACTION TAKES PLACE**, e. g. for the sake of health a man takes exercise. It is the object of deliberate action. It communicates

moral being, and an ideal order and relation towards itself. The *finis* in the mind, itself directed to it by the will, is called PURPOSE or END IN VIEW. It gives intelligibility to man's free actions. The *finis* in itself is an extrinsic cause,. As purpose, it is the cause of the ordering of the means. The action and the objects involved with the end in view, are the MEANS.

Actions directed to an end imply a tendency in the intellectual agent and a deficiency or privation in the means. A new mode of being in them is the ORDER to be accomplished; a new mode of being in the agent himself is the end to be attained, and the tendency is to the end. The choice of the end having been made by the will, the manner of tendency is directed by the intellect, and the choice of a particular order is again the work of the will.

To speak of a *finis* is to postulate a relation with an intelligent being. We have in the last chapter spoken at length about the *finis* in connection with the intelligibility of human acts as well as of the world. The *finis* renders an action intelligible and gives it a moral being. Granted an objective order and natural ordered tendencies, we may infer—by analogy only—the existence of a Mind in which the knowledge and choice of the end and means exist, and to which the order is due. The regular connection according to causal laws that we recognise in the world is only explicable on grounds of teleology. The Final Cause of the world does not come within the purview of Science. This is because it is “at the other end of the road”, and Science does not see

beyond the tip of its nose in the fog of its ignorance. Science depends only on experimental and observational sources of knowledge and their immediate consequences. It must necessarily proceed step by step, and cannot think too far ahead. It can only deal with verifiable and visualisable ends.

I can discover the particular motive of another human being only by analogy. But that a purpose exists can be deduced.

Nowadays several scientists propose non-verifiable hypotheses, such as that of an expanding world. Some of these are even non-visualisable ones. In this, however, they exhibit the urge they feel to apprehend the finis of the world and of existence, and, like ordinary men, every one of whom is at heart a metaphysician, they "go into the deep waters", sometimes out of their depths. (See "The Mysterious Universe," by Sir James Jeans.)

We may have a SERIES OF FINAL CAUSES, where each term is not only an end in itself but also a means to a further end. It is clear that the ultimate end dominates the rest, giving to each a moral being and determining the means (or subordinate ends) and their order. Since each is an end to be attained, each also affords a motive or a purpose. Each is an action to be done or a state to be reached, and each is for the sake of the next. Each is also a condition for the attainment of the next term of the series. Thus to get to my home in the city I must get to the station, purchase a ticket, get into the train, etc. The ultimate end, though the last to

be attained, is, however, the FIRST IN MY INTENTION. Again, it is the most appetible, since the appetibility of the rest is derived from it.

Finality can only be associated with an intelligent agent. Even physical causation would show us finality; and though it be not possible to connect it with a human agency, we must connect it with a higher intelligent cause. This is what Sir James Jeans does when he calls God the Pure Mathematician. The very "LAWS" of Nature which we discover reveal an order in the world. The term "law" itself connotes ORDER. When expressive of the natures of things in their real relations to each other, in their potentialities and tendencies and natural activities; and in their intelligibility in such a way that it may be truly said that "OMNE AGENS AGIT PROPTER FINEM"—"Every agent acts for an end or towards an end"—and that a PURPOSE is exhibited in their manifestative activity, a purpose working itself out in them; then the term "law" is the most fitting and expressive not only of the Uniformity of Nature but also of *order* and *design* in the universe. This is the TELEOLOGICAL view of the universe, according to which it is considered as the expression of a divine plan. Indeed, if such a view be discarded altogether, there will remain no basis for the intelligibility of the world, no ground for any necessity whatever, whether of causal or any other connections; no reason for any uniformity or permanence and not even for any change or activity. With the waning of Materialism this view of the universe is again gaining ground. Our knowledge of the natures of things

helps us to understand their "raison d'etre", the function, the role, the purpose of each and of all in the divine plan, and thus to witness the earth and the heavens blazing forth the glory of the Creator.

Besides the four classes of causes we have mentioned there are two others, the EXEMPLAR and the INSTRUMENT, usually recognised, though they are reducible to the other types.

The EXEMPLAR or FORMAL EXTRINSIC cause is the ideal which an intellectual agent has before him in doing something. He has in mind the idea of the thing he wishes to produce and he directs his energies in such a way that the result will conform to that idea. Thus the exemplar is in a way a Formal Cause, but extrinsic to the object, as well as a Final Cause. It is the similitude of the desired effect intelligibly pre-existing in the mind of agent. It constitutes the artist or artisan in his particular being as such an artist or artisan. Thus it is also an Efficient Cause. Being proposed and accepted by the mind as the model or standard to be followed or reproduced in likeness or imitated, it is the motive stirring the agent to work. It also determines the material to a particular mode of being.

The INSTRUMENT or INSTRUMENTAL CAUSE is that agent used by a higher agent (the PRINCIPAL AGENT) and raised to a higher plane by the latter to produce an effect to which it itself is not proportionate. Thus written and spoken words are instrmental causes in

the communication of ideas. An instrument is an efficient cause which by itself is not wholly proportionate or adequate to the effect. Thus tools and machines are instrumental causes used by man. The instrument itself receives energy and communicates it outside itself. Thus it is also a MEANS. In instrumental causation—A the efficient cause, B the instrument and C'-C the effect—the intrinsic equilibrium of B is not necessarily changed. The point is that B, unable to absorb within itself the being communicated by A, passes it on again to C.' It aids the contact of A with C'. Hence we may even consider A WITH B as the total efficient cause. An instrument is efficient only in so far as it is CONNECTED with the Principal Agent. Strictly speaking, joined together they form the efficient cause.

We have seen in what sense there can be mutual efficient causation. It is clear that two things cannot by the same causation be the termini of effects to each other as efficient causes. Suppose, if it were possible, that:—

1. X communicates being to Y,—X changing to X' and Y to Y'.

2. Y' communicates being to X',—Y' changing to Y and X' to X, so that

3. the net result of 1 and 2 is that X remains the same and Y remains the same.

CASE I. 1 and 2 are **successive**.

We should have a sort of perpetual-motion engine. We have suasions from Thermodynamics and from

repeated failures to produce such a thing that it is impossible. If the original system were initially at relative rest, then the displacement and movement in one direction is precisely the reason that a reversal will not take place. X' and Y' would be in a state of greater equilibrium than X and Y. If not, the first change could not take place. If the original system was not initially at rest, we may have a backward and forward movement owing to the inertia of motion, but even in this case according to the Second Law of Thermodynamics the oscillatory movement cannot be perpetual; nor can one reaction be the exact reversal of the next. In either case the Principle of Sufficient Reason would be violated. If the system were initially at rest in equilibrium, then a change could only be effected by an agent outside the system.

CASE II. 1 and 2 simultaneous.

That is, while X is giving up something it is at the same time receiving the same; so also for Y.

This is firstly of no interest. Again it is not a question of efficient causation. We may say that there is a DYNAMIC equilibrium, such as we come across in cases of Reversible Reactions in Chemistry.

The whole process of causation is *one* "motus". It can however, be regarded from two points of view, that of the giver or agent, and that of the taker. From the former point of view it is *action* or doing ("*actio*" "*facere*") from the latter it is *becoming* ("*passio*", "*fieri*")

We may have MUTUAL CAUSATION but of different orders. For example the causation one way may be an efficient one, and the other way about a moral one. Thus exercise is the efficient cause of good health, and good health the final cause of exercise. Intrinsically from one side there is formal causation, and from the other material causation, matter and form being intrinsic causes.

CHAPTER VII.

The Principle of Causality.

Primary principles are the mortar with which the bricks of ideas are held together in the edifice of knowledge. Such is the Principle of Causality.

In the perception of a change $B' \rightarrow B$, the mind perceives B' , B , and the identity as well as the difference between them. A perplexity is engendered, for the intellect naturally seeks truth. In a way permanence is also truth, the percept being true to itself. Hence in the system of percepts of B' and B an ideal relation is set up based on TENDENCY. B' is said to have a tendency to B , to be susceptible of the form of B . The mind, however, is not yet satisfied. A child's idea of a scent is of something bottled up which would otherwise spread itself out in the air. His idea of ice is of a cold, hard, colourless solid which TENDS to become water. A tendency is inherent in B' . It would become part of the concept of B' except for the fact that further observation or experiment discloses that this tendency DOES NOT NECESSARILY work itself out. We may say that uranium tends to become lead; but we are not satisfied with this statement. We seek for an explanation in Cosmic Rays etc. The Statistical Theory of the world of electrons is only a statement of tendency, of tendency measurable in mathematical terms. It also fails to satisfy the craving of the intellect.

The word "tendency" emphasizes one aspect of the mental assumption, the RECEPTIVITY of B' is the

other. B' is seen to be receptive of being. The mind seeks further for the COMMUNICATOR OF being. Such is the psychology of our search for causes. The concepts corresponding to the new system apprehended—the cause A communicating being, the recipient B' changed to B by the reception, the communicative and the receptive tendencies exhibited by A and B', the passing of the potency of B' to an actual existence in the new mode B—this system of concepts now has a unity which satisfies the mind in so far as did the disparity between B' and B before perplex it. New ideas are generated, affecting the pre-existing concepts of A, B' and B. The conceptual relations of B' and A and B are expressed by a "Law". By it the system is unified. It is the LOGICAL GROUND for acquiescence by the mind to the change B'-B.

Thus the psychological structure of the mind demands a LOGICAL GROUND or "reason" by which unity is given to the system of thoughts. A logical ground, however, postulates an ONTOLOGICAL GROUND or CAUSAL NEXUS in external things, according to the Axiom of Realism. We do not indeed affirm that to every idea in the mind there corresponds a reality; but that if any complex idea to which no reality seems to correspond be analysed, the elemental concepts will have been derived from the reality. Thus we can conceive a Sphinx or a Unicorn or a centaur. Dreams can be analysed in this way.

The logical ground is not one that has an exact ontological counterpart; but it contains some truth, and it is

the aim of Science that our laws and hypotheses and generalisations should express the real world as truly as can be done.

The Principle of Contradiction: "A thing cannot both be and not be", or "A thing cannot be both A and not-A", is a prime principle of thought born of a psychological need. There is a perplexity when there is apparent contradiction. We strive to remove inconsistencies of the mind. We strive for a harmony in our ideas, and in any one concept to remove the elements of contradiction. This principle is fundamental to reasoning. It says nothing more than: Facts are facts and cannot be gainsaid. Being is a fact; so is a particular mode of being. We may call it the Principle of the Ground of Perplexity. In a restricted form we may restate it as: "*Nemo dat quod non habet*". No being is both possessed of and deprived of the same thing. Privation connotes also an inability to give in any circumstances.

The mind recognises that B is B' in some way, and that it is not B' in another way. There is an identity and a difference. Consequently there is a perplexity in the mind. Hence the mind strives to remove the perplexity. The fundamental tendency of the mind is to unify its ideas into a harmonious whole; only in such a state will it be quiescent. Thus Science itself is a natural urge. Its method shapes itself partly according to the end in view and partly according to the material it deals with,

That the mind extends the system B'-B to an external cause is due to its urge for unity; B' and B refuse to be by themselves united. It is a discordant system and psychological needs demand an extension of it. It is too isolated. This demand is expressed by the principle of Sufficient Reason: "*Une raison suffisante, pour qu'une chose existe, qu'un evenement arrive, qu'une verite ait lieu*".

These logical principles are psychological necessities. The mind recognises a privation as well as an acquisition in one and the same thing. In view of the Principle of Contradiction in the restricted form the mind seeks for the GROUND of this acquisition OUTSIDE the system, which ground would be the SUFFICIENT REASON.

But there are also corresponding ONTOLOGICAL principles. THE SUFFICIENT REASON IS TO BE APPREHENDED FROM THE EXTERNAL WORLD. As logical principles they imply that the world of ideas apprehended from reality is susceptible to internal harmony. This is one aspect of the intelligibility of reality. As ontological principles they imply a causal nexus in the scheme of reality. This is the other, objective, aspect of the intelligibility of reality. The ontological principle corresponding to the Principle of Sufficient Reason is the PRINCIPLE OF CAUSALITY.

It may be enunciated simply thus: "Every change has a cause", or more fully: "Every thing that is moved is moved by another". In the forms cited the principle

would state that every movement (in the wide sense of the word) or change is an effect ; and that the cause is in some way other than the effect. In view of what we have stated in our previous chapters we should restrict the principle to **CHANGES IN WHICH AN ACQUISITION OF BEING** is manifested in experience. The acquisition of being by a thing is detected by the new form apprehended which was not contained in the *isolated* potentiality of the object. The new supreme form is one subordinating, co-ordinating, structuring and unifying an increased set of energies of the energy-object.

Modern Physics in its search for **MATERIAL** causes and for **SPATIOTEMPORAL** forms arrived at molecules, atoms and electrons. When the electron itself is conceived as spatio-temporal movement, Physics needs to postulate an ether. The molecule and the atom have been rendered visible indirectly. So also has the electron by Prof. C. T. R. Wilson's condensation method almost made itself visible. It is of course inferred from the visibility of an immediate effect. It is not the molecule, atom or electron which is immediately seen. The perception of other realities underlies the inference, and so these three are not altogether "*entia rationis*." The same is true of the **GENES**, those elementary self-producing structures, units of heredity in the chromosomes, which are structural formations in the nuclei of living cells. Physical problems are not merely logical; they are primarily ontological, i. e. we must seek out realities as the basis of "explanation". When we come to the

modern "ether", however, the case is different. It reveals itself in no way. Its reality has not been established. The early Greeks postulated atoms. Their speculation was more or less substantiated only recently. Thus the method of assumption is useful.

Note that the Principle of Causality does not state what a particular cause is; nor does it direct us how to find it. It is a statement of the reality of causation.

The whole of Science is permeated with methods. There is something common to all of them, and this we may call the general Scientific Method. Some scientists, laying too much stress on method, identify Science with its method, technical or logical. But the goal, the subject matter, and the degree of the order obtained in knowledge must be borne in mind.

There is a greater difficulty in store for us. We have considered changes in things as effects. Must we consider a **THING ITSELF** as an effect? It is the repugnance of some philosophers to this attitude that has caused all the trouble in the problem of causation. We have been careful in our definition of cause precisely with this point in view. A change may be from non-existence to actual existence, from another mode of existing to the actual mode of existing. The question is: not having witnessed a change, i. e. experienced the first term of the system B'-B, with the apprehension of the identity and the difference between the two terms, are we, when B is given, justified in considering B as the terminus of a change? The justification comes firstly

from analogy and induction. We might have seen a change of which an entity similar to B was the terminus. Again we have seen so many changes about us and we know of no object which is unchangeable, so that it is easy to make such a presumption. But there is also a justification by inference. That B itself is liable to change and can cease to exist in time; that B is finitely, graded, imperfect, contingent and potential; that the concept of B obtained from reality does not include necessary existence; these would lead us to consider B as the terminus of some real change and hence as CAUSED in some way. B cannot be altogether uncaused. The concept of an uncaused existent would contain in itself the ideas of infinitude of act, of existence *a se*, of absolute permanence, of strict necessity, of total perfection with no limitation whatever and no possibility of gradation. The reality falls far short of this concept. Hence B must be considered as caused. Again, accepting the doctrine of matter and form, B is the effect of these joint intrinsic causes.

The science of Thermodynamics would convince us that the Physical world was not from eternity and will not last for ever. It had a beginning in finite time and will come to an end in finite time. All Science demonstrates the contingency of things, their mutability, their potentiality, their finitude. The gods of this world are poor things!

Thus we should consider the world as a whole as caused, and we may well infer the presence of the First Cause.

In a series of strictly-subordinated cause-effects, given a few terms, it may not be possible to trace the series backwards term by term to the first term. However, to recognise an entity as belonging to the series it is enough to apprehend it as participating in the being of a known term of the series. Again, if we recognise a perfection common to all the known terms as limited, participated, caused, then the Prime Term in whose perfection all the other terms participate, must be one which has the perfection by itself, underived from any other, by its own permanent nature, uncaused, unparticipated, and consequently unlimited; at least in its own virtue or ability to produce it in another. Such a being is simple in its constitution, i. e. is Pure Form, having no lower forms and energies subordinated, co-ordinated, structured and unified by it.

A cause is required by every change, owing to the internal incoherence of the terms of the system. A privation and a potentiality are opposed to a possession and an actuality. It is not the identity that exists between B' and B that needs the cause, but it is the difference with its contrast and opposition that demands it. A perfect identity would be a perfect unity and a permanence.

In any one thing itself there is no perfect unity. There is discernible a composition of potentiality and act, of integral material parts, of substance and accidents. Such composition implies dispartes, and a union of dispartes demands an ontological cause, the apprehension of which

would unify the mental concepts of the disparates, these concepts being themselves disparate.

To discuss how a change in an object can be INITIATED by another, we need the Theory of Matter and Form. (See "The Philosophy of Form" by E. I. Watkin, SHEED and WARD). There is in every energy-object an equilibrium of forms. Each form strives to manifest itself. In an individual object there is a supreme form which subordinates, co-ordinates, structures, and unifies the matter as informed by its other forms. It is the form of the energies of the energy-object. The matter, i. e. the energies structured by the supreme form, is potentially capable of receiving other forms. The supreme form strives to retain its position and to exclude the advent of any form antagonistic to its own supremacy or to its own manifestation. An equilibrium is set up of the actualised energies among themselves and also with the external actual energies or pressures on the body. The equilibrium is dynamic and more or less stable. The greater the stability, the greater the INERTIA or resistance to change; the greater the instability, the more susceptible is the concrete object to change. Every equilibrium persists for at least the minimum of duration. No form within experience is so perfect that it does not need to struggle to retain its supremacy; and this very struggle, involving reactions within itself and with its ambient, discloses a mutability in the entity as well as a want of total perfection in its form. This last is also seen in the dependence of the form on the matter which it informs,

Every body, therefore, presents TWO ASPECTS, a static and a dynamic one. It strives to endure, the manifestations of its forms being fixed in degree relatively to each other and to that of the supreme form, since they are structured, disciplined, and kept in equilibrium by it; and it is capable of change in spite of any equilibrium established by it.

MATERIAL EVOLUTIONISTS adduce two principles to account for evolution, that matter tends to combine or disintegrate under the *Chance Action* of chemical and physical forces, and that *Natural Selection* ensures the dominance of certain types and the elimination of certain others.

So far genes have indeed been modified by forces artificially introduced, as in the experiments of Harrison and Muller. New genes have not, however, been introduced into a cell; nor has it yet been possible to produce a character of a particular desirable type in an organism. Again, neither has man been able to construct *ab initio* a living cell, nor is he justified in saying that living cells are produced from dead matter by mechanical forces. Indeed the evidence is still to the contrary. By "chance action" can only be meant operations TOO COMPLICATED for us to follow out or analyse or reconstruct or foresee. No doubt the pressure of external forces do modify living beings and may even result in changes of species. Material Evolusion, however, is an over-simplification of Nature.

Generally speaking the more complicated the cell becomes, and consequently the more subtle in behaviour and specialised in its parts, the more fit is it for survival. If a gene be changed, the descendants of the organism will bear a new character. If this new character be compatible with the external forces bearing on the body from the surroundings, that is, if it would help the organism by complication or simplification to adjust itself to its surroundings, then it and its descendants will thrive in it.

These biological considerations and many more common-place ones favour the Theory of Matter and Form and of the dynamic equilibrium of energies, which we have outlined above.



CHAPTER VIII. CAUSAL EFFICACY.

We must carefully distinguish between the perception of causal efficacy and the apprehension of causes, although no doubt they are intimately connected with each other. However, while one may immediately perceive a causal efficacy, the isolation of the cause itself is not an immediate operation of the mind.

When I examine my own experiences I discover casual efficacy and at the same time cases of causation. I recognise particular causal relations. I am conscious of causal activity and of some sort of freedom in what I call my human acts, i. e. acts *qua* human. Even in my apprehension of external things, in the consciousness—vague perhaps but definite—of the distinction between the self and the non-self, and of the stimulus received from outside, I am immediately aware of a causal influence and reaction. Again, a moment of excitement is followed by one of depression, a mood of anger by one of calm. When I examine them I find that it is not a case of mere succession in time but one of actual influence. My present affection inherits the tones of the one past. I become conscious of the relations between my emotions, and among these I perceive true causal relation.

It may be that at moments of tense feelings I am disinclined to pursue such an examination, or that the feeling itself carries my thoughts to other things. Also feelings may operate in a subtle manner. The causal relation is not always perceptible, but this does not mean

that it is not there. It is sufficient for me that I have observed such a relation once.

Prof. A. N. Whitehead testifies to the immediate perception of the transition of feelings. ("Adventures of Ideas.") He states that the transition of character of succeeding occasions would otherwise be without any basis in the nature of things.

HUME confounded the notions of logical connection and causal connection ; but in spite of himself he often refers to the perception of causal efficacy. In the observation of "external bodies" Hume perceived only succession, but he makes the generalization that internal experiences are of the same kind.

LOCKE held that the clearest idea of active power was to be had from spirit ; and that in the case of the observation of changes in external bodies the mind infers a *power*. Descartes, Bacon, Hobbes, Spinoza, and others repudiated what are known as "FINAL CAUSES". Together with these, "EFFICIENT CAUSES" and "substantial forms" were to be dismissed, under the stigma of "OCCULT QUALITIES". These philosophers considered that only a strict determinism and doctrine of uniformity was the best for Science.

Several thinkers, however, of the XVII century did revert to efficient causes ; and "occult causes" under different names somehow crept in. Kepler was accused by Galileo, and Newton by the Cartesians and Leibniz, with resorting to occult causes for the explanation of

natural phenomena. Leibniz spoke again of "substantial forms" when describing his monads. Hobbes himself spoke of "endeavour" in the action of one body on another. The "ether" of the Cartesians was itself an "occult cause,"

If matter is regarded as dead or inert, we are at sea to understand the communication of motion, or the origin of motion. A *deus ex machina* must be invented.

DESCARTES finds difficulty in reconciling two standpoints, neither of which he is willing to give up; determinism, with God as the sole cause, and the free activity of spirits. The freedom of spirits is to him self-evident. For him the essence of matter lay in extension and in that alone. It gave us no idea of causation. Although Descartes may perhaps have distinguished between power and freedom, he never attempted to derive the idea of causal efficacy from that of matter. When Descartes spoke of the "freedom of the will", he meant only that the power of judging was underived. He did not explain error, however, by the freedom of particular volitions. "The freedom of the will—he says—is self-evident". But he also says that "we likewise know that everything is preordained by God". The difficulty of reconciling the two statements is due to human frailty or finite intelligence. (See Appendix.)

MALEBRANCHE accepts the Cartesian definition of matter and believes in its existence as such. This would in itself contain a contradiction. That *Materia Prima* as such can exist is absurd. Malebranche ascribes

power to spirits. He attempts to prove that God alone is the cause from the fact that no bodies have power to move themselves. When however, he includes into his argument SPIRITS to which he has explicitly attributed power, he begins to speak of absence of necessary connection and so arrives at his conclusion. For Malebranche "power" and "necessary connection" seem to be interchangeable terms. Cause is necessarily connected with effect. Perhaps he really distinguished between the terms, but in order to emphasise the point that God is the sole cause, used them indiscriminately.

SPINOZA also derived his notions of efficacy from the activity of the mind. He asserts that the movements of bodies are DETERMINED. He says nothing about causal influence. His determinate series of finite things is based on the immanence of God. In fact Spinoza does not consider at all the causal relation in his discussion of bodies. However, he speaks of the mind as ENDEAVOURING to persevere in its being for an indefinite time and to be conscious of this EFFORT. He also speaks of "conatus" "activity" and "passion", and states that man is active in as much as he is the cause of change and passive in as much as he is affected by his environment. Spinoza meant by "to cause" what we mean by "to completely determine". Perhaps he only meant "to be necessarily connected with". His argument for determinism was based on the concept of the will. "Will is just a name for particular volitions." Will cannot be a cause of a volition, just as humanity cannot be a cause of Peter and Paul. Spinoza said that

only when we realise the immanence of God and nature within us we shall see that freedom, efficacy, contingency, are only apparent, and that in reality all things are determined.

LEIBNIZ gave a careful description of causal efficacy. He defines "APPETITION" as "the action of the internal principle which produces change or passage from one perception to another". "PERCEPTION" is "the passing state which involves and represents a plurality within the unity or simple substance." In his simple substance can be found only perceptions and their changes, and in these alone can its activity consist. Obsessed with his doctrine of "pre-established harmony," he restricts the activity to an internal process. By causal influence "the present is big with the future and laden with the past." From the observation of the events of his own life-history, Leibniz takes the type of causal relation as the observed relations of perceptions. He considers all substances as "SENTIENT", and activity as characteristic of the causal relation. For him space is a MODE of togetherness of such substances. If by "SENTIENT" he meant "reactive" or manifestative of active as well as passive power, we should have no quarrel with him on this score. He, however, considers the relation of the appetites of the soul to each other as one of efficient causation. Leibniz's view of space and time was RELATIONAL. He reduced space to a relation of co-existence, and showed that the essence of substances could not be space or extension. For him the essence of co-existing

entities was "perception" or "appetition". On the other hand he denied the activity of one entity on another. His concept of body as "extended substance", withal made up of unextended and inextensible points, is incongruous. He exaggerated the notion of continuity and immanence. He held—like Locke—that power or efficacy belonged to substantial beings, but that appetitions are appetitions of a monad, and it is the monad, not any particular appetition, which is the cause of another appetition. Locke on the other hand argued that acts involve an agent which acts, and that activity originated in the agent and not in the act. Locke listed "power" under simple ideas, i. e. those which can be defined by appeal to immediate experience. (See Appendix I. 2.)

NEWTON did not concern himself with physical cause. He clearly distinguishes between mathematical concepts and physical realities. He confesses his inability to explain "gravity". Although he speaks of "a certain most subtle spirit hidden in all things", yet the whole of his PRINCIPIA is independent of any recourse to it or to "occult causes". When he speaks of gravity as existing or acting, he is referring to some particular body or spirit as existing or acting. Newton is concerned only with the uniformity of nature. The ultimate agent for him is God.

It seems likely that for him the idea of force and active power was contained in that of spirit. With this Locke also and Leibniz are in close agreement. Locke, however, refuses to grant active power to material

substance. Both Locke and Leibniz hold that matter cannot be a cause, as it does not originate motion; the very concept involves this, and *Materia Preina* does not exist. Locke discussed power without reference to either uniformity or necessary connection.

HOBBS held that the movement of one body can cause the movement of another. The terms he uses are all connected with sentient beings. His crude definitions of "ENDEAVOUR" as motion in infinitesimal points of space and time, and of "pressure" in terms of endeavour, are meaningless when applied to traditionally dead matter. He fails altogether to give any empirical significance to the causal relation.

HOBBS in his defence of complete determinism against Dr. Bramhall, Bishop of Derry, is unable to point to ANTECEDENT necessity, and has recourse to God's omnipotence and omniscience, over and over again.

HUME shut out all free causal efficacy by restricting the search for causes to the observation of "external bodies", i. e. to sense impressions. Again his reduction of causation to uniform antecedence rendered the search for causes abortive; so much so that Lord Russell—accepting the Humean concept of cause—has recently recommended the complete extrusion of the word from the dictionary. Hume believed that the XVII century philosophers took "necessity" as synonymous with "power". It was only Malebranche, however, who might have done so. (See Ch. XI.)

KANT admitted the causal theory of perception in order to defend reality ; but having relegated causality to one of the Forms of the mind he does not succeed in this. (See Appendix. 1, 3)

Some modern philosophers, following Hume, deny causal efficacy before they even begin to discuss causation. They seem to affirm that experience can be described only in terms of successions. (e.g. C.D. Broad in " Perception, Physics, and Reality ") They refuse to recognise a transition of activity in a series of events. Some of them forget that the behaviour of the "external world " cannot be considered apart from the observer. Length, duration and the relation of succession cannot be considered apart from the observer. There is both a certain amount of "abstraction " in relations as well as a certain amount of "reality ", because relations observed are also relations PERCEIVED, i. e. as they are in the mind apprehended from the reality. According to relativists length and duration are relations of things in the external world to some specified observer. But by "external world " can only be meant the observed world; and observation is part of this observed world. This does not signify that such a world is dependent for its existence upon the observer, or that the observation is entirely creative or re-creative of its object. Observation involves the mode of contact of the objective world and the observer. It is absurd to speak of intrinsic changes or of substances "as they are in themselves" unless by it we mean "as they do or would affect our

intelligence or appear to us as ideas", or "as manifesting themselves to our intelligence".

I directly perceive a causal relation, e. g. a transmission of energy from one part of me to another. The experience of it gives me direct knowledge of the relation of the two motions I have felt.

Our experience of spirits is only of embodied human spirits manifesting themselves in and through matter. One reacts on another through the instrumentality of sense-impressions. (We are not here considering telepathy and purely psychic experiences.) SIGNIFICANCE is apprehended as an accidental form by the mind ; it is communicated by one mind through the instrumentality of matter, as an accidental form given to the latter ; and it is received by another mind as an accidental form also. Within the mind, the ideas or accidental ideal forms react on each other by a causal process, directed in part by the living body through the series of physiological processes accompanying the mental states, and in part by the mind itself through its faculties, the Intellect and the Will.

Ideas are given new being by ideas ; they are modified, split up, combined, unified etc., The mind retains its identity in spite of changes in them.

Strictly speaking, ideas do not react on one another directly or as integral parts of the mind. They are not integral parts, but only accidental forms, and the AUTO-CAUSATION (See p. 30—39.) is possible only on account

of accompanying physiological processes. The mind, however, is responsible for this *motus ab intrinseco*. That forms are apprehended by my mind from my physical structure can only be a matter of experience, not of "proof".

IT MUST BE ACCEPTED THAT SUBSTANCES ARE CAPABLE OF *REACTION* OR OF RESPONDING TO EXTERNAL PRESSURE, AND OF EXERTING AN EXTERNAL PRESSURE; i.e., that no existent is so completely isolated, that it cannot communicate energy or receive energy from another entity. This would also agree with the wave-theory of matter, according to which a single electron is not a mere point but would pervade all space, though tenuously and ineffectively, its effective nucleus being very, very small. Nor is it in opposition to the particle theory, in which it may be granted that particles do causally influence one another. Behaviour, however, cannot be wholly reduced to terms of space and time alone.

To assert a causal relation it is not essential that it should be perceived in the particular case. It is sufficient if we know what we mean and if we have perceived it in other cases. We shall, therefore, say that "reactivity" is a general character of all entities within our experience. It is this which is the basis of their causal efficacy. It will be noted that causal efficacy is due to active power ; but also by its contact and its passive power a perceived cause is not itself un-affected by the change, and there is no entity within our experience that cannot be the terminus of some change. When we rise up to

the idea of the supreme Cause Uncaused, we do so in a way similar to that in which we rise up to the notion of mathematical infinity from the concept of numbers; but the analogy stops here, as in the latter cause we are in the realm of the ideal, whereas in the former we are in the ontological plane. Certainly no theologian admits God as "cause" in exactly the same sense as that in which creatures can be called causes. Moreover, divine causation is not an experience of ours but only an inference.

The reactivity of which we spoke is a scientific conclusion, and no scientist would deny it unless he became obsessed with a type of philosophy such as that of Leibniz, who attributed a peculiar cloistral exclusiveness and incommunicability and irreceptivity to his "monads", each one unable to react with its neighbour and "perceiving" nothing besides itself. Reactivity provides the possibility for the whole phenomenon of causation. The desire to observe CAUSAL CONNECTIONS by experience led to an abortive search for them, and to Leibniz's explanation by "pre-established harmony" by which correspondence or parallelism is kept up.

Reactivity is also the basis for the doctrine of Matter and Form, and for the statement that no matter exists without some form informing it. It would be absurd to say: "here is matter, here is form (or here is a spirit and here is a body); let us SEE what CONNECTIONS are set up between them and HOW they react the one upon the other." Giving is a manifestation of Form; receiving is a manifestation of Matter.

Again to assert that inanimate objects are *dead* matter is also an absurdity. Nor is it necessary to postulate the existence of *spirit* in a material body in order to explain its causal efficacy and reactivity. Perhaps this word "spirit" was used only as a substitute for FORM. With an extreme prejudice against Scholastic Philosophy, the best part of Scholastic thought was discarded: but some of the dictines crept in again under new guises. The garbs however, were so ill-fitting as to be indeed incongruous. New terms were used for the old notions; but these already had their own associations (e. g. "spirit", "sentient"). The result was confusion. That DEAD matter *exists* is a contradiction in terms, if by dead matter is meant "MATERIA PRIMA". This is a pure abstraction corresponding to reality only as abstracted from all FORM, from all actuality, from the principle of reactivity by which the corporeal being manifests itself, from specific existence. Causation or reactivity of visible entities can only be explained by *form*. This is indeed accepted in practice in sciences. A certain number of hydrogen particles is not equivalent to a helium atom, although both may be reduced to the same number of electrons and protons. A living being cannot be equated to a mere sum of atoms and molecules.

When scientists, however, step into philosophy they sometimes forget the basic principles of Science itself.

CHAPTER IX.

THE APPREHENSION OF CAUSE.

Causes are not immediately apprehended as such. J. S. Mill enunciated four methods for the discovery of causes, which he called the Methods of Agreement, Difference, Residues and Concomitant Variations. He was of course led to these methods by his concept of causes. He defined the cause of a phenomenon as "the antecedent or concurrence of antecedents, on which the phenomenon invariably and unconditionally follows," and causation as invariable unconditional antecedence. Mill made a grand effort "to build up on Humian foundations a positive theory of causality" by insisting on induction, as if particular experiences were enough ground for a valid generalization.

Present-day Science uses two powerful methods, which we may call the Method of Isolation and the Method of Supposition. The former is well described in Prof. Levy's little book, "The Universe of Science." The latter method led, for example, to the discovery of Neptune and of Pluto. To it is also due the molecule, the atom, the electron, the gene. There is a supposition in the first instance of an existent being. The concept of it is in accordance with the grounds of the supposition, with the needs of the assumption. The supposition is, in a way, a speculation. It is subject to verification of the reality, and the concept consequently to modification. The primary guiding principle is to obtain the concept of a being in a potential relation to the beings whose changes demand a cause, according to the logical Principle of

Sufficient Reason. Moreover, simplicity is desirable. The adage "*entia non sunt multiplicanda sine necessitate*" (Occam's Scissors) is in accordance with our desire for mental convenience. It is, however, clear that simplicity alone is not a test of validity. The subsequent apprehension of the reality of the cause by the Method of Isolation, or by direct verification, as in the case of Neptune, raises the supposition to the plane of reality or as near to it as is possible. Molecules, atoms, electrons, are not directly perceptible; but what are considered as immediate effects of them in physical isolation are actually perceptible. We refer, e.g. to Wilson's condensation method of photographing electrons and to Bragg's X-ray analysis of crystalline structures. Hypotheses help to make the world more intelligible. A single fact can vitiate an hypothesis, which must then be discarded. An hypothesis must fit in with all known facts; it must explain them, and the more easily the better. Of two good explanations we choose for convenience the simpler, as it has a mnemonic value as well. It must help up to anticipate, it must suggest new phenomena obtainable by experiment or by observation, and it must stimulate research. It is an indispensable tool for the advancement of knowledge. It is a striking instance of our natural search for causes and of our craving for a unity and intelligibility in the world of ideas and of reality.

The success of the Method of Supposition has been so startling in recent years, and suppositions can be so various, that we have had a plethora of theories. Indeed, there is such an obsession with this method that often

physical verification is lost sight of, and we have theories which are not only unverified but are also unverifiable as not coming within the means and scope of experience, even—so far as we know—of possible experience. Failing then a means of verification, the authors appeal to SIMPLICITY as the criterion of truth. Such a claim is of course absurd. Even in an idealist system of philosophy one degree of simplicity is not in any way superior to another. Mathematical technique is made use of to a very large extent, and some would apply the CERTAINTY OF MATHEMATICS to the certainty of their unverifiable conclusions. But Mathematics can be used to prove almost anything, provided the starting point is suitably chosen. The conclusions, even though interpretable in physical terms, do not enjoy any more objectivity than the supposed physical principle translated into mathematical terms, taken as the starting point or first principle of reasoning. All we can say is that the intricacy of the mathematics as well as the call for ingenuity in physical interpretation is a strenuous intellectual exercise of exquisite beauty and absorbing interest, most apt to appeal to the intellectual aesthete, and to completely obsess him. Such mathematicians, who make a false claim to be physicists also, ignore the world of reality and tend towards idealism in philosophy, as they confound reality with mental abstractions and have no objective ground for certainty, no solid criterion for truth. It is, moreover, clear that not all experience is amenable to mathematical treatment. It is on the first step, on the physical law which is put in mathematical form, that the validity of the results depends. Not every generalization

is a quantitative one; we cannot apply mathematical processes or operations indiscriminately to the physical world.

The methods of the non-experimental sciences have not been sufficiently developed to give unanimous opinion in their conclusions. There are a great deal of speculation, sweeping assertions, and too much of a tendency to generalize on the basis of a paucity of facts. They depend too much on analogy and induction; but analogy and induction merely suggest and do not logically justify; and when the facts under observation are meagre, their value is trifling. Their difficulty in apprehending causes is due to the fact that the experience with which they deal is not repeatable. Their present-day methods are often only *pis aller*.

An observed constancy of conjunction of A and B'-B, the apprehension of A as existing prior in time to B as well as to B', these are merely SUASIONS to consider A as the cause of the change B'-B. It is only the method of isolation that can enable us to point to A as the cause or as containing the cause. The elimination of the irrelevant is necessary, but this is a purely deductive operation. The negative conclusions arrived at by it, e. g. that P or Q or R is not the cause, are absolutely certain. By the method of isolation we can exclude one by one whatever bears the appearance of a cause, and finally arrive at one thing A, which IS the cause, by the Principle of Causality.

HUME held that our search for causes gave no objective certainty whatever or even any probability ; that the belief in causation was a habit of mind explained by the power of association of ideas, by which an expectancy is felt, engendered by the fact of constant conjunction or succession of phenomena. Hume did not utilise his brilliant mental acumen to the analysis of the concept of objective cause. He took the notion of cause, to fit the scientific methods of his day, and he found no ground for validity in them. That he took a psychological view of the question was to be expected.

Hume's errors arise from his conception of change as mathematically continuous according to the adage "*natura non facit saltum* ", (which is not according to any experience, though in some cases there is an illusion to this effect). He also desired to PERCEIVE sensibly the connection between cause and effect, or the contact between entities in a causation. This naturally was not possible, as only in extremely exceptional cases is there a spatiotemporal contact perceptible. Hume was disgusted with the subtle attempts made at "proving" the Principle of Causality, for all such attempts begged the question or at least demanded the Axiom of Realism. So the principle itself was given only a psychological force by him. He changed altogether the meanings of "causation", "cause and effect". In his concept of cause the element of time came in, and this served to complicate the notion so much that the confusion it created lasted far beyond his times. His philosophy was a subjectivist and sceptical Phenomenalism. Finding no

abstract idea on the same level as the concrete object of sensation. Hume concluded that there were no such things as abstract ideas. He, however, admitted that we know not only similar things but also relations of similarity, thus implicitly recognising that we are capable of abstract thought. Hume's scepticism aroused Kant "out of his dogmatic slumber", and in order to refute it the latter evolved his Transcendentalism, which, however, could not shake off subjectivism on account of the influence of Hume.

A serious analogical argument has a value in as much as the validity of the causal implication is a plausible one ; moreover, it suggests methods of experimental verification. If by narrowing down the isolation it turns out that it is very likely that A is the cause, and, moreover, that this is so in a variety of independent experiments conducted on different lines, then the causal relation is regarded as sufficiently confirmed. Absolute isolation is impossible, as pointed out by Prof. Levy. Induction and analogy are OF USE in finding causes and in pointing them out as very likely or with a great deal of presumption in their favour ; but the strength of the objective validity is proportionate to the degree of isolation obtained; for, by the principle of Causality, we know that some part of the antecedent environment does contain the cause. Mill's inductive methods are useful in the search for causes, but they do not give that kind of validity we desire.

Mill's METHOD OF AGREEMENT (q. v.) labours under the difficulty of a plurality of causes, and it also

confuses causes with conditions. It does not suggest the method of isolation.

HIS METHOD OF DIFFERENCE does not distinguish between the relevant and the irrelevant factors of a change. But it does contain in a vague manner the Principle of Causality, for it points out that the new set of factors introduced in an experiment contains the cause or a joint-cause of the novel results obtained. Pasteur used this method in his experiment on the fixation of oxygen in its relation to the presence of certain micro-organisms.

THE METHOD OF CONCOMITANT VARIATIONS in the same way helps us to isolate a cause.

THE METHOD OF RESIDUES also does this to some extent. But Mill was a phenomenalist, following strictly in Hume's footsteps; and as regards external perception he was contented with ILLUSIONISM. In psychology he was an Associationist, i. e. he attempted to explain all psychological facts by the mere association of images, which were as atoms of the mind. Thus for him causality was an illusion of the mind due to constant conjunctions of instances in experience.

Mill's methods—which he considered exhaustive and infallible—have been found to be scientifically deficient and insufficient. This is because Mill adhered to Hume's notion of cause, and to a psychological explanation of causation.

The method of Isolation, discussed by Prof. Levy, combined with the method of Hypothesis, is *par excellence* the method most suitable to the experimental sciences. Isolation is not a mere abstraction, but it is actually carried out in the experiment; and hypothesis craves for an objectivity, as pointed out in our first chapter. The other sciences cannot well adopt these methods, which are pre-eminently suited to the laboratory. The method of generalization or Induction, using simplicity as a guide, the method of Analogy, the method of Intuition, these have all been tried and each does its share in the progress of knowledge; but they do not give objective validity.

Causal laws must be distinguished from laws of tendency. The latter may promote the execution of a causation, but they do not point out a connection between cause and effect. A mere tendency is static; a causation is dynamic. All factors and conditions must be taken into consideration before a strict causal sequence is established. Even a decision of the will to act may tend to promote the execution of the action, but itself is not the cause of the action; unfavourable conditions may retard the execution, and the will itself may change in the meantime. The concept of causation involves also the actual CONTACT. Connection between cause and effect—or the CONTACT we spoke about—is required as a *sine qua non* condition for the causation.

Behaviourism confounds tendency with causality. Many an ISM is invented in order to slur over difficulties, just as a few medical men nowadays favour

EUTHANASIA to get rid of the cause by getting rid of the "case", and so look for the best method of killing, instead of striving—as their noble profession has always striven, and even now in general strives, thank God—to alleviate pain and to contribute to the happiness of living. To what an extent has not Science been perverted!

Cause is apprehended by an analysis of experience, and its apprehension aids the re-constructive synthesis of the mental content, thus rendering the intelligibility of the world possible.

The degree of complacency of a non-scientific man in his cosmic environment may be due in great measure to habitual association with sequences; that of the scientist arises anew from definite knowledge of causal relations. No one, however, can be said to be altogether of a non-scientific turn of mind.

Lord Russell has advised the "complete extrusion" of the word CAUSE "from the philosophical dictionary". He finds that there are no such things as causes. The idea of cause, he says, involves a temporal contiguity, and such a contiguity between cause and effect is impossible; moreover, there can be no necessary connection between them, for a cause can always be thwarted in its action. Thus he impugns Determinism also. If on the one hand a cause be considered to be static, its sudden bursting into effect finds no explanation. On the other hand if it be considered to be changing, then we may ask what part of the changing cause is relevant to the effect, and we can

diminish it indefinitely so that nothing of the cause remains. Again he says: "Since there are no infinitesimal time intervals, there must be some finite lapse of time between cause and effect. This, however, at once raises insuperable difficulties. However short we make the interval, something may happen during the interval which prevents the expected result....."

The notion of cause as invariable antecedent cannot stand up against this criticism. By shortening the time-interval indefinitely the cause and effect become confused. A regular sequence is not always to be explained by causation. If I turn on a tap, I am not the physical cause of the flow of water. I have only removed an obstruction. (I may be a MORAL cause, as explained above. See Ch. "The Will.") The cause of the flow of water is to be sought elsewhere. A law of sequence is not to be confounded with a strictly causal connection. Primary tendencies to act pertain to the very nature of a thing, and its real relations to other things inhere in it. Hence, there can be a determinism in nature, so that A CAUSE NECESSARILY ACTS IN THE SAME WAY IN THE SAME CIRCUMSTANCES. (This, of course, does not refer to free causes, but to those subject to the constraint of their very nature.) The necessity arises from the nature of the whole system.

Lord Russell forgets that THE EVENT WHICH COULD UPSET THE WHOLE EXPECTATION ITSELF REQUIRES A FINITE INTERVAL OF TIME, and so his argument is really fallacious.

Again, given the same effect, and finding the circumstances to be the same — i. e. the relevant circumstances — we may look out for the same cause. Jaundice is a symptom (an effect) ; but a doctor will say that different organic defects will bring it about. The trouble is that we can never point out to identical circumstances. Hence the rule — i. e. of habitual expectation engendered' by experience of succession — is not of much use as a METHOD to find out a cause.

Time does not enter *per se* into the concept of cause-effect. In the actual causation it enters *per accidens*, as every change is in time.

The concept of cause is not obtained by analogy from the free will nor from muscular force.

It is not necessary that we should be able to distinguish causes in every case or to separate causes from conditions, in order to recognise that there are in reality cause-effects, or in order to accept the Principle of Causality. It is true that quantitative laws are now looked upon as changeable—e. g. the gravitational effect of the earth—but the variation possible is attributed not to the natures of things but to their physical configurations and to other circumstances, and we even attempt to predict them on this basis. Even Science acknowledges that natures are permanent. Geological and astronomical calculations into the distant past or future are grounded on laws obtained here and now. Uniformity to some extent is an observed fact. If there were no

uniformity whatever, our position would be intolerable as one of permanent inexpectancy. A non-uniform mind would be worthless. The measure of probability regarding the behaviour of a body is a measure of the uniformity observed and a tentative measure of the determinacy of the body. In this sense even the electron is **not** altogether irregular and indeterminate. (Uniformity has reference to observation of regular behaviour; determinacy to predictability.)

Reason can only be applied to a reasonable world; and a reasonable world is one in which there is a certain amount of uniformity and permanence as well as some variety and change.

Even a child has some concept of cause, and this has not been got from introspection, by a study of his emotions or will or muscular force. The very questions of the *enfant terrible* show this.

CHAPTER X.

Indeterminism, Freedom, Causality.

Dr. MORTIMER TAUBE has given a great deal of attention to the problem of causation. (See his "Causation, Determinism and Freedom"; London, George, Allen and Unwin, Ltd.) His historical discussion is indeed of great value and we are greatly indebted to it. He tries to reinstate what he calls the traditional notion of causation, and favour Leibniz's idea of attributing "sensation" to all entities. The last words in his treatise are very striking; "The important point is that we cannot argue from the "passivity" of sense-qualities to the conclusion that what exists is incapable of entering into causal relations."

With that last sentence we are in complete agreement. With it in mind we have framed our definition of causation, and have chosen it as an ostensive one. Our lines, however, diverge at the very start.

Dr. Taube defines "cause" in this wise: "An event A causes event B, when B results partly from some activity or influence originating in A."

The word "partly" is well-chosen, but, as he says, by the phrase "originating in A" he restricts his definition to what have been known traditionally as "free causes". If the words were "emanating from A" or just "of A", this would not be the case. However, to the phrase itself we can have no objection if it does include the natural activities of A and not only those

free from internal constraint. Again, being obliged to state as for an ostensive definition what kinds of entities A and B may stand for, he decides to make them stand for ACTS or EVENTS. It is chiefly because he does not wish to complicate the discussion by introducing the notion of "substance"; also, as he says, there is perception of causation without any perception of substance. The "mind" itself he considers as a system of acts. We, on the other hand, retain a distinction between an entity and its manifestative activity.

It would certainly be inadvisable to burden our task with another sore point. In our own definition if A and B stand for SUBSTANTIAL BEINGS, as we desire, the position is clear. However' for those who reject the notion of substantial being, A and B may be taken to be EVENTS. But there would still be the difficulty of defining an event in such a way as to include what is generally understood by a "substance". If the latter were taken to mean a complex of energies unified by a supreme form, we may let it pass; the manifestation of form being energy, and the entity having both active and passive potentiality or "power"—a term which Dr. Taube is willing to substitute for "sensitivity". We ourselves have preferred the word "reactivity", defining it as a readiness to receive and to communicate being—manifested as energy—the readiness arising from the dynamic state of equilibrium of the energy-object. We have, however, carefully restricted EFFECTS to changes perceptible, as in form. It is in form that is apprehended directly. (Forms as objects of the mind go by the name

of "UNIVERSALS". (See Appendix. "World Pictures".) If an "event" be taken to mean the manifestation itself of energy, as it commonly implies, then for obvious reasons we cannot agree to saying that A and B' or B are events.

Dr. Taube next defines freedom: "A finite existent is said to be free when some degree of its activity, however small, is underived from ANY OTHER existent." From the very definition it will be seen that if there be one finite existent that is free, then it would be quite independent in one real respect at least of God. Thus there would be no need for God as ordinarily understood. Dr. Taube purposely refrains from saying "from any other finite existent", because he does not wish to make an appeal to God in his explanation of causal efficacy. But since he wishes to restrict his discussion only to OBSERVABLES, he is not justified in including God in his programme as he really does. How will he ever know that an entity is in its activity free of EVERY OTHER existent including God? The definition itself gives a bias which it is not fair to give. If we are conscious of freedom, it is of a freedom from any other object of experience. But God is not an object of experience. Again, as will be seen, his definition of freedom is identical with his definition of causation, except in so far as it contains no reference to an effect. From this he concludes that only free entities (i. e. free "events") can be causes. It must be conceded, however, that EVERY individual entity — as we understand it — has some activity ORIGINATING WITHIN itself,

or underived from every other existent falling within our experience; the activity is of its own individual nature. Hence, every entity can be a cause and is to some extent "free,". (See, however, our meaning of freedom below.) Dr. Taube's causes are confined to events or acts. What is meant by an act having its activity originating within itself or underived from any other act, we fail to see.

The proposition "A is determined" is taken by Dr. Taube to mean that it is false that "A is free". Thus determinacy is the antonym of freedom; and perhaps "free" and "indeterminate" would have the same meanings for Dr. Taube. "A determines B" or "B is determined by A" is taken to imply immediately that B is not free and also that A and B are necessarily connected, or involve a system of necessary (logical) connections in the sense that it is INCONCEIVABLE that B shall not follow from A. (Dr. Taube does not say whether A can be free in spite of these "necessary connections".) From this it follows that if no entity is free, then every entity is determined and no entity can be a cause. Dr. Taube shows that in the universal denial of freedom "determinism is left without the possibility of accounting for causal connections." As a matter of fact Determinism denies causal connections, in Dr. Taube's sense, and therefore has nothing to account for. However, the determinists of the XVII century, for theological reasons at least, admitted God as the sole cause. Taube considers God's activity as involving a necessity also; but he fails to note that he is speaking of a "consequent" necessity not an "antecedent" one. This distinction — which he himself accepts elsewhere —

is not a meaningless one. It holds for finite beings. When speaking of God we may also accept it, as it involves no contradiction but on the other hand preserves the divine freedom and omnipotence and independence from creatures.

His tacking on "necessary connection" to the concept of determination is altogether unnecessary. The great bugbear is the ambiguity of "necessity". If this word be used without discrimination, for "logical necessity" in one sentence and for "physical necessity" or constraint in another, or for "consequent necessity" in one premiss and for "antecedent necessity" in the conclusion, it would, of course, lead to great confusion ; and Dr. Taube is not at pains to make it always clear what he means.

For him, therefore, it is impossible for one to admit causality as well as determinism, or freedom and determinism, as Descartes did. This philosopher laid the difficulty of reconciling the two at the door of human frailty or finite intelligence. Descartes, however, admitted *universal* determinism, which is certainly incompatible with freedom. It is true that there is a difficulty in reconciling God's foreknowledge and fore-ordination with the idea of moral responsibility. In such a question, however, we attempt to discuss the workings of the divine mind, which is certainly presumptuous. Moreover, the question of freedom and of causality must be first settled before we even go to the existence of God and the mode of existence. If God's existence be taken

as a primary postulate, difficulties will crop up at once. If, however, causality and some degree of freedom is firmly established and the existence of God as omnipotent, omniscient etc., then any difficulty in reconciling the notions may be met or evaded in the Cartesian manner; or better still, failing an attempt to COMPREHEND these notions—for “comprehension” is certainly needed for their reconciliation—we may show that the notions are not contradictory and that both, having been established, can be held side by side. A difficulty raised after the independent establishment of two facts is a difficulty, not a doubt of either of the facts.

Dr. Taube, however, explicitly states that he is dealing with the proposition which affirms complete or universal determinism. Again he takes “uniformity” as synonymous with “necessary connection”, so that his necessary (logical) connection (or INCONCEIVABILITY that B should not follow A) can only be a habit of mind or the force of analogy and is not logical in the sense generally used.

With regard to complete determination in the sense excluding freedom, we must, of course, with Dr. Taube, reject it on the strength of our evidence for freedom. If again Determinism is the doctrine that every entity is fixed in its being and in its mode of being, including its relations to other co-existents by the spatio-temporal reactions of all the pre-existents, then again we must reject the doctrine, not only because it leaves no room for the freedom of any one existent, not only because it does

not take into account the dynamic equilibrium of energies, the play of active and passive potentialities, at the instant under consideration, but also because such a determination is too far-fetched and is against all experience.

Moreover, what logical connection can one hope to see between an entity at one instant and itself at the next? If there is any DIS-CONNECTION, then indeed we should seek for a ground for it and not otherwise. Hence we have the "Law of Contradiction or Perplexity." The mind craves for permanence and ASSUMES permanence, and this assumption is the logical ground of connection. It is expressed by the "Law of Identity". On the other hand if we speak of physical connection we can only mean ENDURANCE, and we do immediately apprehend endurance. Again, though we may speak of physical connection, we must bear in mind the connection AS IT IS APPREHENDED BY THE MIND. A physical connection must not be taken in the sense of a material or observable one, like the rope tied to a bell or the spade "connecting" the hand of the labourer to the soil. Such a physical connection only turns out to be an instrumental cause. Some connection can, however, be apprehended, a real or *ontological* one, when the terms are fully and distinctly apprehended and are together in consciousness. (See Appendix I)

When we speak of "indeterminism", there is no need to confound this with "freedom". The very word "indeterminate" refers rather to knowledge by the subject knowing than to the behaviour of the object known. An electron is said to be indeterminate because

we have no means of knowing, so far as we have got, how it will behave the next instant. We know, however, that it IS behaving and IS acting, and we PRESUME its existence and activity the next instant. That it is free in the sense in which a spirit is free, is not assertable. It is absurd to say that there is nothing to influence its behaviour, or to determine its behaviour, for an electron is reacting with the whole universe and physical isolation of it is impossible, and we are incapable of knowing the influence of the whole universe upon it. Such a statement would err by excess. Nor does it profit to say that an electron is mathematically an indeterminate differential equation, for by putting it in mathematical terms we have only translated certain concepts of it into mathematical language. This only shows that the electron is indeterminate in the literal sense of the word. We need not allot any "FREEDOM" to it. EVERY ACTIVITY OF THE ELECTRON IS DIRECTED TO OR REFERS TO EVERY OTHER BEING. ITS ACTIVITY ALSO IMPLIES ITS REAL RELATIONS WITH THE REST OF THE WORLD. We shall also take the term "determinate" with reference to knowledge. An entity is said to be determinate in its behaviour when this can be fully known from its very nature and its relations to the outside world, provided these are all known. Our very acceptance of certain natural laws show that there is a certain amount of determinism — in this sense — in the world. Many predictions based on calculations are actually verified.

Freedom or liberty is sometimes taken to mean immunity from constraint, but it is more than this ; it is the **CONSCIOUS POWER OF MANIFESTING THIS IMMUNITY**. The constraint is that which arises from its physical nature. An entity is said to be absolutely free if it can consciously manifest its immunity from all constraint whatever. We can point to no being of experience coming under this concept. When we say free, however, we shall mean only partly free, in the sense that a free entity (within our experience) has it, partly at least, in its conscious power to act or not to act, to do this or to do that, manifesting this power in some way. Hence we may have **LIBERTY OF EXERCISE** and **LIBERTY OF SPECIFICATION**. The basis of liberty is of course "**INDIFFERENCE**" or immunity from constraint. (We shall not say "**INDETERMINACY**", as this word has been taken in another sense.)

Opposed to indifference is "**NECESSITY**". Necessity may be either an external constraint or an internal constraint, which we may also call a **NATURAL INCLINATION OR PROPENSITY**. There may also be an absolute necessity, when there is no immunity whatever. Logical necessity or determinacy is the constraint of logical reasoning, based on the principles of Identity, Contradiction and of the Excluded Middle.

It will be seen from our definitions that there can be "**FREE CAUSES**" as well as "**NECESSARY CAUSES**". It is not essential that in causation the activity of the cause should be free or immune from its natural propensities. Every entity can be a cause according to our

definition, as every entity is reactive and manifestative of its reactivity. A "free cause" is conscious of its free reactivity. Determinism, as generally understood, is a doctrine denying the existence of any free causes, and as such must, of course, be rejected. If Indeterminism asserts that there is absolute immunity from constraint of any kind whatever in the behaviour of entities, this also must be rejected, as it would assert just as much on the one side as Determinism does on the other.

That in our definition of causation we were not afraid to assert that the entities A and B' may be substances is clear, because neither those who take substances to be certain complex units of energy (the so-called modern "idealists") nor those who take them to be composite units of dead matter (the so-called modern "materialists") have any reason to complain of our definition. The latter, however, must account for the unity of any entity, and they can only do so by admitting "form", though by some other name. The former also, with their all pervading electron, will find it difficult to define unity or to distinguish between individual entities. At the most both parties may object only to the term "substance".

It is unfortunate that in the XVII century such great confusion was occasioned by mixing up the concepts: freedom, determinism, causation. It was the Calvinistic tendencies of the age that took Determinism as necessarily implied by the idea of God's omnipotence and omniscience. Consequent on the failure of the

attempt to find "necessary connections"—in some vague empirical sense—and hence on the denial of the reality of relations, causation also had to be dropped. The mistake of taking the existence of God as the primary postulate of reasoning is evident. It led in particular to the denial of freedom and to the confounding of causation with uniform antecedence.

Again, long after physicists had ceased to appeal to God, they retained universal determinism as true, forgetting the premisses from which it was arrived at. The XIX century was almost wholly under the influence of the doctrine, and it seemed to be favoured by the discovery of greater uniformities in nature. We may add to this the materialistic reaction to the sterility of XVII century Theology and to the idealism of the XVIII century. Universal Determinism excluded freedom and did away with free cause. The beginning of the present century has seen a swing-back of the pendulum, and Indeterminism is as much favoured now as Determinism was in the last century. But Indeterminism, rightly understood and granted in the world of electrons, does not exclude the operation of free-causes, in the true sense of freedom; though on the other hand, it cannot attribute freedom to all causes.

Hume himself, the destroyer of causes, did not define what he meant by succession. If he did so, he would certainly have referred to experience. So also do we appeal to experience in favour of freedom as well as of causation. We may also say that IF FREEDOM BE

GRANTED TO CERTAIN ENTITIES, THEN CAUSAL EFFICACY MUST BE GRANTED, FOR IN THE VERY MANIFESTATION OF FREEDOM IS THAT OF FREE-CAUSAL EFFICACY. Again from the indisputable observation of a certain amount of uniformity in the world, we may conclude to the existence also of necessary-causal efficacy, keeping, however, the notions distinct.

In our analysis of cause-effects we spoke of "CONTACT." What has been said there as well as what we have said above about real or ONTOLOGICAL connection, makes our position clear. It was the consciousness of the necessity of some sort of contact which led to the search for "necessary connections." In myself spirit and body are in contact. There is a connection, but in what sense is it "necessary"? It is only necessary as a *sine qua non*, i. e. in the sense that WITHOUT IT the whole living human being cannot be *in actu* as such. There is no question of antecedent necessity nor of any visible bonds of connection. The body is not the instrument of the soul as if two mutually separate integral entities existed. Body and soul are essential parts of one operative unity. We have said that an instrument in general as such retains its internal equilibrium of energies and passes on the energy or being, received from the principal agent, to the effect. In the case of the human composite, however, the body acts as a living body by the operation of the soul, by which it is informed and kept in its living human existence. The energy emanating from a human entity is not purely spiritual; it is HUMAN. Even if

there were purely spiritual acts in a living man, the fact will not militate against our view.

We have spoken already about free-causes. The crucial point, however, is not about these but about the freedom or constraint of EFFECTS. Granted an entity A manifesting itself and communicating being outside itself, and an entity B' manifesting itself and capable of receiving the being communicated into itself—of course, in the way dependent on itself—; will there be a causation, and will it be of a determinate nature? That there is a causation and of a specific nature when there is actual sufficient contact, is our experience; and that this is necessarily so can be expected of beings to which freedom in the true sense does not apply. We cannot say the same of beings which are free to react or not, or to react in different ways. And there are beings with some degree of freedom; for them the very contact is dependent on themselves and the reaction after contact is also free. In such beings changes are not necessary-effects, and the causation or the specific causation is not a necessary one. We do not in the least intend to designate all reactions of human beings as free. Only in those higher reactions in which man manifests the spiritual side of his nature and by which he shows a certain independence from matter and a power over the physical world, are his actions free within limits, and effects in him can be called FREE-EFFECTS. The freedom of the will is best seen when a man controls the impulses of the body and loosens himself from the bonds of lust. [See St. Augustine in "De Civ. Dei" XII, 6]. These effects are no doubt

accidental ones, as his human nature is of itself permanent and unchangeable. Although there is freedom in the reactive manifestation, none the less **IT IS AN EFFECT**. Hence we can give an affirmative answer to the question : Can a Material cause have a spiritual effect? This question, however, must be distinguished from that of the contact between matter and spirit. That there is contact is clear, but the nature of the contact is obscure. We can say that the matter in man is **INFORMED** by a spiritual **FORM**, which vivifies it in its essential being and acts in and through it, so that there is an intimate connection between them, forming one unity. In spite of this intimate connection the spiritual nature is so obvious that some degree of freedom is somehow evident.

The difficulties of causation, we have seen, arise from the obscurity of the contact between matter and spirit. The failure to find *necessary connections*, either logical or physical, led to inevitable disaster in philosophical thought, and gave rise to opposing systems of philosophy : the Materialist and the Idealist. In their difficulty to find an explanation, the one or the other **FACT** was ignored. In some cases a distinction had to be made again between "matter" and "form", though not in these terms. Some philosophers confounded "form" with "spirit".

CHAPTER XI.

Scientific and Metaphysical Cause.

In our first chapter we argued against the modern scientific notion of cause. But we must make a distinction here between the ordinary scientific or traditional notion of cause and the mathematico-scientific notion. It happens that Mathematics is more than ever used in the pursuit of many of the sciences. A physical postulate is translated into mathematical terms. Then we are involved in mathematics until a mathematical conclusion can be re-interpreted in physical terms. The physical interpretation is tested, and, if verified, the original postulate — whether it was a wild guess or an intuition or a true abstraction — is held until another of the results obtained from it runs counter to experience. Then it is modified or discarded. The intermediate steps in mathematics may have no significance whatever. There are some, however, who would attribute a physical reality to every step, and whether we use "imaginary" numbers or matrices or periodic expressions, would see in them corresponding physical realities. That is, mathematical operations themselves would be for them representations of physical activities. Then, identifying causes and effects with operations and states, the relations between these become just analogues of mathematical, i. e. logical, relations. It is no wonder then that the mathematical scientist's view of causality differs from that of the non-mathematical scientist. It is no wonder also that the ELECTRON is just a differential equation!

If so it would be only a mathematical concept like the straight line and nothing more.

Just as reality is the basis for the notion of the straight line, so it is for that of the electron. But the straight line does not exist as just a straight line. A real entity is the basis of a most complex notion, and one or two simple abstractions will not suffice to represent it to the mind. It will need the synthesis of a large number of simple (i. e. the most abstract) concepts to represent it adequately i. e. sufficiently for practical purposes. Such abstractions as Mathematics deals with are the simplest quantitative ones, and it is clear, therefore that a mathematical concept or set of concepts is thoroughly inadequate to represent to us reality to satisfy all our needs, and the view it gives us of reality is a very meagre one. It is a one-sided view, and, although most useful in its results — as witness the great strides in technical civilization due to mathematical research — it is far from being sufficient. How can it be said that the mathematical picture of the world is the true picture or the complete picture! There is some truth in it, but it falls short of the whole truth and even of that which we should consider as adequate. To comprehend the world is indeed too tremendous a task for the poor human intellect. With our finite intellects we can take different aspects of it and obtain a fair outline according to each. To put together again even these meagre outlines so as to form a harmonious whole is not an easy task.

Since the physical sciences depend so much on Mathematics, the scientific notion of cause has been

vitiated. The mathematical physicist looks on the world only as a logical construct, a fabrication of the mind alone, and he cares little about its reality. Thus while there is still Materialism in the world of Science, a large number of eminent scientists have gone to the other extreme of Subjective Idealism. Moreover they deal only with spatio-temporal forms and logical groups and ignore intrinsic causes and causation, and for them physical objects consist only of these forms, which are the only ones of any consequence to them.

We shall now consider whether we are justified in a metaphysical notion of cause. A metaphysical notion is one which would apply to all realities, whether they fall within our sensible experience or transcend it. It is sufficient to establish firstly the existence of a Reality to which the ordinary notion of cause as obtained from "visible" entities pertains; but which, as the First Cause Uncaused, the Being from which they themselves obtain their existence and causal activity, will not be a cause in exactly the same sense as these are causes. Hence the metaphysical notion of cause must not contain anything that would limit its application *only* to what are known as "secondary causes".

It is clear, firstly, that "material cause" or "matter" will not apply to God, in as much as in itself it imports imperfection, privation of form, indetermination, potentiality. God, however, can be called "PURE FORM". He is the formal cause of things eminently and virtually, as having it in his power to produce forms and informed

matter. He is the ultimate ground for the intrinsic relation itself of matter and form in a corporeal being.

God is the EFFICIENT CAUSE of all other beings, in as much as they are given their essence and existence by him. They get ontological being from Him ; but He Himself undergoes no change by the causation. Their whole being is contained in His causal efficiency. He is not limited by extrinsic conditions or by the potentialities and relations of things ; and these potentialities are theirs by the specific natures given to them by Himself. Time does not come into divine causation, whereas it does enter—PER ACCIDENS—into secondary causations. Again in secondary causations we deal with pre-existent entities and the changes in them as effects ; but it is not the same in divine causation. There need be no first term B' in the effect, no "taker", for the second term B has taken or received its entire being from the "Giver", The change is from non-existence to specific existence. The relation of God to B' is an ideal one, and there is no relation of B' to God, as B' did not exist. The relation of B to God is a real one, as its whole being is ontologically derived from God ; whereas that of God to B is ideal, as there is no question of a potentiality or tendency or reference of God by His nature to B, i. e. no ontological connection on the side of God. *God alone is the ABSOLUTE.*

It is true that we can synthesize a simpler notion of Cause than the one given in Chapters II and III. By "simpler" I mean MADE UP OF MORE ELEMENTAL CONCEPTS OR SUB-ISOLATES. The new concept

may be one in which those sub-isolates are chosen which do not imply any imperfection whatever. The new concept may be considered to be that of a Perfect Cause, if such there be. We do not, however, arrive at the existence of the Perfect Cause merely because we are able to form such a concept. We begin with the ordinary notion of causality and we infer the existence of a cause, the First of all causes and preeminently a Cause. It cannot be subject to limitations, for these are not essential to the notion of causality, and otherwise it could not be the First Cause Uncaused.

Causation then cannot be spoken of God and of creatures univocally. In the creature it implies imperfection: that of having causal efficacy limited by its own limited nature and by the limitations of other entities like itself, that of potentiality passing into act, that of suffering a loss of its own being by causation, that of dependence on another existent for contact and causation, that of bearing real relationship of tendency and reference to other entities. Causal efficacy is a Transcendental Perfection. In God it pertains to His nature formally, so that He is *The Cause*. It pertains to the creature with limitations, and by participation. It is given to its nature, which itself does not exist of its own right or *a se*, but is put into its specific existence by God.

Again God is the FINAL CAUSE *par excellence*. He is the Finis for whose sake things exist and act. He it is to whom all things refer. He is the END for which they are disposed; for which, according to the LAWS

made for them, they take their places in the ORDER imposed by Him. He is the GOAL which makes intelligible the whole Universe and the course it runs. Without Him it is unintelligible, groundless. All signposts point ultimately to Him.

We might have drawn attention above to a Mathematical method in Geometry. Pure-geometrical notions are translated into algebraic terms, and these are manipulated to give a final result re-interpretable in Pure-geometrical terms. The process is called "The Principle of Continuity", and gives rise to new analytical definitions, e.g. of "projection", "conics", etc. This method Mathematical philosophers would apply to the world of reality, or at least to those sciences dealing with realities.

CHAPTER XII.

The Ascent.

So far we have considered Cause chiefly from the empirical or scientific standpoint, and our own definition of Cause was framed with this particularly in view ; as indeed it should be since the idea originates in the empirical plane. It is said that Thales of Miletus, while gazing at the stars, fell into a puddle ; at which his servant-maid burst out into irreverent laughter. We must keep our feet firmly on earth when contemplating the heavens. It will be seen, however, that when we attempt to speak of *the* Cause we are in difficulties at once. The *material* cause is not *the* Cause, as is obvious ; the visible *efficient* cause, or that which we should consider as such, is not *the* Cause. Nor will both of these together justify the use of the definite article. Neither will the addition of the *formal* cause help us. The change and the specific result must be explained, and given an adequate ground.

That the effect should not be greater than the cause, that the latter must be proportional to the effect, is a requirement which is the same as that of finding an adequate ground. If we take the view that the whole causal system involves nothing more than the entities B' and A, the contact and the process, we have no explanation at all. We may take a higher point of view and include the real relations—or tendencies or reactivities—inherent in the natures of the entities concerned. Any adequacy, however, in the system itself requires explanation. We should have to fall back upon a will, a Free

Creative Power, at which only a full stop can be made, and to which we should ascribe the tendencies, the actuation, the purpose, the finality of the scheme,

These three steps by which we ascend, which have been called "aspects" of cause, correspond to the VAISESIKA the SAT KARYA VADA and the VIVARTAVADA doctrines respectively. They may be considered as the scientific, the meta-physical, and the mystical points of view. In the first we tarry uncertainly in the realm of secondary causes and see a string of them which would form an endless chain if we but dare go far enough ; but not one of them, nor even the whole series as far as discernable or even hypothetically prolonged indefinitely, is perfectly adequate for the effect on hand. The second point of view would take us a step higher, but it would ask us to be satisfied with universal laws as inherent in things of their own independent nature ; whereas we note that these laws are only possibilities of an innumerable number of possibilities, and there is no special reason why the world is as it is and not otherwise.

The third view is from a higher plane and is such that none higher still is required. The special, the particular, the so-called laws of nature, which are themselves particularities, are accounted for by the free creative activity of the Absolute. We stop at His "Fiat". It would be as absurd to go further as it would be to ask what is beyond space or what day follows time when time ends. The first step places us in our environment,

the second carries us into the lap of Nature — with a big N- , the third enthrones us in the bosom of God. On the part of man we have successively : apprehension in the lowest level of intellectual activity; reasoning and contemplation ; science, philosophy and mysticism.

We have referred to adequacy of cause. To take for *granted* that the effect can be greater than the cause, is to disclaim the intelligibility of the world ; it would be like trying to explain the effect by itself, or the whole by the parts. In the doctrine of Evolution taken in conjunction with that of a blind groping of Nature towards perfection, we have such an attempt to explain the effect by itself. In the Doctrine of Progress, the XVIII century precursor of Evolution in the sociological sphere, there was the same acquiescence in the superiority of the effect over the cause. No finality was taken into account, Finality is outside the bounds of the scientific view, which consequently is restricted and static. But restriction and stasis are against the higher nature of man, whose persistent "*why* " echoes through the vaults of the heavens; for man is by nature a philosopher.

Man is by nature even a mystic. He can commune with the Absolute, and at times he does. Whether by an intuitive apprehension or by a subtle process of reasoning or by such an activity of the spirit the external manifestation of which as a process of thinking or speaking dwindles down to a mere dawdling in the presence of the Infinite, the Ah, Ah, Ah of a Jeremias (Jerm I. 6), he sees the Absolute as all-embracing, as holding within Himself

the all-in-all, as *The Cause*, greater than its effects and forming *the* ground for the *What*, the *How* and the *Why*, as the Alpha and the Omega. From the heights of mystical contemplation, the supreme activity of the spirit in union with the Divine, one catches a glimpse again of the world one has left, as if it were nothing; indeed as nothing apart from Him, the great Brahman, God, Allah, Elohim. From Him, by Him, with Him, in Him, and for Him things are and act. Their relations to Him are real, but His relations to them are unreal. He sees them *sub specie aeternitatis*, and by union with Him in the spirit, the mystic catches a glimpse of the *eternal now and here*. Apart from Him is seen a flitting changeful world, with succession in time and space, with no order, no harmony, no purpose, no ground. The one law summarising all the "laws" of nature, coordinating, unifying them all in one word, is GOD.

When considering causes specifically we find that among the causes we deal with, the material, the formal, the efficient and the final cause, there is no perfect adequacy of cause to effect. Even if we include so much in the cause as to leave a very vague distinction between cause and effect still there is no perfect adequacy.

In a causation there is a passing over from a state of potency to a state of actuality. The latent has become patent. The form of the final terminus of the effect has been actualised from the potency of the matter, and manifests its actuality. The ground for the transition,

however, is not only in B' -- the matter to the new form of B -- it is also in A, the efficient cause, and is constituted by the relations between A and B. But this ground is still inadequate. Science does not proceed further, but there are no dead walls bounding the domains of science. As the laws discovered are found to be but particular forms of more and more general laws, as they become more and more correlated and unified, the attention of the scientist is drawn to the harmony and order and intelligibility of the objective world and he sees design and finality in it. Relations do not wholly account for the dynamism of the world. He is confronted with the problem of time, its one-way road; in the irreversibility of processes he sees a direction laid out for things. The symbolism with which he forms a picture of the world is inadequate. Something is wanting. "We do not know -- says Sir Arthur Eddington -- the inner nature of what is being symbolised". ("New Pathways in Science" p. 88). The symbols represent the relations and little besides. The material scientist has left out of account *finality*. Those who deal with living beings have to take totality-finality into account, for vital actions force it on their attention. Those who study the human being in his individual and social aspect are forced further to recognise the fact of free creative activity, design, purpose. It is not the regularity of determinate causation that gives the final explanation; nor is it the determinate probability of indeterminacy. It is but the true freedom of free causal activity that ends the search, and there we stop.

A very meagre freedom is enjoyed by the human spirit; but that little is quite enough to indicate the nature of a free cause, the nature of spirit itself. Intelligibility and finality come from the spirit, and by the spirit they are apprehended. "If the universe is a universe of thought, then its creation is an act of thought" (Sir James Jeans in "The Mysterious Universe," p. 144). Before us is a mighty plan put into execution.

Form seems opposed to form, each striving for its own manifestation, but all together manifesting a unity of design, a harmony and an order in which each takes its place. Just as in a picture each colour is opposed to every other, each line to every other, while all the colours and shades and lines together form a harmonious whole, with a unity which is only that of an intellect, and a purpose which is that of a will, so also the great world of ours appears as the spontaneous act of a Free Creative power, an external faint expression of the goodness and truth and beauty that essentially constitute the Absolute.

There can be no Absolute Truth but God Himself. God alone is a true picture of God, a perfect representation of His own essence and powers. God Himself as known to Himself is the Truth, the perfect image of the Absolute, the Idea generated of itself by the Intellect. God knowing Himself by a single act loves himself, and the act of knowing and loving is God Himself. There is no process in time. It is an eternal process, one above and out of time. Everything else that is manifested by change and in time is in God *ab aeterno*, as contained in

the Idea and the Love pertaining to His Essence, and as the outward manifestation of His free creative activity. They are necessarily finite, deficient and graded; but each in its own way and all together is an image of the Image of God, participating in His Truth, Goodness and Beauty, like the myriad drops of dew each resplendent with the image of the sun. Each is an *idea*, and the whole in an *idea*; and as such each and the whole is a replica of the *Idea*, the Logos. Variety and multiplicity coalesce in unity of design and finality, the individual is disclosed as a detail of a harmonious whole; particulars are all grounded in the Universal. The world is the word "Fiat", created as the external expression of the Uncreated Word.

Creation implies no change in the Creator. The effect is fully contained in the cause. Effectuation is grounded in the cause. The created are really related to each other and to the First Cause uncaused; but the First Cause is the Absolute with no real relations to them. Let us consider the elements of causation. God gives things their being, the contact is with Himself as they are all contained in His Idea, and the conditions for contact rest in Himself. The term "Cause" can be applied to God, but the imperfections attendant on secondary causes are not in Him. A process in time applies to a secondary cause only; change in the cause itself appears in secondary causation. Here permanence is only relative. In the realm of the human spirit, however, there is a higher image of divine causation, for the human spirit can rise above time and change and can manifest a free creative activity in its own plane.

We cannot do better than to refer the reader to Prof. Nalini Kanta Brahmas' book, "Causality and Science" (George Allen and Unwin Ltd.) and especially to the paragraphs beginning: "It is only when....." on page 83, and "But we all know....." on page 113.

CHAPTER XIII.

Hume and Cause.

To DAVID HUME (1711 - 1776) the world is indebted for that confusion in thought arising from his destructive criticism. In the second half of the XVIII century his influence was supreme, and even Kant could not shake it off.

It must be noted that Hume was much influenced by Berkeley. Thus he denied the existence of abstract concepts, and asserted that we have but vague mental pictures which, though themselves individual, are able by their lack of distinctiveness to call up a number of similar ideas. In this he implicitly admitted a knowledge of SIMILARITY, and hence the possibility of abstraction. Moreover, Hume himself employs abstract concepts in his own arguments,

In his *Treatise* he gives a list of *relations*. These are divided into two classes, the first being 'such as depend entirely on the Ideas which are compared together', and the second 'such as may be changed without any change in the ideas'. The former alone are subject to demonstrative reasoning and become the basis of science. They are the relations of Resemblance, Proportion in number and quantity, Degrees in quality, and Contrariety. The latter are Individual Identity, Relations of time and space, and Causation. Thus Hume sets out with a prejudice against the traditional Cause. The Causal relation, in other words, is a relation not implied by the nature of its terms.

Hume then proceeds psychologically and empirically, and looks for the impressions from which we derive the idea of causation. He rejects quality, for the causal relation may be found whatever the particular qualities may be. Contiguity in space he finds to be non essential, as there are non-spatial causes, sounds, tastes, desires etc. Hume considers the relation of NECESSARY CONNECTION to be of fundamental importance, and, failing to find a necessary connection in things or their concepts, is forced to seek for this in the working of the mind alone.

Hume affirms that, as all distinct ideas are separable from each other, and as the ideas of cause and effect are separable, we can easily conceive any object to be non-existent this moment and existent the next, without conjoining to it the distinct idea of a cause or productive principle. "The separation, therefore, of the idea of a cause from that of a beginning of existence, is plainly possible for the imagination, and consequently the actual separation of these objects is so far possible, that it implies no contradiction or absurdity; and is therefore incapable of being refuted by any reasoning from mere ideas; without which it is impossible to demonstrate the necessity of a cause."

Failing then to obtain an ontological insight or a logical ground for causation Hume proceeds to a psychological examination of causal inferences and of the belief in causal laws.

Experience, he tells us, shows us mere SUCCESSIONS; it discloses no intrinsic dependence or necessary

connection of one thing on another, and hence no active power in anything. We indeed BELIEVE that we experience the power of moving a body or of directing the operations of the mind ; all that we do experience is only that an action FOLLOWS a volition, and we do not see how it is so and consequently we find no causal influence. A paralytic or one who has had a limb amputated believes that he can move the limb (which has been paralysed or removed); only on further consideration he knows that he cannot do so. Thus we sometimes believe we can do something which experience shows us later cannot be done. Hence, he concludes that the notion of causality arises from the habit of seeing certain facts constantly associated, as, e. g. fire and heat, mass and weight. The prior are called "causes" and the posterior are called "effects". From the constancy of association and the uniformity of succession is born a tendency, almost invincible, to expect the "effects" after the "causes". A BELIEF is "a lively idea related to or associated with a present impression". Its motive is the force or liveliness communicated to the idea by the associated impression. Frequency of conjunction in the past strengthens the association, so that the closer the association when a new impression is got, the greater is the force of the other idea and the stronger is the belief in the reality. In this way causal inferences are made. The judgement, however, as it is merely experimental, never rises to the level of certainty but remains one only of probability. The uniformity of succession in phenomena is so great, not only in physical facts but also in

human acts, that history may find laws according to which human facts invariably succeed one another. Men CONSIDER themselves the free causes of their own actions, but a free cause is a contradiction.

Hume, therefore, defines cause as "an object precedent or contiguous to another, and where all the objects resembling the former are placed in like relations of precedence and contiguity to those objects, that resemble the latter", or as "an object precedent and contiguous to another, and so united with it, that the idea of the one determines the mind to form the idea of the other, and the impression of the one to form a more lively idea of the other". Thus Hume renders it impossible for us to justify the objective validity of causal laws. We believe in them, and, though on further consideration we remember that the necessity of belief is only a subjective one, we nevertheless fall back into the habit of belief and so carry on with the assumption of an objective truth.

Hume also attacks the notion of "substance". For him a substance is nothing more than the idea of many impressions which we find always united. To suppose some substratum is gratuitous; indeed "the thing in itself" is a contradiction in terms. Our very "ego" is only a "bundle of perceptions". Thus Hume pursues Subjectivism and Empiricism to their bitter end, and lands up in pure PHENOMENALISM, denying all substance and certitude, and reducing all to mere perceptions perceiving themselves. He restricts his Scepticism, however, by admitting — illogically — mathematical certitude.

When Hume wrote his "Treatise", Universal Determinism already held the field. Hume accepted it and held on to it. Unlike the others, who had forgotten its theological antecedents, he set out to enquire into its origin and validity and more particularly to establish it on solid grounds. He easily broke down the usual arguments in favour of it and he dismissed arguments against it by appealing to its undoubted truth and universal acceptance. He himself could give no arguments for the conclusion that all things are determined; yet he firmly clung to the belief as to a dogma of faith. He shows that there are no grounds from reason or experience to believe in necessary connection; and argues against human freedom by appealing to the uniformity of human actions. As Dr. Taube points out, "uniformity is a matter of degree; no one would deny that men's actions are uniform to a degree. But similarly no one would (or should) deny that men's actions exhibit a certain degree of irregularity." Hume cannot argue that 'if we knew the hidden causes' we could predict with the required degree of accuracy, because his argument is, he tells us, based only upon the ACTUAL perception of uniformities." Hume puts aside the cases of observed irregularity in human behaviour as only APPARENT, just as the irregularity of motion of a body does not upset physical determinism and necessity. (But if he could have foreseen modern developments in Physics, this is just what has happened.) "Perhaps no one — observes Dr. Taube — has ever been disappointed in expecting a body to move or the sun to rise. But most certainly men have mispla-

ced their trust and have been disappointed in friendship and love; and having been so disappointed, on Hume's own grounds there remains not the slightest basis for the belief that "actions of will rise from necessity". Ultimately Hume has no other basis for the denial of human freedom than a dogmatic (non-empirical) belief that all things are determined." In human actions the two things which Hume considers essential for the assertion of necessity, viz, constancy of association and the inference of the mind that they are necessarily connected, are both absent. Again, having banished causality, Hume has no place for freedom.

Hume even resorts to the device of casting the experience of freedom into the realm of the illusory; but with his extreme Subjectivism "illusory" itself would have no meaning and bear no distinction from "real" whatever he could mean by this word. Again, how can he confidently assert in a dogmatic manner that if all the causes were known, the behaviour of a human being could be with certainty inferred? (Indeed after dethroning "certainty" he could not even assert this, unless he means that all phenomena can be discussed in mathematical terms. For this he has no warrant whatever.)

The origin of the notion of efficient cause as given by Hume, is certainly not accurate. Even a child, whose experience is not one of much uniformity but full of novelty, easily admits the notion of cause.

His objection to the notion of efficient cause is a very weak one. I do not experience HOW my will moves my hand; therefore, I do not experience my will

moving my hand! His search for necessary connections led him astray. Such a relation cannot be observed. He has failed to distinguish causation from determinism with which he also confounds necessary connection. Thus he fails to find necessary causes and goes on to deny also free causes.

Hume's very classification of relations is biased. The ideas he considers are abstracted even from their real relations to each other. His "Separability" of ideas, even of cause and effect which are in a way correlative, only shows that from the intrinsic natures of the objects we do not find that they are connected. If, however, they are considered in all their relations, then they are not found to be separable; in fact the mental separation involves a contradiction. Hume thus assumes precisely what he sets out to prove.

Hume attacks the demonstrations of the Principle of Causality offered by Hobbes, Clarke and Locke. Hobbes said that without a cause there would be no ground for the coming-into-existence of an entity at some particular point of space and time. Clarke argued on the absurdity of a thing producing itself, and Locke on that of a thing being produced from nothing. These and other attempts, as Hume pointed out, assumed just that which had to be proved.

Hume believed that he had refuted Locke and others of the XVII century, but his disagreement with them was only a matter of words. With Hume's antagonism to "substance" we shall not be concerned for the present; let it suffice to say that the same failure to find "necessary connections" as the ground of PERMANENCE, led to this; and also the Subjectivism in which he was steeped.

CHAPTER XIV.

After Hume.

REID was the first to voice the indignation aroused against Hume. According to him, both Berkeley and Hume proceeded logically from Lockian principles; but the absurdity of the conclusions point to the absurdity of the principles. According to Locke we have "representative ideas", and we know immediately not the things themselves but only the ideas as representative of things. This principle would logically lead to Idealism. The other principle of Locke which Reid impugns is that the mind is at first a perfect blank and draws its cognitions from sensations.

Reid asserts that the mind has certain innate principles which can be analysed, though not proved, and which should be accepted as evident and proceeding from commonsense. Such are mathematical and logical principles, and, with reference to the facts of experience, the following: Our thought informs us of our existence; All sensation discloses itself as sensation of some object, not a natural sign of it; Every effect has a cause; We can in some way direct our own acts; etc.

Requisite physiological conditions, sensations—which are subjective impressions—, and perceptions—of which alone knowledge consists—must be carefully distinguished. Perception is "certain conception following assent." Sensation is a NATURAL SIGN, which, as soon as it is felt, makes us CONCEIVE the object in ourselves and

SUGGESTS an invincible assent to the existence of the external object as the cause of the sensation. We know, however, only qualities. Primary qualities are in things as they are perceived ; not so secondary qualities. Some perceptions are natural and some are acquired ; the mixing up of these is the occasion of error ; In other words the origin of errors arising from sensations lies in the confusion between actual perceptions and acquired perceptions. Wherefore Reid would recommend the right education of the senses. The most obvious conclusions which reason deduces from perceptions are called "common sense"; the more remote conclusions form the sciences.

Reid regards the Principle of Causality as a truth immediately apprehended and self-evident. Our notion, of active power, at least in the experience of volition, is justified by everyday speech and thought and practical life. Reason would be required only to infer from its occasional use that the power is permanent.

Thus Reid, setting out with good intentions to contend against Locke and Hume, does not free himself entirely from the tentacles of Subjectivism and Scepticism. As the object of sensation only SUGGESTS the existence of it, we can only have as the basis of certitude not the evidence itself but a sort of natural faith or blind instinct. His philosophy is on the whole timid, incomplete, incoherent, unsatisfactory, and altogether unable to stand up against Scepticism. He gives no alternative analysis of the reality and objectivity of the notion of active

power, and instead of argument resorts to mere emphatic assertion,

KANT agrees with Hume that the notion of causality cannot be obtained from the data of sense-existence, but must be regarded as imported by the subject, some objectivity, however, being retained inasmuch as the importation is an indispensable condition of the constitution of an object of knowledge. By its mental forms, the necessary prerequisites of knowledge, the mind adapts objects to itself and is able to order and interpret for itself what would otherwise be a chaos. If Kant's view of the nature of knowledge were the correct one, then his theory of causality must be accepted.

THOMAS BROWN, in his "Inquiry into the Relation of Cause and Effect", regards the Principle of Causality as intuitively certain. He makes much of the Uniformity of nature, which also for him is intuitively certain. It is not clear, however, what he means by intuition; sometimes he speaks of it as an impossibility (psychological) to believe otherwise, sometimes as an overpowering feeling of belief. He certainly upholds the objective validity of causal laws, but he does not distinguish clearly between the subjective necessity of belief—which Hume admits—and the objective necessity of self-evidence; also he fails to see the difficulty of applying the Principle of Uniformity, that "The same sequence of events recurs in the same circumstances"; for the circumstances are never exactly the same and the difficulty would shift on to pointing out what the

relevant circumstances are. No modification of Hume's account to build up a theory of causality turns out a success.

J. S. MILL in his LOGIC makes a magnificent attempt to build up on Humian quicksands. He proceeds on purely inductive principles, assuming that the mere experience of particulars is a sufficient ground for inferring validly the character of unobserved instances. Mill's philosophy is thoroughly Humian, and does not provide any ground for inferring invariable or unconditional antecedence from observed cases nor for believing that "the present constitution of things" is stable and unalterable. We have referred to Mill elsewhere.

Dr. EWING, in his "Kant's Treatment of Causality", argues that it is sufficient to show that knowledge without causality is impossible. This will not solve the problem, which it nevertheless points out. The notion of cause-effect and the derivation of the notion and of the Principle of Causality are still left to be investigated.

MR. HOBART in his article on "Hume Without Scepticism" (*Mind*, July and October 1930) calls the inductive principle an ultimate appearance of fact, to be unchallenged until and unless something to the contrary appears. Most of us, however, do wish to go further (against his advice) and if the truth of a proposition is not self-evident we demand a demonstration. Mr. Hobart's analysis does not avoid Scepticism.

Several other modern philosophers analyse a causal law in terms of REGULAR OBSERVED CONNECTION and a BELIEF in its universality.

LORD RUSSELL ("Mysticism and Logic") like a fervent mathematician wishes to replace the word "cause" by a factual notion of functional correlation, such as is done already in mathematical physics. Prof. L. S. STEBBING speaks of proceeding to quantitative laws of functional dependence from qualitative laws of causal relation between objective entities. She admits that they apply to different regions of fact and that the same logical difficulties will crop up. The highly specialised and still too abstract concepts of mathematical-physics are certainly inadequate to represent the whole of reality, and we shall always clamour for a logical validity for any generalized statement.

KARL PEARSON, Russell and Miss Stebbing are of the school that knows only mathematical language and purports to understand nothing that is not couched in mathematical terms. We cannot translate our ordinary notion of a horse or a cow or a goat into mathematics except perhaps as capacities for eating grass or of fetching a price in certain types of sums in Arithmetic. Neither can we express "CAUSE" as a mathematical function.

PROF. WHITEHEAD holds that causal efficacy is a primary element of experience. ("Symbolism", and "Process and Reality".)

Prof. PRICHARD declares that by reflection upon what is really meant by a PHYSICAL EVENT we can obtain an insight into the fact that by its very nature it is "an element in a process of change undergone by a system of substances in space, this process being through and through necessary in the sense that any event (i. e. the attainment of any state by a substance) is the outcome of certain preceding events (i. e. the previous attainment of certain states by it and other substances), and is similarly the condition of certain subsequent events." ("Kant's 'Theory of Knowledge' ")

Prof. G. F. STOUT stoutly defend the "specific character of activity and active tendency and their unmistakable presence in experience." ("Mind and Matter".) Both Prof. Stout and Dr. Ewing maintain that causality includes specific implication—"a necessity analogous to the logical connexion of reason and consequence, that taken together with the laws of probability supplies a warrant for valid inference."

In general we may say that modern theorists on Cause are going back to the traditional views. Some are still wavering, for, as Prof. Broad says, "the most impressive arguments for either kind of analysis—the regularity analysis and the entailment analysis—are the arguments *against* the other side."

For our part we have on the one hand declared definitely against the Humian analysis, and on the other avoided the entailment analysis, for we have kept in mind

also FREE-CAUSES, which must be included in the analysis.

In the case of NECESSARY-CAUSES, we must take into account the SPECIFIC NATURE of the reactivity of things. It is in the potential specific reactivity of entities, which is OF THEIR VERY NATURES, that we must look for the CAUSAL RELATION, or the relation between the potential cause A and the first term B' of its potential effect. If we consider natures so abstractly as to isolate from all relations whatever, naturally we shall be in a quandary.

A finite free-cause also has its potential specific reactivity with other entities, free to some extent but within certain limits.

(We are particularly indebted in this Chapter to Dr. D. J. B. Hawkins' "CAUSALITY and Implication", London, Sheed and Ward.)

CHAPTER XV.

Religion, Philosophy and Science.

The EXPERIMENTAL and observational sciences, especially the mathematically-aided ones have made such rapid strides in recent times that the intellectual revolution in the scientific world can only be compared to the parallel revolutions in the affairs of men. Theory after theory has been set up to "account for" the nature of things or their behaviour, that is to unify the "Laws of Nature". Each is put forward primarily to explain phenomena not satisfactorily accounted for before, to suggest new lines of research, to predict phenomena verifiable by observation; and more than this, to co-ordinate disjointed and apparently unrelated phenomena so that several laws seemingly unconnected may be implicit in the one theory, deducible from it. Theories have one after the other been dashed to pieces against the rocks of facts. But theorising has gone even further, and many non-verifiable hypotheses have been put forward, so that it would seem that the only test for them is logical consistency. A few years ago a revolution was made in the science of Logic itself and consistent systems have been built up without the use of certain so-called "Laws of Thought"; and now it is even difficult to understand what is meant by logical consistency, unless the system of logic be specified. The hegemony of the Reason is again threatened, but from a new angle altogether. For the present we shall not discuss the consequences of this new departure.

When the Physical Sciences began to postulate infra-sensible entities and infra-sensible phenomena by which

sensible entities and sensible phenomena can be explained, they entered into the realm of Philosophy. Even Science pretends to have a say with regard to the ultimate nature of reality. But are not sub-atomic Physicists too presumptuous in this respect? Without explaining "life", "feelings", "consciousness", "intellect" and so many other things, they dissect and dissect and find only waves and particles; by their minute analysis, they fail to see the wood for the trees. Physical synthesis or a reconstruction of the analysed concepts has recently been attempted, e. g., in the recognition of the "arrow of time", its "one-way-road". But this is only recent, and it is only a beginning of scientific synthesis. If analysis kills, the new synthesis must give back life to the world. If it cannot do this, then we must necessarily have two irreconcilable views of the world, a microscopic view and a macroscopic view.

Science is certainly a systematic study of reality; that is, a mental ordering of the reality. It takes up an objective standpoint eschewing all the subjective and personal and individual, and attempts an ordering by the mind with no reference to the mind. But the pure scientist who in his philosophising does not take a wider view of things, inevitably glides into either Materialism or Idealism; into the former if he is obsessed by the dogma of the non-existence of spirit, into the latter if he views the ordering by the mind for the mind merely as an ordering of the mind itself.

Philosophy is professedly a systematic study of the ultimate nature of reality, and her subject-matter is the

whole of reality, of which she aims at giving a unified account in a comprehensive scheme. Science kills to dissect, but philosophy would rather consider the living whole. The doctrine of Holism, that the whole is more than the sum of its parts, is in a sense a philosophical truism. All the conclusions of the sciences put together do not make up Philosophy, nor are they the whole subject-matter of Philosophy; nor is the latter merely the isolating of notions common to all the Sciences or the reconciling of their conclusions. The sciences should recognise the spheres of their validity, but this they are basically incapable of doing without the good offices of Philosophy. The fundamental postulates of Science, which, in so far as they go below the surfaces of things, stand on philosophical grounds, must also stand on philosophical legs; i. e., it is necessary to find out how far their assumed *correspondence with the reality* holds; i. e., the "truth" of these assumptions is the problem of Philosophy. Philosophy, like Science, is based on facts and reasons; but, unlike science, which deals securely with the quantitative side of nature, Philosophy has to consider all experience. Theories must not only make facts intelligible but they must be suggested by the facts themselves, or forced on the mind by them. Facts must be accepted as facts even by Philosophy. Science builds a house brick by brick as she gets them; then she tries to put in the mortar, then the foundation, little by little going deeper and deeper; Philosophy on the other hand keeps what materials can be got for the house ready and sorted out and does not build the house until she has first dug

deep down and come across what she considers solid rock on which to set up the structure.

Science cannot be the enemy of Philosophy or of Religion. It is a postulate both of Science and Philosophy, that there is a fundamental harmony in the whole of experience. Each science attempts to discover that harmony in its own subject-matter, and Philosophy attempts to discover it in the whole universe. The problems of Philosophy are more profound, tremendously more difficult than those of the sciences, and they are indeed of more importance. The sciences are very far from their goal, and Philosophy may be further away from her goal; but that does not signify that Philosophy has not attained anything. Philosophy, as a systematic study, is more ancient than any of the sciences, because she did have some experience to work upon before the refined methods of observation and experience developed; and also because the problems of philosophy, the Whence, the Whither, and the Wherefore, perturb the very soul of man, who, acknowledging Reason as the authoritative guide to man's actions, seeks for the ultimate answers to the most obvious questions bearing on his own behaviour.

The body of the philosophical truths attained is, therefore, not an end in itself. The subject-matter is the external world and ourselves, and their mutual relations. Philosophy cannot be an "abstract", utterly objective, or detached science, and still maintain the truth. The motive for the research is the inner urge we have for Truth as well as its bearing on our own attitude and

behaviour in life. The code of behaviour derived from the acquisition of truths, our standard of moral conduct, or behaviour according to our free nature directed by Reason, constitutes the subject called ETHICS, which by many is considered also a part of Philosophy or a practical application of it. Philosophy may even extend further. If she gives some definite answers to the three fundamental questions, and points to a Supreme Being, an Ultimate End and a Divine Purpose, then necessarily the practical application would go further still to delineate our duties towards the Supreme Being, so that we may conform formally to His Purpose and seek and make use of the means to our end. This would constitute Natural Religion, which can also be considered as part of Philosophy. Thus Science touches upon Philosophy and Philosophy upon Religion. One overlaps the other. There seems to be no boundaries to any of them.

According to Kant, Religion consisted in MORALITY alone, by which he understood the dictates of conscience as the voice of God in the heart of man. This is not even a complete view of Ethics. For Fichte Religion was merely a speculative study of the most profound matters, and so was nothing more than pure or unapplied Philosophy. Many moderns consider Religion as a mere human affection like a tender internal feeling or a soft kind of sentiment towards the mysterious; others again take it to mean an inner communion with the immanent divinity arising from the subconsciousness and working itself outwards into consciousness. (When it comes into consciousness, perhaps, the bubble bursts!)

Others again, especially the Positivists, who accept only laboratory tests, consider Religion as nothing more than a puerile explanation of natural phenomena not yet fully studied or explained, and so amounting only to superstition.

It is not fair to say that Religion is based only on authority, or on some prophet's "Thus saith the Lord". For the acknowledgement of authority and of a particular subject of authority is itself an act of reason. We accept the results of a well-known chemist or group of chemists regarding the fixing of an atomic weight; we accept the determination of astronomic time by the Observatory at Greenwich; we accept the findings of certain anthropologists, geologists and archeologists. No man, however learned or resourceful he may be, can reasonably disclaim authority. Thus even Science turns to authority and authoritative statements. Religion, if she insists on mere authority, as Sir S. Radhakrishna would have us believe, ("The Reign of Religion in Contemporary Philosophy") insists on the Absolute Authority, that of God, and does so only after the existence of the Personal God, distinct really and in essence from the world, has been established. Not everyone can be a Scientist, few can be Philosophers, and fewer still can be Religionists, in the strict senses, although most of us have some sort of scientific, philosophic and religious ideas and motives. An ordinary man accepts the findings of Science, why not those of Religion, of the study of which he is less capable? That scientists in general agree, whereas philosophies and religions differ greatly is no argument against acceptance

on authority. If an ordinary man is capable of recognising their differences and of appreciating their import, he is something more than the ordinary man and is quite able to examine things for himself and at least to go a further step forward.

The spirit of popular religion, i. e., to accept dogmas without discrimination, is certainly detrimental to Religion, and not only to Religion but to Philosophy as well and to Science and to the spirit of reason. Men, however, vary greatly in abilities, opportunities and resources, and so most men would be UNREASONABLE if they were not guided by authority in most matters. Even faith must be reasonable, as St. Paul says. To follow a creed as a fashion or from a herd-instinct or even as a family connection is certainly not according to reason. Faith must be based on reason, at least the exoteric reason of recognising some human authority for guidance.

Coercion, especially by the paramount authority, the State, is the enemy of "Reason" and consequently of that ideology on behalf of which it is practised, even though that system be a most reasonable one. For many years the world has witnessed persecution and counter-persecution, the abuse of the powers of the State, the miscarriage of justice, the forcing of a one-sided prejudiced education on the people; and, whether the right to private property be admitted or not, it seems as if one's private faculties and knowledge no longer belong to one but wholly to the State; as if one existed wholly for the State and not the other way about; whereas at one time it

was generally recognised that the State was for the good of men, so that the individual may be able in a well-ordered society to attain to that perfection of his nature which it is not possible to attain in detachment; and that any possible Society of Nations was for the good of the States, so that each one may be able in a well-ordered association to attain the more easily and surely to that perfection congenial to its people and possible only with mutual good-will and co-operation. Recently, however, the scales were turned; the only answer given to the question: Wherefore are we? was the the obviously superficial one. "We live for one another". This is inadequate and a confession of philosophical barrenness. It has been asserted by some that man lives for the State, and the State for the Comintern; and that present society exists for the sake of that hypothetical perfect society which will live in the Golden Millenium of a Paradise on earth.

There is a difference to be made between philosophies in theory and philosophies in practice. A man's actions would imply a certain attitude to life, and even if his principles of action are not clear to himself they work in his subconsciousness in all his responsible acts. It seems now-a-days that philosophical theory is forced to serve the ends of the majority or of a party or of a dictator. There has been almost a collapse of Reason; and in an age of tremendous technical progresss, we witness the degradation of the true philosophical spirit. There has never been more intolerance than in our own days, never more persecution, never more bigotry, never more the

manifestation of a cringing slavish cowardly spirit, never less freedom of thought, never more subservience of the human intellect to human passions and nefarious designs.

Philosophy, as a sum of truths alone, cannot be an end in itself, for the fundamental question LEADING to its study is one bearing on practice. Indeed, with respect to this question we may say that Science is *for* Philosophy, Philosophy *for* Ethics and Ethics *for* Religion. Our study of ourselves and of the world and of us in it, has reference to our human actions, our behaviour, our knowledge of our end and of the means to it, and our obligations, if any. Many of our modern philosophers strive to justify their preconceived notions, their attitude to life, their behaviour, and more often that of the party or system whose slaves they are. At all times, we may say, true Philosophy has suffered persecution. No wonder progress has been slow and uncertain! Philosophy cannot advance under force, intolerance and prejudice. She must be free. It is not the function of thought to give us a religion to suit our predispositions. True philosophy is not like that convenient kind of Arithmetic which would concoct one statement of accounts for the directors and another for the share-holders of a company. The freedom to doubt a methodical doubt, i. e., to look at things as detachedly as possible, keeping assent in abeyance, is necessary. This, however, does not imply a freedom to doubt any and everything. We cannot doubt facts and experience; if we deny the validity of the **TESTIMONY OF OUR SENSES**, not only philosophy collapses but also science; even society and even the

himself with "ifs" and stifles himself in his own "iffism". His is a set attitude to life. There are many things acknowledged in all the ages and even now in these topsy-turvy times; for example, the scale of ethical values and even of intellectual values. If we cannot reasonably explain the scale, we should still have no reason to turn it upside down or to deny it altogether. If a doctor cannot diagnose the ailment of a patient, he is not thereby justified in putting an end to the ailment by putting an end to the sufferer.

No philosophy is worth the name if it does not give a rational basis to Ethics and to Religion. As we said, Philosophy has the whole intelligible world including ourselves as its subject-matter. Religion is also something that needs explaining; its origin, its hold on men, its spread over all the earth. The idea of a Supreme Being, it is said, gradually evolved: it began with the worship of Nature, of phenomena, of supposed forces or agencies endowed by man with consciousness and will, of the heavenly bodies and atmospheric appearances, of beneficent and even malignant beings. It then went on to hero-worship, and by the weaving of tales fed by a fantastic imagination, some men were deified, and others were held to persist in a spiritual existence. Thus came animism, fetishism and the worship of the manes; then the anthropomorphism of the deities and their multiplication to represent different functions in analogy with the world and the human being. Then philosophers, presumably, purified these beliefs and arrived at one

Supreme Being. All this theory is, however, merely the work of fancy dwelling on the present day beliefs of savage races and even of civilised countries. The contrary seems to be the case. In the oldest scriptures there is nothing so sublime as the first few verses of Genesis. What higher notion of God can be had than that given there! Has philosophy risen to greater heights! "And God said ; Be light made. And light was made." In the very ancient Vedas the concept of God is again shown to be superior to that of any of the later Hindu Scriptures. Indeed, the probability that monotheism, and that of a high order, existed before polytheism, animism, etc., is very great historically, and further research seems to bear out this statement. Did the ancients, Israelites and Hindus, arrive by thought alone, i. e., by Philosophy, at the MOST DIFFICULT idea of a Supreme Being transcending the visible world? Or did they get it by tradition; and then what was the remote origin? Was the knowledge of Nature, of man and his surroundings, sufficient to lead up to the idea? These and similar questions need answering by present-day philosophy. There is a FACT, and the fact must be accounted for and not ignored.

If religion were engendered by fear, it seems to have been a fear associated with the conscience, rather than a fear of the unknown terrors of Nature.

Philosophy must explain, i. e., find the ultimate reasons for, the state and movement of this world; for the FACT of the existence of ourselves, our feelings, our

aspirations, our consciousness of freedom and of moral responsibility. The whole course of history needs an interpretation. Jesus Christ needs an explanation; His life, His work, His achievement. We must not confine ourselves only to physical phenomena; there is a whole realm of reality outside the regions of the experimental sciences. A most important problem would, of course, be the nature of knowledge and what constitutes certainty. In the investigation of the acquisition of knowledge we must recognise not only the ordinary ways for this through the faculties of the senses and the reasoning powers; but also other ways in which knowledge is acquired. Our natural mode of obtaining knowledge is not only personal experience, but also instruction. Obtaining information from others is natural to man, and he cannot get on without it. The criteria we must use to test the validity of knowledge thus acquired, must be determined by Philosophy, e. g., to test the genuineness, the authenticity, the veracity, the integrity, in short the historicity of any document or historical testimony. The problem of Evil must also be considered an important one.

Thus the burden on the shoulders of Philosophy is a tremendous one, and we need therefore be little surprised to behold chaos in the philosophic world, the conflict of opinions, divergent views even on points bearing on the fundamentals of all reasoning. Man is human; he is swayed by passions, blinded by prejudice and preconceived ideas; restricted in his access to knowledge, circumscribed in time and space, handicapped by the constitution of his body in which and through which his own intellect acts;

subjected to external forces and influences; so that it is not ONE man alone that can arrive at the whole truth and nothing but the truth; nor can it be even a group of men; nor is the accumulated knowledge of the ages enough. Knowledge progresses and philosophy will progress with it. But will there be agreement? We may as well ask: Will pride vanish from this world? Will stubbornness, envy, prejudice all vanish? Will all men ever acknowledge the authority of the one who will have collected all the partial truths so far arrived at and put them together in some sort of harmony? Can there be complete harmony until the sum-total of knowables be attained? Is this acquisition possible or probable in our life time, in a thousand years, in a definite period of time?

Yet, certainly, there must be a great number of truths picked up at different times. Is there a possibility of our arriving easily at a sure, safe knowledge of that body of truths which would give us a knowledge of our end and of the means to it, i.e., the body of truths necessary for the right conduct of our lives? In short, is Revelation possible? Claims have been put forward. We must examine those claims, for, owing to their importance, they cannot be ignored by any one, least of all by the Philosopher, the Lover of Truth.

APPENDIX I.

1. **Descartes** (1596-1650)

Descartes' doctrines cannot be understood except in relation to his method and principles.

Taking Mathematics as his ideal, he wishes to erect a solid system of philosophy by the deductive method, starting from a few simple principles, Wherefore: **NOTHING IS TO BE ADMITTED WHICH IS NOT EVIDENT**, whether immediately by intuition or mediately by rigorous deduction from the immediate conclusions; **DIFFICULTIES SHOULD BE SPLIT UP** in order that they may the more easily be solved; **DEDUCTIONS MUST BE DRAWN IN STRICT ORDER**; and care must be taken that **DIVISIONS SHOULD NOT OMIT ANY MEMBER**.

At the start we have the "methodical doubt" in order to arrive at certitude. This doubt is "real" and "radical", i. e. there is an effective suspension of the assent continued until and unless we arrive at the solid truth. The reason for doubting is that, so far, whatever I have assented to I have received from sense-impressions and tradition, and these sources are liable to err. Descartes himself never doubted the ideas or mental representations, i. e. immediate apprehensions whether external or internal, which he had, nor did he doubt the affections which he experienced. He doubted, however, about **JUDGEMENTS** by which we affirm that some idea corresponds to an external reality or that some idea is consonant with

or opposed to another one. The ground for this doubt is the assumption — of which we never doubted — that thought, in as much as it is immanent to the mind, can reach to nothing immediately but the idea itself or the mental representation. So an idea or concept is for Descartes not **THAT IN WHICH** the object is apprehended, but that itself which only is apprehended; so that it needs showing that it is representative of something. This is the Principle of Immanence or Subjectivism which has dominated modern Philosophy for so long.

An impregnable truth which ends a doubt is this: "Cogito, ergo sum." This is not an argument but an immediate intuition. This intuition, however, manifests nothing to me except my thought, so I cannot say anything more about myself than: "I am a thinking substance."

This intuition, moreover, provides me with a **CRITERION** by which I can judge of the truth of propositions. The reason why I am forced to assent when I say "Cogito, ergo sum", is that I see the idea of existence clearly contained in the idea of thought, Whence it is permissible to generalize and say: Whenever the idea of the predicate is **CLEARLY** contained in that of the subject the proposition is true; or briefly, whatever is contained in a clear idea of something is true.

Since every idea requires a cause proportionate to itself, and the idea of God or of a Perfect, Infinite Being, which I discover within myself, cannot come from me,

who am finite; this idea points out evidently to the existence of God. It is there not by deduction but by immediate intuition. Nor can it be said that the idea of the Infinite, being a negative one, can be constructed by me; for it is most positive, because it is one of a being. utterly positive and pre-exists the idea itself of a finite being. Moreover, the idea of God contains existence in itself; hence that God exists, is immediately known to us. (Thus Descartes revived the argument of St. Anselm.)

THE CERTITUDE THAT BODIES, of which I have ideas, EXIST is based on the truthfulness of God, who would not perpetually illude me. From this it does not follow that bodies are in all respects just as I apprehend them; for there is much confused and obscure in my sense apprehensions; but it does follow at least that the extended world exists, for the idea of extension and of properties connected with it, being geometrical notions, is quite CLEAR and DISTINCT, and without extension no body can be conceived.

God alone is in the proper sense a SUBSTANCE, i. e., "an entity not needing any other for existence"; creatures are substances in a relative and analogical sense. Descartes denies ACCIDENTS in the Aristotelian sense. but he says there can be "modes" and "attributes". A "mode" is "that which can neither exist nor be conceived without that of which it is the mode." An "attribute" is an "essential quality of a substance"; that, namely, from which abstraction cannot be made without at the same

time losing the notion of the substance itself; such is "THOUGHT" for spiritual and "EXTENSION" for corporal being.

As space itself consists of extension, matter is the same as space, so that there is no vacuity, whether in the world between particles of matter or beyond the world; so that the world is unlimited in extent. Extension is of itself homogeneous, so that all bodies are ultimately made up of particles of the same nature (not the "atoms" of Democritus, for matter is interminably divisible like extension with which it is identified). The diversity of bodies, which is perceived by the senses, arises only from **loco-motion**. Matter is devoid of all internal activity, **inert**, dead; but God originally endowed it with a "CERTAIN QUANTITY OF MOTION" which remains constant. (Descartes believed in the Conservation of Momentum; Leibniz, however, showed that it is not "momentum" which is constant, but "energy" — the sum of the kinetic and the potential energy of an isolated dynamic system.) Motion, however, is distributed between distinct particles of matter, which, moving in all directions, meet each other and bring about vortices; thus gradually arises the diversity of bodies and of phenomena which we observe.

Descartes' Psychology follows the same lines. Just as Matter is essentially extended-substance, so SPIRIT is essentially THINKING-SUBSTANCE, hence active, alive. Neither plants nor brute animals have souls; they are MACHINES, or AUTOMATONS. The union of

the body and soul in man is not a substantial one, for the two are too disparate to coalesce in one substance; it is, however, very close, as the soul not only acts in the body but is also affected by it through the sensations and passions. The soul is united to the whole body, but chiefly in the brain; strictly speaking it resides in the pineal gland of the brain. Mutual actions and reactions take place through mediating "spirits", vital and animal, which are not spirits properly speaking but very subtle bodies. (Descartes shuffles through a difficulty very lamely.)

Sensation is the operation of the mind alone. It is elicited when an excitement is produced in the organs of sense by external things and transmitted by the nerves to the private quarters of the soul. The diversity of feelings arises from the diversity of the stimuli.

The will is free; to it pertains the act of judging i. e. affirming or denying. (Descartes flounders with regard to the possibility of error.) All error is voluntary. The origin of error must be found in this, that the will is wider than the intellect so that it does not wait until the intellect is sufficiently illuminated. Descartes made a radical change in the notion of intelligibility and consequently in scientific explanation. He dethroned reason, which is discursive, because he confounded it with intellection. For him, to understand is to separate clearly, to be intelligible is to be capable of being reconstructed in mathematical terms. The Cartesian CLARITY of perceptions—the criterion of truth—is not the "fulgor

objecti" of the Scholastics, but it is manifest to us in notion. All ideas must be reduced to self-evident immediately-intuited principles, or be at once rejected.

We have given at length an outline of Descartes' Metaphysics, Cosmology, and Psychology, because it is to him primarily that Philosophy is indebted for her subsequent strange vagaries. "Thus the Cartesian reformation is not only at the source of the torrent of illusions and fables which self-styled "immediate clarities" have poured on us for two centuries and a half; it has a heavy weight of responsibility for the immense futility of the modern world and that strange condition in which we see humanity to-day, as powerful over matter, as informed and cunning to rule the physical universe, as it is weakened and lost in face of the intelligible realities of which the humility of a wisdom subject to Being once made it partaker. To fight against bodies it is equipped like a god; to fight against spirits it has lost all its weapons, and the pitiless laws of the metaphysical universe crush it in mockery."

Again, "The retreat of the human mind on itself, independence of the reason with respect to the sensible origin of our ideas, to the object as the rule of our science, to real natures as the immediate term of our intellection — absolute intellectualism, mathematicism, idealism — and, finally, irremediable breach between intelligence and Being — that, then, is how Descartes revealed Thought to itself." (J. Maritain: "Three Reformers".)

Maritain points out three great notes in the Cartesian theory of cognition: "INTUITIVE, as to its mode, INNATE, as to its origin, and INDEPENDENT OF THINGS, as to its nature"; and observes that Descartes' human mind usurped them from the Angels. His starting points are the principles: "My thought exists", "God exists"; from these all else follows. Indeed, there followed in fertile succession Spinoza's Pantheism, Leibniz's "Pre-esta-blished Harmony", Hobbes' Materialism, Locke's Empiricism and Hume's rejection of Cause, Kant's Transcendentalism, Hegel's Absolute Idealism, *et cetera*. What a progeny did not Descartes beget!

2. Leibniz (1646-1716)

LEIBNIZ rejected the Cartesian distinction between "EXTENDED SUBSTANCE" and "thinking substances", as quite arbitrary, as there could be no mutual action between them and the unity of the natural composite of body and soul, and indeed the order and harmony of the whole universe, was at stake from this distinction. Neither is the soul, he said, conscious of all that takes place within it, nor does everything that happens in bodies argue a passive extension. Extension, which can be considered the essential predicate of matter, demonstrates indeed—for Leibniz—a power which at once extends a body and resists other bodies. Hence the essence of every thing is "power"; and "substance" is a being endowed with the power of acting. Since this power is not visible in itself but only in its effects, matter itself, which falls by extension under the senses, is, in

respect to its essence, insensible, inextended and consisting of simple elements.

The simple elements of which all things consist, aptly called "monads", are metaphysical points, formal atoms, "substantial forms". (By the use of this term Leibniz says, and perhaps thinks, that he has restored the "substantial forms" of the ancients)

Each monad is an undivided unity, different essentially from the rest, sufficient unto itself for existence, endowed with the faculty of perceiving and desiring, but secluded in itself, unable to exert influence on or be influenced by the others, and hence knowing nothing but itself.

Inorganic bodies are made up of juxtaposed monads of the lowest order. In them perception is confused and unconscious. In living beings, besides monads of the inferior kind which constitute a body, there is a "monad-queen", or "entelechy", of a higher order of monads, called the "Soul". In man alone does soul reach perception clear and self-conscious; this is the "APPERCEPTION" which distinguishes spirit from body. There are also higher monads than the soul; the highest of them is God, pure act, i. e. pure activity, whose existence is demanded by the very idea of the infinite possible being. (Leibniz resuscitated in another from the Anselmian argument to show this.) Thus his monads or "substantial forms" are hierarchically ordered according to their essential perfection. However, as "Natura non facit

saltum", there is a perfect continuity from one species to another. Also Space is a "PLENUM" and this ensures contact between monads. (See "Monadology" n. 61. Everyman's Edition p. 14),

Mutual action between monads, and cognition by one of the others, are disposed of as mere appearances, which suppose a "pre-established harmony" by God. God so made finite monads that each, evolving itself according to its internal laws, may represent other monads within itself and adapt its operations to those of the rest. From this adaptation arises the wonderful order of the world. Not even the mind itself can act on the monads of the body, but when any impression is made on the monads of the body, as in "sensation", the mind perceives. When the mind desires, then there are corresponding movements in the organs : and all this takes place by virtue of the "pre-established harmony". Thus there is no perception of an external object, but preceptions SEEM to come from something external. The mind acquires its perceptions from the principles which are, as it were, pre-formed in it, just as in a block of marble there can be veins forming the image of Hercules. Hence to the principle — to which Locks attached great importance — "*Nihil est in intellectu quod non prius fuerit in sensu*", Leibniz would add "except the intellect itself."

Thus Leibniz abandoned altogether the causal theory of perception and of phenomena and substituted the "correspondence theory" in its place; appealing, of course, to the "harmony pre-established by God". In several,

places, however, e. g. in his Letter to Foucher, he asserts the objectivity of knowledge and appeals to the Principles of Causality and Sufficient Reason. He admits, however, that all things may be a dream; but that there is no reason to believe so.

In his long correspondence with Arnould, Leibniz defends the following thesis: "As the individual notion of each person includes once and for all everything that will ever happen to him, in it can be seen the *a priori* proofs, or reasons of the truth of every event, or why one thing has happened rather than another. But these truths, although they are assured, are none the less contingent, since they are based on the free choice of God and of created beings. It is true that there are always reasons for their choice, but these reasons incline without necessitating." He insists on the principle: NOTIO PREDICATI SEMPER INEST SUBJECTO IN PROPOSITIONE VERA. He says also: "THERE MUST ALWAYS BE SOME FOUNDATION OF THE CONNECTIONS OF THE TERMS OF A PROPOSITION, WHICH FOUNDATION MUST LIE IN THEIR NOTIONS." Leibniz, however, is an avowed REALIST. We are not concerned with Leibniz's thesis as such, which is connected with his Principle of the Choice of the Best and God's foreknowledge in his choice; but it is clear that he implicitly admits such a thing as CAUSAL IMPLICATION based on REAL RELATIONS, which in causal phenomena cannot be abstracted away from the natures of the things under consideration.

Leibniz draws a distinction between the association of facts and the knowledge of causes. (See: "Principles of Nature and Grace, Founded on Reason", n 5. Everyman's Edition p. 24). He also proves the existence of God from the Principle of Sufficient Reason, (Ibid. n. 8; also "Monad". nn 36-38 and in other places.) Leibniz arrives at his optimism — that this world is the best possible world — from the supreme perfection of God, and offers it as the only explanation of why things are as they are and not otherwise. He considers the Laws of Motion, which depend on the Principle of Fitness, or "choice of the best" and not on the Principle of Necessity, as affording another proof of the existence of God. (Ibid. n. 11) Leibniz finds it necessary to have recourse to FINAL CAUSES which are put in consonance with his Principle of Fitness. He claims to have reconciled two methods, one proceeding by final causes and the other by efficient causes. He rejects the Cartesian criterion of certitude, namely, clearness of ideas.

3. **Kant.** (1724-1804)

Kant's active life is generally distinguished into two periods; the FORMATION or PRE-CRITICAL period in which he prepared his system, and the CRITICAL period in which it was evolved. He was greatly influenced by Cartesian Subjectivism, Wolffian Dogmatism, English Idealism, and in particular, Humian Phenomenalism. Hume, he said, roused him from his dogmatic slumber. He sought for a solution to Hume's problem, which would avoid the Scepticism into which Hume fell, and he attempted a different line of approach.

The critical problem is: What relation exists between *that which appears to us* ("phenomenon") and *that which is* (the "res in se")? This problem is put by Kant in the form: How is it that on the one hand the certitude of SCIENCE both mathematical and physical, (as is shown by the progress of the sciences) is possible, and is absolute, universal, necessary, although all our knowledge seems to be derived from experience; whereas on the other hand, certitude in Metaphysics is impossible, as is clear from the contradictions and antinomies that abound in this subject? To find an answer Kant proposes to re-analyse human knowledge and find out its true nature.

Examining the judgements we make, he distinguishes them into ANALYTIC and SYNTHETIC, and the latter further into A PRIORI and A POSTERIORI. Analytic judgments are such as have the predicate included in the very notion of the subject, from the analysis of which the judgment follows. In Synthetic judgements this is not so. Synthetic judgements are A POSTERIORI when a new predicate is asserted of a subject, the predicate being based on experience alone, so that the truth of the proposition is neither UNIVERSAL NOR NECESSARY. There are, besides, SYNTHETIC A PRIORI JUDGEMENTS, which truly extend knowledge and proceed beyond experience, and which are properly speaking SCIENTIFIC. Such are universal mathematical judgements, the certitude of which Hume himself (though he mis-called them analytic — so Kant), did not dare deny.

Thus there is some scientific knowledge, in which another element besides experience comes in, which is prior to experience and arises from the mind alone; hence the term "a priori". Hence, PERHAPS, all principles on which science is founded, e. g. the Principle of Causality, result from this, that to experience is added an A PRIORI element which gives them their universality.

When Kant proposed this hypothesis, he had already formed a notion of an A PRIORI element in cognition both from the existence of symmetrical figures about a line or plane, which cannot be superposed one on the other within the plane or within space respectively, and which therefore require a FORMAL or MENTAL element for this; as well as from our sense-perceptions in Space and Time, which are not two intuitions, but rather conditions prerequisite for all sense-intuition, and which therefore are not properties of things but FORMS in the mind itself. In the "Critic" Kant generalizes and extends this thesis to all knowledge.

It is supposed that the object of our knowledge does not pre-exist cognition, but that it is CONSTRUCTED by the mind itself, no doubt under the action of things, but according to the laws of the mind. Thus the mind does not adapt itself to things, but it adapts things to itself forming "phenomena" and connecting them synthetically according to its own laws. In this way the problem, for Kant, is solved. To the question why Metaphysics, unlike Mathematics and Physics, is impossible, Kant replies that Mathematics and Physics are

possible because they deal with phenomena, which are made up and connected by the mind itself through a subsumption of sensible impressions under subjective forms of sensibility and intelligibility. In them the mind only sees what the mind has placed. On the other hand Metaphysics — i. e. the science of the world, soul and God — is impossible, because in it the mind attempts to transcend the order of phenomena, like a bird trying to fly above the atmosphere.

The Philosophical system obtained in this manner is rightly called **CRITICISM**, as it discerns in cognition what is contributed by things and what by the mind. It may also be called **TRANSCENDENTAL IDEALISM**, as it does not stop with sensible appearance, but rising above a purely sensualistic as well as a purely intellectualistic explanation, explains experience itself by that which precedes it and makes it up. In this system the only Metaphysic possible is a **CRITICAL INVESTIGATION** into the value and mode of our cognition.

Kant had to evolve his thesis by showing of what forms of the mind objects of our cognition can be made up, as well as to demonstrate it, or show that our cognition is indeed made up in this way. In the latter it is generally recognised that he made a very feeble attempt and that not very successfully, even according to his followers.

He distinguished three faculties of the mind which correspond to three sciences: **SENSIBILITY** to Mathematics, **INTELLECT** to Physics, **REASON** to Metaphysics.

I THE CRITIQUE OF SENSIBILITY, OR TRANSCENDENTAL AESTHETIC.

Whatever we perceive by the senses we perceive IN SPACE AND TIME. Space and time are not determinations of this but FORMS which our sensibility applies to impressions received from outside, or CONDITIONS of perception pre-requisite to all experience. Space is the form of external, time of internal sensibility. This is clear from the fact that while we can represent to ourselves that there is no body in a given space we cannot represent to ourselves that there is no space; also from the fact that we represent to ourselves only one space, of which particular spaces are parts, and that this one space is considered infinite whereas nothing infinite can be drawn from experience. Again, if space were not a form of the mind we should have no reason for the necessity of Geometrical principles.

II THE CRITIQUE OF THE INTELLECT, OR TRANSCENDENTAL ANALYTIC.

1. THE ANALYTIC OF CONCEPTS. The forms under which the intellect subsumes sensible intuitions to set them up as universal and necessary judgements are called CATEGORIES. These may be listed from the different kinds of judgements we make, as follows:

ACCORDING TO QUANTITY:

Judgements are universal, particular or singular. Hence we have the categories of Totality, Plurality, Unity.

ACCORDING TO QUALITY :

Judgements are affirmative, negative or indefinite (or limitative). Hence the categories of Reality, Negation Limitation.

ACCORDING TO RELATION :

Judgements are categorical, hypothetical or disjunctive. Hence the categories of Substantiality (and Inherence), Causality (and Dependence), Mutual Causality.

ACCORDING TO MODALITY :

Judgement are problematic (e. g. "Perhaps S is P"), assertive ("S is P") and apodeictic ("It is necessary that S is P") Hence the categories of Possibility (and Impossibility), Being (and Not-Being), Necessity (and Contingence).

The "metaphysical" deduction of the categories from the judgements shows that these concepts are "a priori", merely subjective. Kant then attempts a "transcendental" deduction by which he would show that things must fall under these categories, so that they would have objective value. This is the most difficult part of the Critic, and in it Kant is most obscure and intricate. It seems, however, that his "proof" is nothing more than a mere affirmation of that which is to be proved. He rejects the doctrine of "Pre-established Harmony" to account for the parallelism between concepts and things, as well as the doctrine that concepts are drawn from

things; and he concludes that no other course is left but to acknowledge that things accommodate themselves to concepts, so that we know things, not as they are in themselves but as they appear in phenomena, which the mind elaborates according to its forms. In other words that our cognition has an EMPIRICAL value, not a transcendental one, and its truth consists in the equalising of the mind not with the object but with the phenomenon, and thus with the LAWS OF THE MIND. The "Objectivity" of cognition consists in this, that, since the mental forms are the same among all men—if he attempted to substantiate this statement Kant would have fallen into greater difficulties—phenomena, which are the objects known by them, are formed in the same way.

2. THE ANALYTIC OF PRINCIPLES. The second part of the Transcendental Analytic is introduced by a psychological enquiry about the MODE by which the categories can be applied to sense-objects. The application is done by the IMAGINATION, which, using particularly the form of time, produces SCHEMES of categories, or GENERAL IMAGES, under which the sensible objects are classified before they fall under the fundamental categories. This is called by Kant "the Schematism of Pure Reason."

Then Kant sets forth the PRINCIPLES, certain universal A PRIORI judgements, which are based immediately under the categories, and are in Physics most prolific. From the categories of Quantity arises the AXIOM OF INTUITION: All phenomena are extended in space and

time. From those of Quality comes the ANTICIPATION OF PERCEPTION: "Phenomena are endowed with intension." The categories of Relation give rise to principles of greater importance, called "THE ANALOGIES OF EXPERIENCE": (i) from Substance: "In every change there remains an invariable substance"; (ii) from Cause; "Quidquid fit, ab alio fit" — Whatever is done, is done by some other being — (iii) from Mutual Action; "All substances act and react on one another."

From the categories of Modality there proceed the "POSTULATES OF EMPIRICAL COGNITION":

(i) from Possibility: "That only is possible which can be the object of experience".

(ii) from Reality: "That only can be called real which de facto is an object of experience".

(iii) from Necessity: "That is necessary, which necessarily coheres with the object of experience."

III THE CRITIQUE OF REASON, or TRANSCENDENTAL DIALECTIC.

This part is subdivided in two. In the first, Kant indicates what are the FORMS or ideas of pure reason, and what is their value; in the second he discusses ratiocinations which are based on these ideas, i. e. the chief theses of the "dogmatic" Metaphysics of the ancients.

(1) THE IDEAS OF PURE REASON: Reason, in the strict sense, is the faculty of reducing by ratiocination the judgements of the intellect to a few most universal principles. Hence judgements come under

three heads: the WORLD (the totality of phenomena), the HUMAN SOUL (the subject thinking), and GOD (the first cause). These ideas are, like the categories of the intellect, A PRIORI, not drawn from experience. But they do not enjoy objective value, as they are of objects which are not given nor can be given in experience: *a. v.* they are not phenomena but merely NOUMENA. (A NOUMENON for Kant, is that which can be THOUGHT OF, but not proved. Thus every "res in se" is a mere noumenon.) The legitimate use of these ideas is merely REGULATIVE and ORDINATIVE (*i. e.* for putting an order in our thoughts), although by an almost invincible tendency men proceed further and believe that real objects correspond to these ideas. Hence, Metaphysics, as conceived by the ancients, cannot be a science.

(2) THE DIALECTICAL RATIOCINATIONS OF PURE REASON. In this part Kant institutes a critique of Psychology and of cosmology and of rational dogmatic Theology, which, he contends, abound in paralogisms and antinomies (or questions in which the reasons for affirmation or negation are equally strong.) The apriority of space and time remove the antinomies about the infinity of the world in extension and duration and the infinite divisibility of matter; and the distinction between phenomena gets rid of the antinomies about free causality in the world and the existence of any necessary being. The arguments for the existence of God are reduced to three, the ontological, the cosmological, and the teleological (to which last is also reduced the

argument from conscience). He shows that the first is invalid and endeavours to reduce the other two to the first. The conclusion of the whole Critique of Pure Reason is this: NO SCIENCE CAN RISE ABOVE PHENOMENA, WHICH ARE ELABORATED BY THE MIND ITSELF ACCORDING TO ITS OWN FORMS. The ‘*res in se*’ certainly exists, for otherwise nothing would be subjected to the forms of the mind nor could there be any cognition; but what it is we can by no means apprehend;. This is, as Kant says, a kind of Idealism, but far different both from the dogmatic idealism of Berkeley, who denied bodies, as well as from the problematic idealism of Descartes, who taught that it is at least probable that bodies exist. Kant gives it the name of “Transcendental Idealism.”

We shall not go further to expound the results of the Critique of Practical Reason or the critique of the faculty of judging, or to give Kant’s teaching about religion and ethics. We have said enough to make clear his standpoint in connection with causation. The principle of Causality in the form: “Every event has a cause,” is given as an example of a Synthetic A Priori Judgement. Cause-effect is a mental category. Causality is a subjective necessity for connecting together two phenomena of which we perceive one following the other in *time*—another mental category.

We grant that there are synthetic judgements which are truly extensive of knowledge inasmuch as they are possessed of a necessity and a genuine universality; but

that the possibility of such judgements is due to the constitution of the mind, which applies its forms to reduce to order the chaotic data of the sensations, is "an inversion of the essential meaning of cognition." Kant's claim to objectivity is a weak one involving a contradiction. By what right can he affirm the necessary existence of the *thing in itself* which would offer matter for our cognition? By the Principle of Causality, for otherwise, says Kant, our mind would have nothing which could be subjected to his FORMS. But Causality, for him, is only one of the apriori forms which the mind applies to impressions. This is an illicit use of a mental form. Thus we are not even certain of the existence of things. This argument of Jacobi Kant tried to meet, but he did not have much success. It is no wonder that his immediate followers went on logically to absolute idealism or phenomenism.

Kant's qualificative "A PRIORI" refers to the *origin* of the note of universality and necessity in such synthetic judgements; and for this reason we reject the term. There is no reason to deny at once that the universality and the necessity may not arise from the objects themselves. A universal is in an object fundamentally, remotely and potentially—potentially indeed, as Kant himself illogically admits when he claims objectivity for his synthetic apriori judgements. The necessity is one of implication. Prof. D. J. B. HAWKINS in an enlightened chapter (CH. IV, "Causality and Implication") discusses the nature of propositions and examines Kant's Synthetic APRIORI Judgements. We shall content

ourselves with giving some extracts. He points out that "every relation has an attributive aspect," and that "every attribute has a relational aspect". "In general, the copula signifies both the presence of the relation of the subject to the predicate and the attribution to the subject of that relation." "Hence there is no absolute opposition between a subject-predicate and a relational proposition. Since a relation is an attribute of one and only one of its terms, it is as truly predicated of it as any other attribute. And since every attribute is predicated of its subject on account of the relation uniting them, there is a relational element in every proposition. Thinking is more than the mere concentration of attention on some particular aspect of the sense-object Thinking involves both the presentation of the sense-object in its unity and the holding apart of an element, or elements within it ... In other words the fundamental act of thinking is rightly described as abstraction. ... It follows that the simple objects of thought are as real as the objects of immediate experience, because they are in fact the same objects though differently presented. The contribution of the act of thinking to the constitution of its object is no more, and no less, than abstraction and its consequences.

"Now the very fact that an element in the object is isolated in thought enables it to be apprehended distinctly in its relations to the object as a whole or to other isolates. Hence if from one point of view, thought is abstraction, the formation of concepts, analysis, so from another and complementary point of view it is the

discovery of relations, the formation of propositions, synthesis. A proposition is true when its subject has in the unity of fact the relation articulately attributed to it in the predicate. This, in a sentence, is the correspondence between thinking and fact in which truth consists."

"An implicative proposition — continues Hawkins — is one in which a conjunctive relation is asserted of an isolate as such The kind of proposition with which we are concerned is one in which the isolate is liberated from any particular context; attention is no longer directed to what belongs to it on this or that occasion but to what belongs to it in itself. The immediate significance of such a proposition is entirely abstract and intensional; its extensional consequences are expressed in a genuine, as opposed to a merely enumerative, universal proposition. A predicate is always abstract in its own special way and so the predicate is clearly not a concrete thing but a character of a thing.

"A genuine universal proposition expresses the concrete consequences of an abstract truth.

"There is a conjunctive element in every proposition, for every proposition exhibits some sort of multiplicity in some sort of unity of relation, and every relation supposes that togetherness of terms which is conjunction. But in a singular proposition the conjunctive element does not come to the fore. A singular subject is, by reason of its singularity, embedded in its context and implicitly includes its relations, and consequently the

predicate is presented as found in it rather than as added to it. The abstract subject, on the other hand, is an isolation in its isolation, and so the proposition in which it figures pivots on the conjunction of it with its predicate. The conjunction, thus appearing in full relief, becomes an if-then relation, an implication. Therefore, any genuine abstract proposition is an implication. Whatever therefore is stated about an isolate as such has reference to implication.

“The problem of the apprehension of implication is then essentially the same as the problem of the discovery of abstract truths, and it is on these that genuine universal propositions depend. Consequently, the question with which we are concerned resolves into the familiar one of the validation of genuine universal propositions.....”

The absence of formal identity of subject and predicate in a synthetic proposition gave rise to the Kantian problem. “But this is a pseudo-problem. The absence of formal identity of subject and predicate in a proposition raises no special difficulty. A proposition exhibits a unity of relation, and whether the relation be to something within the subject or to something outside it does not affect the essential character and knowability of the proposition.....Kant simply fails to distinguish what sort of identity must belong to subject and predicate, and so faces himself gratuitously with an unanswerable question.

"In order then that a simple implication may be apprehended, all that is required is that its terms must be fully and distinctly apprehended. In an implicative proposition the subject of thought is an isolate as such, not in this or that particular context but in itself. In an analytic implication another isolate is abstracted from it, is found to be contained within it as a part of its analysis. In a synthetic implication it is considered in relation to another isolate outside itself and is found to be essentially conjoined with it. In either case, given the terms, the relation of conjunction belongs to them and is waiting to be noticed.

"An implication, therefore, is directly apprehended when an isolate is viewed in the relations which it has of itself, in abstraction from the peculiarities of the situation in which it actually occurs. But, in order that a conjunction may be apprehended, it is clear that both terms of the relation must be present....." It must be noted that a relation between two universals is itself a universal, and is thus apprehensible.

Mr. E. J. WATKIN has made a substantial contribution to philosophical thought by his book "The Philosophy of Form." He for one considers *contemplation* as the highest activity of man. He shows the futility of concentrating on experimental methods and statistical data, as the doctrine of Behaviourism would have us do, and he upholds the importance of introspection. Forms, he says, "are given as directly and self-evidently as the elementary and atomic sense-data through which they are mediated." (Chapter III) That "sense-percep-

tion is not exclusively sensible," and that "nothing can be in the senses unless form be at the same time in the mind", are statements of his with which we are in close agreement. The cut-and-dried distinction between sense-cognition and intellect-cognition only emphasizes the fundamental difficulty that we pointed out in the first chapter. Forms are directly apprehended from the objects themselves. If they were only Kantian categories, then we must accept Subjectivism. To make such an assumption, however, is gratuitous and perverts our very idea of cognition. Kant's original problem is wrongly put, and his solution is not so much in favour as it once was.

WHAT THEN DOES THE INTELLECT CONTRIBUTE TO KNOWLEDGE? It apprehends a whole variety of forms in the world and gives them an ideal accidental being in itself. Owing to a psychological need for permanence and stability even in its accidental nature, it analyses and synthesizes, coordinates and structures, these forms from their very consideration; not by imposing upon them a plan of its own — it has none to offer owing to its bewilderment — not by binding them together with a mortar of its own (the "Categories"); but by uniting them with the very mortar ("Relations") which it finds in them, and reconstructing the plan for itself from the objective bits of knowledge, like putting together a jig-saw puzzle. Just as the analysis by the mind is of objective concepts, so also should the synthesis

remain objective if the results are to have objective truth and value.

Note:—The examples of Mathematical "Superposition" of symmetrical figures which Kant adduced to illustrate his *a priori* element of cognition, only demonstrate our dependence on sense-experience for the elementary geometrical concepts. Symmetrical figures in space are not "superposable" within three dimensions; but they can be laminated (mentally) into two-dimensional slices of infinitesimal thickness and—"superposed" (mentally) as plane figures; just as plane-figures can be Split up into strips of infinitesimal width and "superposed" as straight lines in the plane; and one-dimensional lines can be divided into infinitesimal parts, which, as "points", can be superposed on other points of the "continuum". The mathematical ideas and processes are based on experience.

APPENDIX II.

World Pictures. (*Madras Univ. Journal. Vol. X. 1.*)

At times in the course of one's life, one is inclined to be more than usually meditative, and the lines of thought run into philosophical channels. Practical problems and topics fade, as it were, into the background ; one begins to probe more deeply into the meaning of life. Even the ordinary intellect, which in supreme moments dwells on the infinite, is "rocked in the cradle of the deep": the mystery of Being, the whence, the whither, the how and the why of existence. One mind dwells longer on these problems than another, one delves deeper into it than another ; and although in general men have not sufficient time, or training, or aptitude, or even the inclination, for continuous philosophical contemplation, yet everyone is influenced some time or another by a metaphysical mood, and the utterances of some famous scientist or learned man will somehow attract the attention. This is true even of the human race as a whole ; at some periods metaphysical speculation is more indulged in than at others ; and while at one time they are placed entirely in the back-ground still the same problems crop up again and again, to show the inherent importance attached to them and the interest they bear in themselves. Such periods generally occur when some being of extraordinary personal authority and esteem makes certain profound statements bearing on these questions, or when in the realm of physical phenomena some discovery has been made which would overthrow previous physical theories

in such a way that metaphysical conclusions supposed to have been intimately associated with them are also shaken.

It would seem that at the present day the reason for more than usual interest taken in metaphysical problems is the latter one mentioned above. However, we are not in want of utterances bearing on these questions by men whose fame and personal influence in the realm of science are carried over, as it were, and bring a great deal of weight to bear on these matters. We live in an age of vigorous mental activity, as shown not only by the wonderful inventions recorded in the last two generations, but also by the novel and revolutionary theories proposed.

The recent discoveries of science may be generally stated as those of Astronomy, of Physics, and of Biochemistry. Investigations into stellar constitution and distances, into molecular, atomic and sub-atomic structure, and electro-magnetic phenomena, and into elementary living structures have led to results which could not be satisfactorily explained by previously existing theories.

In some scattered articles of his the writer has considered number, space and time; and he has stressed the point that these are mere abstractions from the reality. He believes that it cannot be over emphasised. Moreover, all these concepts put together will not make up the reality. The reality exists apart and is the basis of our abstractions.

An abstraction, considered as the concept itself as distinguished from the act of the intellect, implies the direction of the attention to one particular aspect of a thing not considering the others or attending to them. The thing itself presents us with so many aspects of itself, that we are not capable of considering them all together, and we are constrained therefore by this limitation to consider each one separately even though in the thing itself they necessarily exist together and dependently on each other. The simplest concepts are evidently more common and universal. These are, for example, the concepts of being and unity. The proper and immediate objects of our intellect is the "thingness" of some physical object as abstracted from the individuating conditions, and this it must recognise only as existing in some particular object; but the intelligible species is not wholly representative of the particular object, i. e., there is no single concept fully expressive of an individual object. However, a particular thing can be distinguished by a connected group of concepts, which by its complexity would correspond to that thing without any ambiguity.

A "universal" is opposed to a "singular", which signifies something not shared by or applicable to more than a single entity. Hence a universal is a general term applied to anything which has reference to many. This it may have either by significance or by causation or by existence. A universal by significance or representation is one in which many are expressed as in one image; a universal cause is one which can attain several effects; a universal in existence is one which is apt to be

in many and which consequently can be predicated about many.

In the concept of a universal is involved a unity in itself and an aptitude to be in many. The unity is one not only in the name, but also in the entity which is signified by the name, and which must be in the thing, some how contained in it. A threefold aspect may be taken of this entity; according as it is in itself pure and simple, or according as it is in the individual thing, or according as its immaterial existence is in the intellect by abstraction. As it is in the singular thing it is individuated, and can be called universal only fundamentally, potentially and remotely, in-as-much as it is the basis for that concept which is in the mind and which formally receives universality by a further operation of the intellect. As the reality itself corresponding to the concept, the entity is properly speaking, neither universal nor singular; it is singularised by the individuating properties of the thing, and becomes universal by the operation of the intellect; it can therefore be called universal, fundamentally, potentially, and proximately, for this is what is abstracted by the intellect. It exists in the mind by *abstraction*, i.e., prescinding from individuals and individuating conditions. To this abstract universal is sometimes restricted the term "metaphysical universal"; and by a further operation of the mind it becomes the "logical" or "relative" universal. The metaphysical differs from the logical universal in-as-much as it signifies something abstracted from singulars *irrespective of its applicability to the many*; it is one abstracted from the

many. Whereas the logical universal has this applicability to many in consideration ; it is one applied to the many ; the abstraction and the application being of course both operations of the intellect. Again, whereas the metaphysical universal stops with this abstraction, the logical requires in addition a comparison, since the many are the *terminus ad quem* to which it refers, the relation consisting primarily in its predicability about the many. A logical universal exists as such, i.e., formally as a universal, *only* in the mind, but a metaphysical universal in the more general sense exists both in the thing as well as in the intellect; in the thing, as a constitutive entity which is the basis of the concept, existing, however, concretely and determinatively ; in the intellect, according to the manner in which it is known, i.e., abstractly and indeterminately. Hence Universals, whether logical or metaphysical, are neither pure names nor pure concepts.

The concepts abstracted from a thing are after all few as compared with the complexity of the sum-total of the "knowables" of the thing, and this is one reason for stating that the concepts, for example of space and time and quantity, all put together do not make up the reality. If, therefore, we enter into metaphysics with a meagre armament of these universals, and argue that the thing and our concepts are identical, or pessimistically assert that we cannot know things as they are in themselves outside the mind, or optimistically affirm that the latest theories tell us everything concerning the nature of things, we are just deceiving ourselves by misunder-

standing the relation and neglecting the distinction between the thing perceived and the perceiving mind. It is a great thing to be able to abstract, to extract, as it were, universals from individuals; in fact, it is the characteristic of the human intellect; the more abstractions we make, the more we progress in knowledge. To confound, however, the real thing with the abstraction or with a sum of abstractions is like identifying coffee with a taste. The product of the intellection is a complicated intelligible species. It is like a tangled skein of coloured wool in which it is difficult to follow the course of each strand; it is like a star cluster easily seen as a whole, but of which it is difficult to fix the gaze on a single scintillating point. It is vague because the elements are not singled out, like a forest seen at a distance. It is difficult to assimilate it and retain it to be a pre-intellection for later use, because it is complicated and its complication gives it a singularity of its own; and we fail to accept it as familiar, for it has little in common with other complicated intellections. We need to unravel the tangled skein and separate the strands, to lay side by side one of them with a strand of a like shade from another tangled skein. We need to see singly the trees, at least some of them, in a wood in order to recognise them as having been seen in another wood. To separate a single element from the complicated intellection is an "isolation" of it. To isolate concepts is facilitated by comparison and contrast. When we have two tangled skeins of threads of different colours and shades we can perhaps detect two threads of like shade one in each skein and draw them out. Contrast

would help us to single them out. Still more easy would it be if we compare a skin with threads already singled out and sorted. So it is with concepts. This, we venture to say, is the process we undergo from the moment we come forth into the world. There is intellection from infancy onwards, but isolation—the unravelling of the elements—is slow and laborious.

However, what we generally isolate is not a single *elementary concept*, i.e., one which cannot be split up into simpler ones. By comparison and contrast we are able to isolate simpler groups from the complexes intellected, and the breaking up of any such group into still simpler ones requires more comparison and contrast. This it is our continuous effort to achieve, right down to the elementary concepts which cannot be split up further: the supreme epistemological process of human thought, the very core of science and philosophy and theology.

To split up the apprehended complex is to “analyse”, and to set up the elements together again in their order and relation to similar elements in other complexes and in themselves is to “synthesise”. Man would have reached the final stage of mental progress when he has analysed all his concepts into their elementary ones, and recognised again the synthesised complexes. Each individual can contribute a share in the task, but that of any one can only be infinitesimal. It needed all the intellections of all men down through the ages up to the present time for the results so far attained—insignificant in comparison with the final goal. Progress, however,

becomes more and more rapid as time goes on, like the speed of a stone falling to the earth; for the work gets simpler as we proceed and deal with less and less complicated concepts. In Mathematics the epistemological process has been explicitly in progress for over a century, and with its definite acceptance in Physics and the other sciences we have witnessed some remarkable results in recent years. When we say that space is three-dimensional, all we mean is that we have isolated a three-dimensional concept from our complicated notion of it. We apply this concept again to obtain our deductions. That space and time cannot dissociated, according to the Theory of Relativity, would only imply that a more complex concept would correspond more accurately to the nature of things about us. When we reason from our universals and arrive at our conclusions, these conclusions will apply to the reality *in the same way and with the same limitations* as the universals do. Universals exist in the thing in one way and in the mind in another; and if this distinction be not borne in mind we shall inevitably be led on to Subjective Idealism.

We must note that isolations can be made from inexact observations. There is nothing that is perfectly smooth, but we can and do obtain the concept of smoothness; nothing perfectly straight, yet we have the concept of perfect straightness; nothing perfectly good or beautiful, but we do have concepts of goodness and beauty. When we attribute the concept to a thing, we do so with the consideration that it is *but one ingredient in the complexity of concepts corresponding to the thing*. For a

legitimate application the thing itself must, as a primary requisite, provide the basis for the attribution of the universal to it.

Concepts are called "transcendental" when they are applicable to all things whatever, e. g., the concepts of "being", and of "unity". The universals of Mathematics are isolations from such properties of things as would in their own way limit the *absolute* application of the concept to any one thing. Such concepts are in themselves absolute; they are incapable of comparison. We do not speak of more "straight"; "more of a number", "more continuous"; a pair of chickens is not more "two" than a pair of gloves. (N. B.—Each number is a concept in itself, so also the number-system, its compactness, its infinitude, etc.) Such concepts are not, however, "essential" concepts, for the reason that they do not express the essences of things. Essential concepts are not affected by individuating properties, and are attributed to a thing formally, wholly and in the same manner to the different members which are classed in the same *species*. A mathematical concept, on the other hand can be attributed to a thing in the manner that we choose to do so; but if a number be attributed to a thing it must be referred to it under a certain aspect; a thing cannot be one as well as two under the same aspect:

As examples of isolation made in the sciences we give the following: unity, plurality, integral numbers, the positive rationals, zero, the negative numbers, the continuum of reals, limiting values, continuity, infinity,

the complex numbers ; all algebraic operations and symbols, arithmetical and algebraical laws ; every extension in the meaning of an operation or symbol ; point, the straight line, the plane, co-ordinates, frames of reference, points of view, the space-time continuum ; the classical Laws of Mechanics, the Restricted Principle of Relativity, the General Principle of Relativity, the Quantum Theory, the Laws of Thermodynamics, the Particle Theory and the Wave Theory of matter ; the laws of heredity, life, the so-called laws of supply and demand in Economics, etc.

If we say that any one of these, or some, or even others not mentioned, express all that we know of Nature, our outlook of Nature would indeed be very narrow. Moreover, it would not be any wiser to identify these abstractions with the things themselves of Nature ; it would be like identifying a ten-rupee note with " goodness ", because it is good in a way. There is certainly a correspondence between a concept and the reality. " A thing does not act where it is not ", is an axiom which the Principle of Relativity as well as the Wave Theory has again incidentally reinstated if not implicitly assumed ; by this principle a thing must be in the knowing mind in some manner, and since it is not there in its physical being, it must be there in its intellectual species. The Universe as known to us by these concepts, generalisations, and laws, is in our mind in a way different from but corresponding to what it is in itself. There is little excuse for the following loose statements ; the universe is nothing but waves, the universe is only a soap-bubble,

(whatever that might be) ; the world-lines of observers are just strings in a lump of jelly. The universe, waves, soap-bubbles, world-lines, observers, strings, jelly, are all mere concepts in this kind of statement ; isolations from the most complicated concept of the Universe, intended to draw up before the imagination pictures of what cannot be imagined or visualised.

Somebody may ask ; if these laws and notions be mere concepts and not the things themselves, how is it that we are able to calculate so exactly, and measure and predict phenomena ? Would these operations also be mere illusions ? Firstly, let it be noted that concepts are not illusions. That we can and do arrive at conclusions which agree with observable phenomena is naturally rendered possible by the mutual correspondence between our ideas and reality or the physical world. The mental picture is a picture after all of the reality. A landscape portrayed on canvas with oil paints consists of canvas, chemical colouring matter, oil ; it is not the real ground, grass, trees, water, etc. ; but there is a real correspondence between the picture and the place represented. It is, however, a very meagre picture.

A " theory " or hypothesis, or postulate, or assumption,—whatever we might call it—is put forward primarily to explain phenomena not satisfactorily accounted for before, to suggest new lines of research, to predict phenomena verifiable by observations ; and more than this to co-ordinate disjointed and apparently unrelated

phenomena. If a theory does all this it has a "*raison d'être*" The theory itself must follow the classic adage "*entia non sunt multiplicanda sine necessitate*," by making as few assumptions as possible. An assumption is an isolate. It stands on an insecure basis if it is *supposed* to be an element in a complex notion *not yet analysed*. Conclusions derived from it are equally dubious. Caution is often cast to the winds by those who would rush hastily forward; and they who would obstinately and foolishly assert that their own pictures of the universe correspond *exactly* to the reality, are little to be respected.

The more closely our observations fit in with our theory, and the more accurately we can predict, the more we should be led to the conclusion that we are applying a more complex set of concepts, analysed and synthesised anew, to the reality then before. For example, in measuring the distance, between two points A and B, we can do so along a fixed path, or we may assume the surface on which the points lie to be plane or spherical, or spheroidal, each time with a more "accurate" result; we may assume the lengths to be unaltered by motion or by time, or to be altered in a particular way; we may disregard the existence of a gravitational field, or take it into consideration. These assumptions are, however, only isolations, one more complex than the other. The Particle Theory insisting on the coarse-grainedness of Nature, and the Wave Theory smoothening it down, are also isolations, each probably a partial truth.

When I isolate and get a universal, and later apply this concept again to the reality, the questions that arise are not only : is my isolation true ? Is the assumption that it is an element of another concept correct ? but also and rather : How much does the single concept fall short of the sum-total of knowables of the thing ? It may be remarked that modern theories are just complex sets of concepts put together with the object of being more conformable with the refined measurements now-a-days possible than were the less complex or vaguer systems of previous hypotheses.

It must be carefully noted what kinds of universals we deal with in the sciences. The mathematical concepts are universals in the logical sense only ; in the other sciences, a universal is sometimes considered in the metaphysical sense as it is in the intellect and sometimes in the logical sense. It is on this account that philosophical confusion often arises. In mathematics all definitions are nominal in the sense that names are given to concepts. A concept beginning as a universal in the early stages of the science is made more and more universal by the extension of the application of the name. The universality is not now the aptitude of being in and being predicated about many real entities, but of *being included in many less simple concepts*. In this way the applicability of a term, e. g., " number " is extended more and more with the needs of the subject by an operation of the intellect in order to unify and co-ordinate the subject. In no case is there any opposition to the older or less simple concept. The extended concept is really more isolated, being

in fact an isolation from isolations. In the physical and other experimental sciences (which should deal primarily with metaphysical universals) by the introduction of mathematical ideas and methods of treatment, universals have become to a great extent logical, and the extension of the application of terms tends to be made on purely logical considerations as in the case of Mathematics. It is for this reason that if "you ask the new physics to specify an electron for us, it does not give us a mathematical definition of an objective electron," (we assert that mathematics does not ever give *definitions of 'objective things'*) "but rather retorts with the question, 'How much do you know about the electron in question?' We state all we know, and then comes the surprising reply, 'That is the electron!'" (Sir James Jeans in his Presidential Address at Aberdeen before the British Assn., for the Advancement of Science, 5 September 1934.) In other words Physics at present also makes use of nominal definitions. The electron in the mind is an analysed and synthesised set of concepts, sufficiently characterising it and distinguishing it from all other complex sets.

To continue with the quotation: "The electron exists only in our minds—what exists beyond, and where, to put the idea of an electron into our minds we do not know. The new physics can provide us with wave-pictures depicting electrons about which we have varying amounts of knowledge, ranging from nothing at all to the maximum we can know with the blunt probes we have at our command, but the electron which exists apart from

our study of it is quite beyond its purview." This, however, is an agnostic attitude. The reality is indeed within our purview, and the only possible and natural purview of it consists of all the branches of human knowledge. Why deny the reality of that of which we have formed a mental picture. The picture, however, is only partial and incomplete.

The trouble arises from the fact that a mathematical concept obtained firstly from the nature of things is extended according to the needs of the subject by analysis and isolation in such a way that the physical significance, that is, the direct and immediate applicability to things, is lost sight of. It is an isolation from isolations, as we remarked above, and there is no visual picture corresponding to it; whereas an extension of a purely physical concept of a thing is a combining together of elementary concepts as a complex whole approximating more to the sum-total of the knowables of the thing, and therefore corresponding more closely to the reality. If the physical extension had been made on purely logical considerations, then there can be no visual picture corresponding to the extended meanings of terms. *The fundamental difference between the mathematical and the physical sciences consists in this: in the former progress is made from the most isolated concepts; the more isolated and elementary they are the further do mathematics develop, and the whole of mathematics is the synthesis attained.* Whereas the physical sciences can only proceed from synthesised sets of concepts, for a physical

object corresponds more with a set of concepts than with a single elementary one; and the greater is the correspondence, the greater the number of elementary concepts unified into the set. Mathematics are the auxiliary of physics for the treatment of the simplest isolates, but only so far and no further. They cannot replace Physics, for Mathematics cannot deal with such complex sets and with non-mathematical real relations between the elementary concepts in a set. Further, concepts are not merely mathematical and quantitative; but they are also qualitative and have non-quantitative real relations between them. There is a limit to a physical extension of a term. A physical concept is extended by including in it all simple concepts so as to correspond as closely as possible with a physical object, remaining nevertheless isolated from as many individuating concepts as possible and particularly from the concepts of space and time. By this isolation from space and time the physical concept suffers from a want of *further* correspondence with the reality. However, it cannot be otherwise. Different sciences may treat of the same physical object but each with a different point of view, i.e., each science having its own set of isolates—the analysed-synthesised concepts—for itself. It is obvious that it is only all such concepts put together that will take us as near to the truth as possible, i.e., give us the closest mental representation of the reality. Man, for example, is treated very differently in the different sciences which profess to deal with him; anatomy, physiology, biology, anthropology; economics, sociology, psychology, etc.

We have already remarked that modern theories are just complex sets of concepts put together with the object of being more conformable with the refined measurements nowadays possible than the less complex systems of previous hypotheses had been, and thus also more capable of co-ordinating phenomena previously considered as unrelated. Modern Physics explains phenomena on the basis of two main theories; the Wave Theory and the Particle Theory, as they are called. The ultimate constituents of matter are considered either as waves or as particles. These waves and particles, however, are mathematical isolations very far from the *whole* truth and corresponding to no picture that the imagination can conjure up. The question: does matter consist of waves or of particles in the ultimate analysis? has no meaning, unless we know exactly what we mean by the terms used. If the question be about matter as it is in itself, the answer is that there is in the things about us a reality forming the basis for the 'wave' concept as well as for the 'particle' concept. If the question bore regard to "matter" as it is in the mind, the answer would be that it is whatever we choose to consider it, waves or particles, according to the point of view. Closest to the truth would be the sort of answer given by the "New Physics" to our question about the electron.

Fundamental concepts are isolates from our intellection of things, and they are immediately applicable to things. A set of such concepts will apply to a much more limited number of things than will a single concept; moreover, it will certainly be nearer to the sum-total of

the knowables of the thing than would be a single concept, and lead, as we have already remarked, to more accurate results. An hypothesis is not only a set of concepts, but it is also an assumption regarding the *interdependence of the corresponding universals as they exist in the thing*. It is this assumption that is put to the test; like gold it must stand the fire of very many stringent demands made on the modern hypothesis. It is the string which keeps the pearls together. If it be put into mathematical form, it can soon be subjected to a searching scrutiny, and will either be rejected or accepted provisionally until a better string be made of the same pearls, or more pearls be added and held together by a new string. Modern discoveries have gone so far that, in the words of Sir James Jeans, "the theoretical physicist must admit that his own departments looks like nothing so much as a building which has been brought down in ruins by a succession of earthquake shocks."

"The truths (of Nature) can only be made comprehensible in the form of parables. Yet no parable can remain true throughout the whole range to the facts it is trying to explain. Somewhere or other it must be too wide or too narrow, so that 'the truth, the whole truth, and nothing but the truth' is not to be conveyed by parables. The fundamental mistake of the old fashioned physicist was that he failed to distinguish between the half-truths of parables and the literal truth." (Ibid.) Sir James means by a "parable" either a visualisable picture or a word which in its ordinary and every-day significance would correspond to a visualisable thing, but

which by mathematical extension has become a pure isolation which cannot be visualised. In the words quoted, however, he seems to take his own words "parable" in both senses. The mistake of trying to visualise a mathematical concept, or of inventing a parable and then treating the parable as if it were the visible entity, is as much the fault of the modern scientist who poses as a metaphysician before the common people as of his predecessor. To pretend to explain the investigations of modern science by simple pictures is an imposture. A baker knows more about a loaf of bread than he needs to learn or can learn from any sub-atomic physicist. He has a complex concept of it. Perhaps he has not abstracted the several elementary items in it; but he does not make the mistake of saying that half-a-dozen or more pure isolations put together make up that loaf of bread. If he has a concept of it he does not picture it as existing in the reality unless it be with individuating conditions as *this* loaf of bread. The Wave Theory presents us with a complex set of mathematical concepts which cannot be visualised or called a picture in this sense; the "waves" are strictly "mathematical" existing in four, six, and more "mathematical" dimensions.

To sum up; a mathematical concept is a logical universal; whereas a concept in the experimental sciences is a metaphysical universal as it exists in the mind, with the further consideration that it can only exist individuated in the thing, or with the formal consideration of it as only an elementary part of the sum-total of the knowables of a thing. Only the simplest isolates can be given

over to mathematical treatment and they must undergo firstly a change into logical universals. In the experimental sciences the aim is to make use of the universality in application and at the same time to obtain the common or most universal part of the sum totals of the knowables of all existing things; to pick out, as it were, the highest common factor of all our complex concepts. Making use of this figure of speech, we see that the more we factorise the terms the higher the common factor we should get, and it is only when we resolve the terms down to their prime factors that we can get to the highest common factor of them all. Further, any additional term may upset everything and reduce the common factor even down to unity, unless we employ our energies again to factorise the new term.

An *elementary* concept is one in which we have the maximum common applicable to all the entities considered. The greater the number of entities considered the *simpler* will be the isolate (or set of isolates) common to all. The science of physics, for example, provides us with the terms to be factorised and with the motive; mathematics helps us with the factorisation of the individual terms. Physics, using mathematical symbols and generalisations, picks out the common factor, and then applies it to the terms again, to verify its observations, to predict new phenomena, etc. The common factor is the physical hypothesis in mathematical form. One hypothesis takes the place of another when new terms are put up for consideration, or when the factorisation of terms is carried further than before. In this sense the older

hypothesis was not wrong: it would have been wrong (and so would the newer hypothesis be) if it were considered to correspond exactly to the whole thing, i. e., to express not only not more but also not less than the whole nature of the thing. If we should call the common factor of *all* things "matter", the Wave Theory or the Particle Theory would hold according to the terms selected for consideration.

That Space was treated separately and Time separately in the "old mechanics" was not an error. It was necessary to make these isolation—to pick out, as it were, the simpler factors of the universe—and refine their separate concepts before making intimate connection between them as in the mathematico-physical space-time continuum, or the more generalised mathematical concept of a multidimensional continuum. Such a concept is no more a reality than any other abstraction; it exists as a universal in the mind, but outside the mind only fundamentally or as the reality providing the basis for the concept. In the mind it can be crumpled and twisted and warped, but the reality must provide the basis for these mental contortions. Matter exists in our minds as an abstraction in the same way as the ether, Newtonian force, and other concepts which Sir James Jeans classes as "unobservables"; by which he means perhaps entities imperceptible to the senses, whereas we should call them isolations. The very "determinism" resulting from the classical mechanics was itself an isolation, but incomplete and correct only within certain limits. Heisenberg's concept of the electron specified by matrices is supposed to be

nearer to the truth than other less complex concepts. Let us take the word "truth" in the sense that it often seemsto have in the minds of writers as the sum-total of the knowables of a thing, understanding a "knowable" as a universal in the metaphysical sense. This sum-total is the closest correspondence to the reality that can possibly be attained by the natural human intellect. "The whole picture, and the manifold dimensions of space in which it is drawn, become pure mental constructs—diagrams and frameworks we make for ourselves to help us understand phenomena." (Ibid.) Not purely mental constructs, but constructs of the mind with such an insufficiency of material and so weakly bound together as to correspond only a little with the reality.

What we are concerned with is not only the idealism to which philosophical speculations have led some scientists, but also the inevitable pantheistic tendencies of this idealism. The wave-electron is conceived as occupying the whole of space, and the two theories are more or less reconciled by Sir James Jeans by his statements that where the wave theory makes its wave the most intense, there the particle theory also places its particle. Action at a distance is eliminated by the wave theory, which also satisfactorily accords with the coarse-grainedness of Nature as originally propounded by the Quantum Theory. Sir James Jeans deduces "determinism" from the wave-picture, and, by placing the indeterminism of the particle-picture *in our minds only*, concludes that there is a determinism in reality. (Previously in his book "The Mysterious Universe" he had favoured

indeterminism.) But are not the wave-picture and its determinism also isolations and therefore as such also only in the mind? Sir James goes on to consider "the perceiver and perceived as parts of a single system. In both pictures—he says—the mind fulfils the function of a receptacle, never as an emitter." And he takes a definite realistic stand when he says: "The determinism which appears in the new physics is one of waves, and so, in the ultimate resort, of knowledge. And even this knowledge is one only of probabilities and not of certainties; *it is at best a smeared picture of the clear-cut reality which we believe to lie beneath.* And just because of this, it is impossible to decide whether the determinism of the wave-picture originates in the underlying reality or not. Can our minds change what is happening in reality, or can they only make it look different to us by changing our angle of vision? We do not know, and I do not see how we can ever find out; my own opinion is that the problem of *free will* will continue to provide material for fruitless discussions until the end of eternity." In other words Sir James has discovered that his attempt to prove free will in his book "The Mysterious Universe" from the indeterminism he had previously favoured was a futile one. However, reasoning by analogy from the all-pervading electron of Heisenberg that the perceiving mind is of the same nature as the object perceived, he inevitably lands into the pantheistic phantasy that we may be but "ingredients of a continuous stream of life", and he obviously suggests that the intellect is all-prevading, and it is only the intensities of the intellect-waves that show themselves as individual intellects, which by abstract consideration in space and time would appear to have individual existences. This is his answer to the "funda-

mental difficulty which confronts every form of philosophical idealism. If the nature we study consists so largely of our own mental constructs, why do our many minds all construct one and the same nature?" Would it not appear that Sir James tells a parable and then himself "makes the fundamental mistake of failing to distinguish between the half-truth of a parable and the literal truth?" Again, if he were a thorough-going idealist he would be an "illusionist", and such a question would not be a real difficulty for him. It seems to us, however, that the answer to the question is to be found in the doctrine of universals as outlined above. Our minds all construct one and the same nature, because, firstly, one and the same nature is the basis of all the activities of our several intellects, and, secondly, because our intellects must all be modelled on the same plan. "To his own image and likeness He made man". It is not that we "believe" or *assume* a reality to underly our mental pictures. We "do experience" the reality, and the experience is by way of intellection.

The writer has had great difficulty in presenting his ideas, not only because he has had to marshal them in a new manner for himself, but also because he writes for the general reader who is supposed to be neither deeply versed in philosophy nor specialised in any of the sciences. He hopes, however, that he has set some minds thinking which are more capable than his own to enter into these discussions and to make abstruse discussions more intelligible to the ordinary reader. For all his deficiencies he craves indulgence.



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