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ESSAYS TOWARDS A THEORY OF KNOWLEDGE

[3]

Rosalind: I pray you, what is't o'clock?
Orlando: You should ask me, what time o' day;
there's no clock in the forest.
As You Like It, Act III. Sc. 2.

[4]

ESSAYS TOWARDS A THEORY OF KNOWLEDGE

[5]

ALEXANDER PHILIP

F.R.S.E



LONDON
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1915

ἡ γὰρ ἀχρώματός τε καὶ ἀσχημάτιστος καὶ ἀναφῆς οὐσία
οὕτως οὐσα ψυχῆς κυβερνήτη μονῶ θεατῆ δῶ, ρεπι ἦν τὸ τῆς
ἀληθοῦς ἐπιστήμης γένος, τοῦτον ἔχει τὸν τόπον.—PHÆDRUS.

[6]

PREFACE

[7]

Two years ago, in the preface to another essay, the present writer ventured to affirm that "Civilisation moves rather towards a chaos than towards a cosmos." But he could not foretell that the *descensus Averni* would be so alarmingly rapid.

When we find Science, which has done so much and promised so much for the happiness of mankind, devoting so large a proportion of its resources to the destruction of human life, we are prone to ask despairingly—Is this the end? If not; how are we to discover and assure for stricken Humanity the vision and the possession of a Better Land?

Not certainly by the ostentatious building of peace-palaces nor even by the actual accomplishment of successful war. Only by the discovery of true first principles of Thought and Action can Humanity be redeemed. Undeterred by the confused tumult of to-day we must still seek a true understanding of what knowledge is—what are its powers and what also are its limitations. Nor may we forget that other principle of life—with which it is so quaintly contrasted in Lord Bacon's translation of the Pauline aphorism—*Knowledge bloweth up, Charity buildeth up.*

[8]

January 1915.

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ESSAYS TOWARDS A THEORY OF KNOWLEDGE

I

TIME AND PERIODICITY

We can measure Time in one way only—by counting repeated motions. Apart from the operation of the physical Law of Periodicity we should have no natural measures of Time. If that statement be true it follows that apart from the operation of this law we could not attain to any knowledge of Time.^[11:1] Perhaps this latter proposition may not at first be readily granted. Few, probably, would hesitate to admit that in a condition in which our experience was a complete blank we should be unable to acquire any knowledge of Time; but it may not be quite so evident that in a condition in which experience consisted of a multifarious *but never repeated* succession of impressions the Knowledge of Time would be equally wanting.^[12:1] Yet so it is. The operation of the Law of Periodicity is necessary to the measurement of Time. It is by means, and only by means, of periodic pulsative movements that we ever do or can measure Time. Now, apart from some sort of measurement Time would be unknowable. A time which was neither long nor short would be meaningless. The idea of unquantified Time cannot be conceived or apprehended. Time to be known must be measured.

Periodicity, therefore, is essential to our Knowledge of Time. But Nature amply supplies us with this necessary instrument. The Law of Periodicity prevails widely throughout Nature. It absolutely dominates Life.

The centre of animal vitality is to be found in the beating heart and breathing lungs. Pulsation qualifies not merely the nutrient life but the musculo-motor activity as well. Eating, Walking,—all our most elementary movements are pulsatory. We wake and sleep, we grow weary and rest. We are born and we die, we are young and grow old. All animal life is determined by this Law.

Periodicity—generally at a longer interval of pulsation—equally affects the vegetal forms of life. The plant is sown, grows, flowers, and fades.

Periodicity is to us less obvious in the inanimate world of molecular changes; yet it is in operation even there. But it is more especially in the natural motions of those so-called material masses which constitute our physical environment that Periodicity most eminently prevails. Indeed it was by astronomers that the operation of this Law was first definitely recognised and recorded. Periodicity is the scientific name for the Harmony of the Spheres.

The two periodic motions which most essentially affect and concern us human beings are necessarily the two periodic motions of the globe which we inhabit—its rotation upon its axis which gives us the alternation of Day and Night, and its revolution round the Sun which gives us the year with its Seasons. To the former of these, animal life seems most directly related; to the latter, the life of the vegetal orders. It is evident that the forms of animal life on the globe are necessarily determined by the periodic law of the Earth's diurnal rotation. This accounts for the alternations of waking and sleeping, working and resting, and so forth. In like manner the more inert vitality of the vegetable kingdom is determined by the periodic law of the Earth's annual revolution. When fanciful speculators seek to imagine what kind of living beings might be encountered on the other planets of our system, they usually make calculations as to the force of gravity on the surface of these planets and conjure up from such data the possible size of the inhabitants, their relative strength and agility of movement, etc. So far so good. But the first question we should ask, before proceeding to our speculative synthesis, should rather be the length of the planet's diurnal rotation and annual revolution periods. Certain planets, such as Mars and Venus, have rotation periods not very different from those of our own Earth.^[14:1] Other things being equal, therefore, a certain similarity of animal life must be supposed possible on these planets. On the other hand, the marked difference in their revolution period would lead us to expect a very wide divergence between their lower forms of life, if any such there be, and our own terrestrial vegetation. The shorter the annual period the more would the vegetal approximate to the animal, and *vice versa*. It would, however, be foolish to waste more time over a speculation so remote.

But these two facts remain unshaken:—(1) That our measurements and whole science of Time depend absolutely on the operation throughout Nature of the Law of Periodicity, and (2) that the periodicities which affect and determine animal and vegetal life upon our Earth are the periodic movements of rotation and revolution of that Earth itself.

Now it is to the curvilinear motions of the heavenly bodies that we must ascribe our subjection to the periodic law. If these heavenly bodies moved for ever in straight lines, as they would do if unacted on by natural forces, the periodic rhythm of Nature would disappear.

It is to the fact that all Nature is under the constraint due to the constant silent operation of physical Force that we owe, therefore, the law which determines the most essential features of vitality. The pulsations in which life consists and by which it is sustained are attributable to the constraint and limitation which we recognise as the effect of the operation of Natural Force. It is to this same cause that we ascribe the resistance of cohering masses in virtue of which sensation arises and by which our experience is punctuated. It is by means of these obstructions to free activity that our experience is denoted, and by reference to these that it is cognised. Indeed, Activity itself as we know it depends upon and presupposes the existence of these cohering masses. [16]

Thus the operation of Natural Force and the constraint and limitation which are thereby imposed upon our activity appear at once to determine the conditions of life and to furnish the fundamental implements of Knowledge.

We cannot overleap the barriers by which Life is constrained. These, whilst, on the one hand they seem to *create the environment* which sustains Life, on the other hand seem to impose upon it the limitations under which it inevitably fails and dies. We cannot even in imagination conceive, either as reality or as fancy, the illimitable puissance of a Life perfectly free and unrestrained. Yet the assurance that Perfect Love could overcome the bonds of Materiality and Death encourages in mankind the Hope of an existence beyond the impenetrable veil of physical limitation. And this at any rate may be admitted, namely, that that dynamic condition in which materiality arises is also the condition-precendent of Tridimensionality, of Force, of Time, and of Mutation. But we cannot thus account for the *elan vital* itself.

FOOTNOTES:

- [11:1] Plato in the dialogue *Timæus* tells us that Time was born with the Heavens, and that Sun, Moon, and Planets were created in order that Time might be.
- [12:1] This might be contrasted with the statement of M. Bergson who tells us (*Evolution créatrice*, p. 11): "Plus nous approfondirons la nature du temps plus nous comprendrons que durée signifie invention, création de formes, élaboration continue de l'absolument nouveau."
- [14:1] Recently, we believe, astronomers have favoured the view that the day of Venus is equal in length to her year.

II

THE ORIGIN OF PHYSICAL CONCEPTS

"*Penser c'est sentir*," said Condillac. "It is evident," said Bishop Berkeley, "to one who takes a survey of the *objects* of Human Knowledge that they are either ideas actually imprinted on the senses or else such as are perceived by attending to the passions and operations of the Mind, or lastly ideas formed by help of memory and imagination either combining, dividing, or barely representing those originally perceived in the foresaid ways." J. S. Mill tells us, "The points, lines, circles, and squares which one has in his mind are, I apprehend, simply copies of points, lines, circles, and squares which he has known in his experience," and again, "The character of necessity ascribed to the truths of Mathematics and even, with some reservations to be hereafter made, the peculiar certainty attributed to them is an illusion." "In the case of the definitions of Geometry there exist no real things exactly conformable to the definitions." Again Taine, "*Les images sont les exactes reproductions de la sensation*." Again Diderot, "*Pour imaginer il faut colorer un fond et détacher de ce fait des points en leur supposant une couleur différente de celle du fond. Restituez à ces points la même couleur qu'au fond,—à l'instant ils se confondent avec lui et la figure disparaît*," etc. Again, Dr. Ernest Mach, Vienna, remarks, "We are aware of but one species of elements of Consciousness: sensations." "In our perceptions of Space we are dependent on sensations." Dr. Mach repeatedly refers to "space-sensations," and indeed affirms that all sensation is spatial in character. [18:1] [18]

According to the view of Knowledge of which we have extracted examples above, the ideas of the mind are originally furnished to it by sensation, from which therefore are derived, not necessarily all our Thoughts, but all the materials of Discourse, all that constitutes the essence of Knowledge.

Our purpose at the moment is to show that this view is altogether false, and our counter proposition is, that it is from our Activity that we derive our fundamental conceptions of the external world; that sensations only mark the interruptions in the dynamic Activity in which we as potent beings partake, and that they serve therefore to denote and distinguish our Experience, but do not constitute its essence. [19]

We do not propose now to devote any time to the work of showing that sensations from their very nature could never become the instruments of Knowledge. We propose rather to turn to the principal ideas of the external world which are the common equipment of the Mind in order to

ascertain whether in point of fact they are derived from Sensation.

Of course to some extent the answer depends on what we mean by Sensation. If by that term we intend our whole Experience of the external, then of course it necessarily follows—or, at least, we admit—that our Knowledge of the external must be thence derived. But such a use of the term is loose, misleading, and infrequent. The only safe course is to confine the term Sensation to the immediate data of the five senses—touch, sight, hearing, smell, and taste, with probably the addition of muscular and other internal feelings. It is in this sense that the word is usually employed, and has been employed by the Sensationalist School themselves.

Now we might perhaps begin by taking the idea of Time as a concept constantly employed in Discourse, but of which it would be absurd to suggest that it is supplied to us by Sensation. It might, however, be urged in reply that the idea of Time is not derived from the external world at all, but is furnished to us directly by the operations of the Mind, and that therefore its intellectual origin need not involve any exception to the general rule that the materials of our Knowledge of the world are furnished by Sensation alone. Without, therefore, entering upon any discussion of the interesting question as to what is the real nature of Time, we shall pass to the idea of Space. [20]

Mach, the writer whom we have already quoted, in his essay on *Space and Geometry* speaks constantly and freely of sensations of Space, and as there can be no denial of the fact that Space is a constituent of the external world, it would seem to follow that those who hold Sensation to be the only source of our Knowledge must be obliged to affirm the possibility of sensations of Space. Mach indeed claims to distinguish physiological Space, geometrical Space, visual Space, tactual Space as all different and yet apparently harmoniously blended in our Experience. He is, however, sadly wanting in clearness of statement. He never tells us when and where exactly we do have a sensation of Space. In truth he never gets behind the postulate of an all-enveloping tridimensional world; so that he throughout assumes Space as a datum, and his inquiry is an effort to rediscover Space where he has already placed it. [21]

Let us, however, consider for a moment what can be meant by a sensation of Space. Does it not look very like a contradiction in terms? Pure Space, if it means anything, means absolute material emptiness and vacuity. How, then, by any possibility can it give rise to a sensation? What sensory organ can it be conceived as affecting? How and in what way can it be felt?

The truth is the idea of Space is essentially negative. It represents absence of physical obstruction of every kind. No doubt, we may describe it positively as a possibility of free movement, and such a description is at once true and important. Yet even *it* involves a negative. The term "free" is in reality, though not in form, a negative term and means "unconstrained." And the reason why such a term is necessarily negative is to be found in the fact that a state of dynamic constraint is the essential condition under which we enter upon our organic existence. Freedom is a negation of the Actual. Absolute freedom is a condition only theoretically possible, and is essentially the negation of the state of restraint in which our life is maintained. [22]

But the definition last quoted is nevertheless valuable because it clearly shows what really is the origin of the idea of Space. It proves that the idea of Space is a representation of one condition of our Activity. It is because the primary work of Thought is to represent the forms of our dynamic Activity that we find the idea of Space so necessary and fundamental.

But it will perhaps be argued that our ordinary sensations carry with them a spatial meaning and implication, and that indirectly, therefore, our sensations *do* supply us with the idea of Space. It will readily be agreed that if this is so of any sensations it is pre-eminently true of the sensations of vision and touch. Indeed, it will perhaps not be disputed that the ordinary vident man derives from the sensations of vision his most common spatial conceptions. We propose, therefore, to inquire very briefly how the character of spatial extension becomes associated with the data of Vision.

The objects of Vision appear to be displayed before us in immense multitude, each distinct from its adjacent neighbour, yet all inter-related as parts of one single whole—the presentation thus constituting what is called Extensity. [23]

This is the most commonly employed meaning of the term spatial. Yet it is evidently in its origin rather temporal than spatial. In ordinary movement we encounter by touch various obstacles, but only a very few of these impress us at any one moment of time. On the contrary, they succeed one after the other. To the blind, therefore, as Platner long ago remarked: Time serves instead of Space. In Vision, on the other hand, a large number, which it would take a very long time to encounter in touch, are presented *simultaneously*. In this there is an immense practical advantage, the result being that we come habitually to direct our every action by reference to the data of Sight. Now it is because these data—so simultaneously presented—are employed by us as the guides of action that their presentation acquires the character which we denominate Extensity. The simultaneous occurrence of a large number of Sounds does not seem to us to present such a character. But let us suppose that all the objects which constitute obstacles to our Activity emitted Sounds by which they were recognised; it is not doubtful that these would then come to be employed by us as the guides of our Activity and would acquire in our minds the character of Extensity. They would arrange themselves in a cotemporaneous, extensive, or spatial relation to one another just as the objects of Vision do at present. [24]

It is only, therefore, when we come to employ the simultaneous presentation of Vision as the instrument of our Activity and the guide of Action that it acquires the character commonly called

extensive. *Successive* visual sensations convey no extensive suggestion.

It is important to realise the nature of this peculiar feature in the data of Vision. The sounds which we hear, the odours which we smell, are the immediate result of certain undulations affecting the appropriate organ of sensation. We refer these to the object in which the undulations originate. In like manner a light which we see is referred to its objective luminous source. But light also and in addition is reflected from, and thus reveals the presence of the whole body of our resistant environment. Hence is derived the coloured presentation of Vision to which the character of extensity attaches. Nothing similar takes place in the case of the other distantial sensations. If sonorous undulations excited vibration in every resistant object of the environment they would undoubtedly come to arrange themselves in an order resembling the extensity suggested by Vision, though the slower rate of transmission of sound would detract from the practical simultaneity in the effect which, as we have seen, largely accounts for the perception of visual extensity. The universal diffusion of sunlight is also a determining factor.

[25]

The matter becomes still clearer when we contrast the experience of vident men with what we have been able to learn of the experiences of the blind. Nowhere have we found this aspect of the question discussed with the same clearness and ability as by M. Pierre Villey in his recently published essay, *Le Monde des Aveugles*—Part III.

The blind man, as he remarks, requires representations in order to command his movements. We must then penetrate the mind of the blind and ascertain what are his representations. Are they, he asks, muscular images combined by temporal relations, or are they images of a spatial order? He replies without hesitation: Both, but, above all, spatial images. It is clear, he says, that the modalities of the action of the blind are explained by spatial representations. These must be derived from touch. What, then, can be the spatial representations which arise from touch? The blind, he says, are often asked, How do you figure to yourself such and such an object, a chair, a table, a triangle? M. Villey quotes Diderot as affirming that the blind cannot imagine. According to Diderot, images require colour, and colour being totally wanting to the blind the nature of their imagination was to him inconceivable. The common opinion, says M. Villey, is entirely with Diderot. It does not believe that the blind can have images of the objects around him. The photographic apparatus is wanting and the photograph cannot therefore be there.

[26]

Diderot was a sensationalist. For this school, as Villey remarks, *l'image est le décalque de la sensation*, and he refers not merely to Condillac the friend of Diderot but to his continuator Taine whose dictum we have already quoted.

Diderot attempts to solve the problem by maintaining that tactual sensations occupy an extended space which the blind in thought can add to or contract, and in this way equip himself with spatial conceptions.

There would, on this view, as M. Villey remarks, be a complete heterogeneity between the imagination of the blind and that of the vident. M. Villey denies this altogether. He affirms that the image of an object which the blind acquires by touch readily divests itself of the characters of tactual sensation and differs profoundly from these. He takes the example of a chair. The vident apprehends its various features simultaneously and at once; the blind, by successive tactual palpations. But he maintains that the evidence of the blind is unanimous on this point, that once formed in the mind the idea of the chair presents itself to him immediately as a whole,—the order in which its features were ascertained is not preserved, and does not require to be repeated. Indeed, the idea divests itself of the great bulk of the tactual details by which it was apprehended, whilst the muscular sensations which accompanied the act of palpation never seek to be joined with the idea. This divestiture of sensation proceeds to such an extent that there is nothing left beyond what M. Villey calls the pure form. The belief in the reality of the object he refers to its resistance. The origin of each of these is exertional. The features upon which the mind dwells, if it dwells upon them at all, are *les qualités qui sont constamment utiles pour la pratique*—in a word, the dynamic significance of the thing.

[27]

We may remark that much the same is true of the ideas of the vident. In ordinary Discourse we freely employ our ideas of external objects without ever attempting a detailed reproduction of the visual image. Such a reproduction would be both impracticable and unnecessary, and would involve such a sacrifice of time as to render Discourse altogether impossible. All that the Mind of the vident ordinarily grasps and utilises in his discursive employment of the idea of any physical thing is what we have ventured to call its dynamic significance. And the very careful analysis which M. Villey has made of the mental conceptions of the blind clearly shows that in their case he has reached exactly the same conclusion.

[28]

Our fundamental conceptions of the external world are therefore derived from and are built up out of the data of our exertional Activity combined with the interruptions which that Activity perpetually encounters, and in which sensations arise. It would indeed be a useful work of psychological analysis if the conditions of exertional action were carefully and systematically investigated—much more useful than most of the trifling experiments to which psychological laboratories are usually devoted.

The principal elements of such a scheme would be—

[29]

(1) The force of gravity. This force constantly operating constrains the organism to be in constant contact with the earth on which we live. But, further, it gives us the definite idea of *Direction*. It is from the action of gravity that we derive our distinction between Up and Down from which as a starting-point we build up our conception of tridimensional Space. And in this respect it must be remembered that as the areas of spheres are proportional to the squares of their radii it necessarily follows that gravity if it acts uniformly in tridimensional Space *must* vary in intensity in proportion to the square of the distance of the point of application from the centre of origin. Gravity and tridimensionality are in short necessarily connected.

(2) The same law which determines the force of gravity seems to determine also the force of cohesion, and therefore the form of material bodies. These, therefore, are necessarily subject also to tridimensionality, and in the force which generates solid form we find a second source of our elementary spatial ideas.

Such form is the expression of an obstacle to action which determines all our movements, and in which we discover those forms of the limitations of activity which we call spatial characters.

(3) Organic Dualism is a third determinant of activity, and thus also a source of spatial ideas.

The structural dualism of the human body, its right and left, its front and back, etc., furnish our activity with a set of constant forms to which its action must conform, and which necessarily also partake of, and help us to conceive of tridimensional form. It is interesting to note that this dualism characterises the organs specially adapted to serve exertional action rather than those which serve our vegetal or nutrient life. [30]

The way in which our spatial conceptions are ever extended and built up out of the data of action is also well illustrated in the case of the blind, and to this also M. Villey devotes an interesting chapter under the title *La conquête des représentations spatiales*.

This is effected in their case by the high development of what we must call active touch. Just as we distinguish between hearing and listening, between seeing and looking, so must we distinguish between touching and *palpation*.

Mere passive touch gives a certain amount of information, but comparatively little. It is necessary to *explore*; that is what is done in active touch—palpation—of different degrees.

The sensitiveness of the skin varies at different places from the tongue downwards. Palpation by the fingers marks a further stage. The blind also, we are told, largely employ the feet in walking as a source of locative data. [31]

To the concepts reached by such palpation with the hand, M. Villey gives the name of Manual Space. In this connection he thinks it necessary to distinguish between synthetic touch and analytic touch—the former resulting from the simultaneous application of different parts of the hand on the surface of a body, the latter that which we owe to the movements of our fingers when having only one point of contact with the object the fingers follow its contour. Various examples of the delicacy of the information thus obtainable are given. Following two straight lines with the thumb and index respectively, a blind man can acquire by practice a sensibility so complete as to enable him to detect the slightest divergence from parallelism.

The analysis passes on from the data of Space manual to those of Space brachial; then to the information derived from walking and other movements of the lower limbs, and then to the co-ordination of the information derived from the sensations of hearing, which is necessarily very important to the blind.

The conclusion of the whole matter is that our principal spatial ideas are common alike to the blind and the vident. Both can be taught and are taught the same geometry. Both understand one another in the description of spatial conditions. The common element cannot possibly be supplied either by the data of visual sensation which the blind do not possess, or by the data of passive tactual sensation which the vident hardly ever employ. *Une étendue commune se retrouverait à la fois dans les données de la vue et dans celles du toucher*. The common element is furnished by the common laws and forms of our exertional Activity by means of which and in terms of which we all construct our conceptions of the dynamic world of our environment. [32]

It is from our dynamic Activity also that we derive our conception of Force. Force, though it is studied scientifically in the measurement of the great natural forces which operate constantly, is originally known to us in the stress or pressure to which muscular exertion in contact with a material body gives rise. Such a force if it could be correctly measured, would record the rate at which Energy was undergoing transmutation, and it is from such experience of pressure that our idea of Force is originally derived.

The mass of bodies is usually measured by their weight, *i.e.* by gravity. Its absolute measurement must be in terms of momentum. The true estimate of the Energy of a body moving under the impulse of a constant Force is stated in the formula $1/2MV^2$. To ascertain M, therefore, we must have given F and V, and these are both conceptions the original idea of which is derived from our exertional activity. [33]

Quantity of Matter originally means the same as amount of resistance to initiation of motion, at

first estimated by the varying amount of personal muscular energy required to effect the motion in question, thereafter objectively and scientifically by comparison with some independent standard whereby a more exact estimation can be attained than was possible by a mere reference to the varying inferences of the individual who might exert the force.

Space, Mass, Force are all therefore ideas which are furnished to us out of our experience as potent actors, and the recognition of this great truth provides us with the means of clearly apprehending and co-relating our conceptions of the external world, the framework of our Knowledge.

The true distinction between a *percept* and a *concept* is just that a percept is a concept associated with the dynamic system discovered in and by our exertional activity.

In like manner we find here the true solution of the many questions which have been raised as to the distinction between general and abstract, singular and concrete terms. [34]

Language expresses action: the roots of language are expressions of the elementary acts which make up experience. They are therefore general. Each applies to every act of the class in question. They are also concrete. That is so because they refer to exertional activities. Abstract terms are terms abstracted from this dynamic reference. Thus *white* is concrete because colour is a property of the dynamic world. But when this property is considered apart from its dynamic support it is called *whiteness*, and becomes abstract. In the case of purely mental qualities the term is regarded as abstract simply because the quality is in every reference extra dynamic. Thus *candour*, *justice* are called abstract terms; they are properties of the Mind. But a property of the dynamic system, *e.g.* Gravitation, does not strike us as abstract—the sole distinction being the dynamic reference which the latter term implies.

It will even be seen that there is sometimes a shading off of abstract quality. Thus *Justice* as an attribute of the Mind strikes us as a purely abstract term. But as the word takes up a dynamic reference so does its abstraction diminish. Thus in the expression "Administration of Justice" the abstractive suggestion is less pronounced; till in the person of Justice Shallow it vanishes in the very concrete. [35]

Behind and beneath all these considerations we should never lose sight of the great main facts—that thought is an activity; that its function therefore is to represent or reproduce our pure exertional activity; that such representation is *at the basis* of all our concepts of externality; that sensation, *per se* is mere interruption of activity; that *per se* it possesses no spatial or extensive or external suggestiveness; that sensations nevertheless serve to denote or give feature and particularity to our experience of activity; that all perception of the external is at bottom therefore a mental representation of exertional activity and its forms, denoted, punctuated, identified by sensation, which latter by itself, we repeat, carries no suggestion of externality. This view revolutionises the whole psychology of Perception, and therefore, though it at once gives to that science a much-needed unity, clarity, and simplicity, it will naturally be accepted with reluctance by the laborious authors of the cumbrous theories still generally current.

FOOTNOTES:

- [18:1] His reason is that we *ab origine* localise sensations with reference to our organism. This, of course, means by reference to the system of potent energy in which our organism essentially consists.

III

THE TWO TYPICAL THEORIES OF KNOWLEDGE

The evolution of living organisms is in general a gradual and continuous process. But it is nevertheless true that it presents well-marked stages and can best be described by reference to these. Frequently, moreover, the meaning and true nature of the movement at one stage is only revealed after a subsequent stage has been reached.

The development of a brain or cerebrum marks one important advance. The presence of this organ renders possible to the animal in varying degree what are called representations of objects, and the faculty of making such representations appears to be a condition precedent to the development of deliberation, volition, and purposive action as opposed to reflex or instinctive activity. The latter is specially characteristic of other orders of organic existence such as the Articulata—being remarkably exemplified in the activities of the social insects such as the bee.

The advent of man with his faculty of Discourse may be regarded as marking another distinct stage in the evolutionary movement—a stage, moreover, the operations of which throw light upon the whole nature of cerebral representations. The faculty of rational Discourse, as Max Müller pointed out, is denominated in Greek by the word *λόγος*, applicable at once to the mental activity and to its appropriate expression in speech. Discourse is an instrument by means of which man [37]

has been enabled to construct his whole system of representations of the world in which he lives, the system of what is commonly called his Knowledge. Human Knowledge just is the body of man's representations of his Experience in the world of which he forms a part. It is not necessary to insist here on the gradual but remarkable growth and extension which Human Knowledge has undergone during the last two thousand years. Concurrently with its extension man's ability to control the forces of Nature has been enlarged and increased. At the same time, however, that extension has rendered possible false developments and aberrations to which the more limited representations of the brute are less liable.

With the faculty of rational Discourse constantly striving to extend the bounds of Knowledge, man came in time to attempt to give an account not only of the immediate objects which surround him, but of the whole choir of Heaven and furniture of Earth. In this advance the Greeks took a leading part. [38]

When we first make acquaintance through historical records with the intellectual activity of the Greek mind, we find it engaged in the construction of various such schemes for an explanation of the world—usually called cosmogonies.

It was at this stage of intellectual progress that what we might call an interruption occurred in the normal process of evolution. Great intellectual activity had for some time prevailed in the Greek communities; several men of conspicuous genius—notably Heracleitus and Parmenides—had carried speculation as to the origin and nature of the world to a height hitherto undreamt of. These achievements and the consciousness of continual progress had engendered in Athens particularly what might be called an epidemic of intellectual pride.

On this scene Socrates appeared, plain, blunt, critical. His teaching was in effect an appeal to men to reflect: to turn their attention away from the world which they were supposed to be explaining to the contemplation of their own Minds by which the explanation was furnished. γνώθι σεαυτόν was his motto. All explanations of the Universe or of Experience were, as he showed, vain unless the Cognitive Faculty by which they were constructed were operating truly. In particular, the process of Rational Discourse implied the use of concrete general terms, which were recognised to be the essential instruments of Cognition. Socrates therefore devoted his attention specially to a critical examination of these general terms and also of the abstract terms which were the familiar instruments of Discourse. [39]

The Greeks of that day were endowed with a singular clearness of intellectual vision. They readily recognised that Knowledge was an intellectual process; they appreciated the activity of Thought or Rational Discourse as essential to its formation. They quite understood that Knowledge is not of the nature of a photograph—a resemblant pictorial reproduction of the data furnished by sensation. Only very casually and occasionally do we ever attempt to supply ourselves with a resemblant reproduction of our sensations. Obviously such a reproduction would only be of value memorially and could tell us nothing new.

These early Greeks realised this, and they appear to have realised also pretty clearly that it would be impossible by means of such pictorial impressions to establish any community of Knowledge. It is of the essence of Knowledge that it is something which can be communicated to, and which is the common possession of, several individuals. That can never be true of sensation. We can never tell whether our sensations are the same as those of other people—never at any rate by means of sensations themselves; never unless and until such sensations have been inter-related by some other instrument. A mere photographic reproduction of sensation is thus quite useless as a means of Knowledge. [40]

In some way or other general terms supply the common bond. The recognition of this fact was one of the great results of the Socratic discussion. This explains the immense importance which Socrates naturally attached to the criticism of general and abstract terms.

The work of Socrates in this direction was immediately taken up and carried much further by Plato. Plato maintained that these general and abstract terms were in truth the names of ideas (εἶδη) with which the mind is naturally furnished, and further that these ideas corresponded to and typified the eternal forms of things—the essential constituents of the real world. Knowledge was possible because there were such eternal forms or ideal elements—the archetypes—of which the εἶδη were the counterparts and representations. [41]

Knowledge, Plato held, was concerned solely with these eternal forms, not with sensation at all. The sensible world was in a state of constant flux and could not be the object of true science. Its apprehension was effected by a faculty or capacity (*Republic*, v. 478-79) midway between Knowledge and nescience to which he applied the term δόξα, frequently translated *opinion*, but which in this connection would be much more accurately rendered, *sensible impression*, or even perception. At any rate, the term *opinion* is a very unhappy one, and does not convey the true meaning at all, for no voluntary intellectual act on the part of the subject was implied by the term. Now intelligence in constructing a scheme of Knowledge is active. The ideas are the instruments of this activity.

Plato's doctrine of ideas was probably designed or conceived by him as affording an explanation also of the community of Knowledge. He emphasised the fluent instability of the sensible

impression, and as we have already pointed out, sensation in itself labours also under this drawback that it contains and affords no common nexus whereby the conceptions or perceptions of one man can be compared or related with those of another. [42]

Indeed, if Experience were composed solely of sensations, each individual would be an isolated solipsistic unit—incapable of rational Discourse or communication with his fellow-men. To cure this defect, Plato offered the ideas—universal forms common to the intelligence of every rational being. Not only would they render possible a common Knowledge of Reality—the existence of such ideas would necessarily also give permanence, fixity, law, and order to our intellectual activity. Our Knowledge would not be a mere random succession of impressions, but a definitely determined organic unity.

In all this argument it must be remembered Plato never said or suggested that the intellect of man—thus equipped with ideal forms—was thereby enabled to become, or did become, the creator of the world by and in which each one believes himself to be surrounded and included. He always distinguished between Idea and Reality, between Thought and Thing. The ideas were types of the forms immanent in things themselves. It has been said by some scholars that he generally distinguished between the two by the employment of distinct terms, applying εἶδος to the mental conception and ἰδέα to the substantial form. This verbal distinction was accepted by many scholars of the epoch of Liddell and Scott and Davies and Vaughan. A reference to this distinction in the present writer's essay on *The Dynamic Foundation of Knowledge* provoked at the instance of one critic the allegation that it is not borne out by a critical study of the Platonic texts. That is a matter of little moment and one upon which the writer cannot claim to pronounce. The important point is that in one way or another Plato undoubtedly distinguished between and indeed contrasted the idea and the substantial form. No trace of the solipsism which results from their being confounded and which has ultimately brought to destruction the imposing edifice of Hegelian Thought is to be found in his writings. [43]

The Platonic doctrine of ideas speedily found an energetic critic in Aristotle. In Aristotle's view, it was quite unnecessary and unwarrantable to postulate the existence in the Mind of ideal forms or counterparts of the substantial forms of Reality. This, according to him, was a wholly unnecessary reduplication. He was content to believe that the mind found and recognised the essential forms of things when they were presented to it in perceptive Experience. *Universalia in re* were conceived by him as sufficiently explaining the genesis of cognition without the postulation of any such *universalia extra rem*. [44]

To the Platonic doctrine he offered the further objection that the eternal forms of things which that doctrine affirmed and which it declared to be represented in their ideal types were necessarily impotential. There was no generative power in the pure activity of Thought. If, therefore, the essentials of Reality were ideal, it followed that they also were impotent, and incapable of causative efficacy. The sensible world, however, was a fluent and perpetually generated stream, which required some potent cause to uphold it.

The eternal Reality which sustained the world was for him an Energy constantly generating the actual, and no conception which failed to provide for this process of causative generation of the things of Sense could in his view adequately account for the phenomena of Nature nor consequently could constitute the system of science.

In this argument Aristotle undoubtedly expressed a profound truth, but it may perhaps be admitted that he rather failed to appreciate fully the difficulty which the Platonic doctrine was designed to meet—that, namely, of providing some sort of common nexus or unifying principle by which the validity of Knowledge could be maintained. For he had no certain means of showing that the potent energy of Nature was unitary and homogeneous. [45]

He is frequently described as a sensationalist, but such a view is certainly incorrect. This, however, may be admitted—that he sought the essentials of Reality not in the Mind but in the Object. It may be fairly claimed that to this extent he occupied common ground with the sensationalists, in that he was an adherent of the *tabula rasa* view of the Mind, expressed in the maxim:—

Nihil est in intellectu quod non fuit in sensu.

Plato and Aristotle may be taken as typical of the two principal intellectual tendencies which have characterised all subsequent speculation—the Platonist, he who finds in the constitution of the Mind the eternal principles or at least the types of the eternal principles of Reality; the Aristotelian, he for whom these seem to reside in the object and, in the act of Cognition, are merely impressed upon, transferred to, presented to, or otherwise introduced into or apprehended by the Mind.

The Aristotelian view of Nature as an energetic process failed to impress itself upon his [46]

successors. Greek Philosophy soon after Aristotle's death decayed or was deprived of its early vigour, and the doctrine which survived the wreck was essentially derived, however imperfectly, from the Platonic theory.

Throughout the first fifteen hundred years of the Christian era this doctrine undoubtedly dominated the course of speculation—a speculation of which much is now forgotten and almost as much was certainly barren and unfruitful, but of which we would entertain a very mistaken notion if we were to imagine that it was not often pursued with great subtlety and acumen.

One natural result of the fact that such a principle dominated human thought was the prevalence of a belief that the explanation of Nature and natural processes could be derived from the cognitive faculty itself. Our cognition of our immediate surroundings was doubtless continuously corrected by immediate practical tests. But the science of a more extended view of Nature was vitiated by this false principle and in consequence for many centuries our whole Knowledge of Nature remained unprogressive and unfruitful.

Causa æquat effectum, Nature abhors a vacuum, are examples of the maxims derived or supposed to be derived from the necessities of our Reason, and by the aid of which it was vainly hoped to attain a knowledge of Nature and natural laws. [47]

The principle was in itself unsound.

The necessary laws of our rational faculty could discover to us only the essentials of that faculty itself.

The maxims by which it was sought to constitute *a priori* a scheme of natural laws could not justly claim descent from the necessities of Thought. Had the Schoolmen formed a true conception of the nature of Knowledge they would never have imagined that any necessity of Thought obliged them to believe that a 10 lb. weight would fall to the ground more rapidly than a 1 lb. weight. Equally true is it that their scientific principles had not been derived from any study of the action of natural law. They were unacknowledged intellectual orphans.

The movement associated with the names of Galileo, Bruno, Bacon, Kepler, and Newton owed its origin and its success to the abandonment of this vicious principle. So far as Nature was concerned, the Mind was regarded as a *tabula rasa*, and the physician set himself to ascertain the laws of nature not by reflection upon his own mental processes or requirements, but by experiment with and observation of natural processes themselves. The result has been the establishment of modern science—the greatest triumph which the human mind has yet achieved. [48]

In a criticism of the writer's essay on *The Dynamic Foundation of Knowledge* in the *Revue neo-scholastique* of Louvain, the critic wrote as follows: "Remarquons qu'il n'a pas compris la synthèse scolastique du moyen âge, elle qui cependant a concilié d'une façon admirable l'*actuel* et le *potentiel* dans l'explication de la nature des choses. Il s'est mépris aussi sur les caractères de la méthode scolastique de connaître la constitution intime du monde experimental; il croit cette méthode exclusivement deductive."

We have felt that candour demanded that we should quote the foregoing passage—coming as it does from a source exceptionally well qualified to express an opinion. If we have nevertheless allowed ourselves in the precedent paragraphs of this essay to express again the view which this critic seeks to qualify, but which we still think in the main sound, we are at the same time very glad to be able in this way to invite attention to the undoubted fact that the distinction between the actual and the potential was recognised by the schoolmen as of a very deep significance. We believe further that the real secret of the failure of mediævalism to extend its Knowledge of Nature was not so much a preference for deductive over inductive methods as the failure to realise that Nature was a dynamic operation. [49]

It is important, then, to understand accurately what is the method of Science.

The external world of our Experience seems to be composed of sensible impressions. The ever present visual panorama combined with the constant occurrence of other sensations suggests that Nature is, as has so often been asserted, simply another name for the sensible presentation. A truer view of Nature was adumbrated by Aristotle when he formulated the theory of an Energy ever generative of the sensible. If the founders of Science did not fully grasp the Aristotelian conception, it is at least certain that they looked upon Nature not merely as a sensible presentation but as a process—a dynamic operation. It was to the study of these operations, to the measurement of the natural forces or normal categories of physical action that Galileo and Newton devoted themselves. The true estimate of a moving force may indeed be said to have been their first great problem, just as the law of universal gravitation was their grandest generalisation.

It was to this sure instinct that the founders of Science owed their success. Had they devoted themselves to the mere study of sensations—of blue things and green things, of hard things and soft things, of loud things and silent things—Science as an efficient and co-ordinated system would never have come into being. [50]

Having struck the right path, they moved rapidly along it, leaving the Schoolmen and Philosophers behind them, suspicious, hostile, and amazed.

But Philosophy did not remain altogether negative. The new movement extended itself to Metaphysics, and under the leadership of Descartes a resolute effort was made to reform Philosophy on sympathetic lines.

It was in the true spirit of Socrates that Descartes advanced his famous method of Doubt. The whole fabric of beliefs and rational principles was to be subjected to a re-examination, and Descartes found himself on bedrock when he touched his famous *Cogito, ergo sum*. The simple fact or act of Doubt implied the Activity—the Reality therefore—of the Doubter. But the cogitant subject was reduced very much to the condition of a *tabula rasa*, and when Descartes proceeded to fill up the blank with a rediscovery on more scientific lines of the essentials of Cognition he found his basal feature in Extension. Tridimensional Space seemed the simple elementary framework of our Knowledge of Nature. [51]

The method of Descartes was further extended by the English philosopher Locke. Those qualities which formed the elements of Knowledge were described by him as the primary qualities of body; the sensible presentation comprised also the secondary qualities which seemed to be in some way superposed upon and contained within the former.

Our fundamental ideas of Nature were called by Locke sensible ideas. These ideas were derived from our sensible Experience, and it is only just to Locke to point out that, when examined in detail, his sensible ideas are seen to be not mere qualifications of sensation, but rather the elementary characters of Nature viewed as a dynamic process and discovered by our Activity. Yet the ambiguous term *sensible ideas* unfortunately led to their being regarded as ideas derived, not from our action in any form, but from pure sensation alone.

This extraordinary error was intensified in the speculation of Berkeley and Hume. Experience with them appeared to consist solely of a succession of sensations appearing to, impressing, or affecting a *tabula rasa* of consciousness.

Of course in such a state of affairs all Knowledge would be impossible. The scepticism which logically followed from such a doctrine was too universal to be capable even of the fiction that it was credible. Berkeley, it is true, endeavoured to save the situation by postulating the incessant and immediate intervention of the Deity as the sustainer of the sensible panorama. This purely arbitrary and fictitious expedient was entirely rejected by Hume, who with fearless honesty carried to its ultimate results the direct consequences of the doctrine and then complacently left human Knowledge to take care of itself. [52]

A masterly protest against the position of Hume was made by his countryman Reid, who in his *Inquiry into the Human Mind* very clearly pointed out the fundamental difference between the sensible accompaniments or constituents of our Experience and the real and independently existent substratum by which that Experience is sustained and organised. His argument, though it attracted considerable attention, did not, however, affect as deeply as might have been expected the future of philosophic speculation, probably because he offered no new clue or key whereby to detect the origin and account for the presence in our Experience of those enduring and substantial elements or forms by which it is sustained, but on the contrary left their recognition to what he rather vaguely described as common sense. [53]

Much more influential was the elaborate answer of Kant, which has profoundly affected the course of Metaphysics since its publication. Reverting in principle to the platonic method, Kant again sought the enduring elements, the fundamentals of Science, in the constitution of the cognitive faculty itself. But very differently from Plato he discovered these in the categories or essential forms of intellectual action,—the category of causality and dependence and the so-called forms of the transcendental æsthetic—Time and Space. Under these categories the indefinite data of sensation were thought to be organised into a cognisable system.

A rapid advance of speculation along the lines signalled by Kant took place after his work was published, and for many years this movement was regarded by a large part of the speculative world as the most hopeful and progressive of philosophic efforts, and by its own votaries as placing them in a position of superiority to all other schools of thought. The thoroughness of their studies and introspective methods to some extent justified, or at least excused the arrogance of their pretensions.

But it is to-day almost unnecessary even to criticise this Philosophy. [54]

From the first it was foredoomed to failure, and had no prospect of succeeding where Plato—equipped with armour from the same forge—had already failed.

Kantianism like Platonism failed because it still left the sensible unaccounted for. Not only did it fail to tell us whence came these sensations which, however transitory and unreal, constantly saluted our consciousness and largely constituted our Experience; it failed also to show us how they could be brought into relation with the faculty of Knowledge.

Finding its elemental forms in the structure of the organ of Knowledge, it failed to tell us how we ever managed by means of these to get beyond our own subjective states, or how we ever came to think that there was a World outside of the individual consciousness, by the categories of which, according to them, our cognitions of such a World were called into being. For if Reality were unknowable except by and through the categories, then our Knowledge of Reality was the creature of our own mental activity, and we must still remain unable to understand why we should suppose that we had got beyond ourselves.

These defects of Kantianism were early recognised by Schopenhauer, who also appears to have realised that what was wanted was another and a new key to unlock the gateway of Knowledge. [55]

Knowledge was in essence an affirmation or series of affirmations about a real World distinct from the Knower. It was surely now obvious that the warrant for such affirmations and the source of their validity must come from somewhere beyond the cognitive faculty itself. The source upon which men again and again have seemed to fall back is Sensation; but Sensation being transitory and dependent for its existence upon its being felt can really give us no help. Some other, some self-existent thing is wanted, and with considerable insight Schopenhauer suggested that the key was to be found in the Will.

But this theory, though it has lately attracted considerable attention, can hardly be claimed as offering any definite prospect of a solution. Its cardinal defect is that it still fails to show how the sensible arises. It is supposed to be generated out of pure Volition, but no causal nexus, no direct connection of any kind is immediately apparent between the two, and Schopenhauer in developing his theory did nothing to supply the want. The doctrine cannot therefore be regarded as more than a helpful stepping-stone to the true answer. [56]

In recent years various forms of opportunist philosophies under the names of Pragmatism, Pluralism, etc., have endeavoured to elude the pressure of the dilemma and to solace mankind for the failure of Kantianism by advising them to accept Experience as it is. But though such a counsel of resignation may in a popular sense of the term be regarded as philosophical it can hardly be accepted as a solution.

We find, then, that since man first began to inquire reflectively upon the nature of his cognitive faculty his speculation has followed one or other of two great lines or divisions of theory, neither of which has been found to afford intellectual satisfaction.

We have (1) the theory that seeks in some way or other to derive the real constituents of Science from the constitution of the cognitive faculty itself. To this theory, which has inspired one whole stream of speculation from Plato to Hegel, there are at least two absolutely fatal objections.

(a) It fails altogether to account for the sensible presentation which however fluent and unstable appears to stand in a direct and even unique relation to the real. It fails to let us understand how that relation arises, how the sensible is generated, or how it enters into our consciousness. [57]

(b) We are unable under this theory to discover how we ever reach a Knowledge of the real World, how we can get beyond ourselves, how if the Mind in its search for truth is perpetually intercepted by its own forms it can ever furnish us with any genuine cognitions of the external.

(2) We have the theory that the essential forms of Reality are to be found in the Object and are thence supplied to the Understanding, which plays the part merely of a receptive surface or *tabula rasa*.

In the hands of Aristotle this doctrine took the form of an affirmation that Nature must be regarded as an energetic process containing within itself the potency by which it perpetually generated the actual.

Promising as it was in Aristotle's hands, this speculation was not carried forward or assimilated by his immediate successors. Indeed, it was practically forgotten until the intellectual revival of the sixteenth century, which inaugurated the foundations of modern Science. However little the fact may have been consciously recognised even by the leaders of scientific discovery, this was the conception of Nature which inspired and sustained the scientific advance. In the department of philosophic speculation, however, it appeared only under the debased and misleading form of a belief that the sensible presentation was the true source of the contents of Cognition, that it was from Sensation that the Mind of Man derived the whole fabric of Science. "*Penser c'est sentir*" was the form in which it was expressed by Condillac, but was equally the view which commended itself to Berkeley, at least in his early writings, to Hume, and to a whole army of successors down to J. S. Mill. [58]

We hope we have already sufficiently emphasised the falsity of such a view. Obviously, if the Mind were merely the passive recipient of a stream of impressions, no sort of rational Discourse, no scientific or cognitive effort could ever have been stimulated into activity, and the very ideas of causality and relation, indeed all that we associate with the exercise of the understanding, could never have been called into being.

Upon neither of these views of the nature of Knowledge can we arrive at any consistent or intelligible conception of its genesis, nature, or method of operation.

What, then, must we do? It is hardly doubtful that if we are to make any progress we must find another and a new key whereby to unlock the double door that bars the entrance to the inner shrine of truth. [59]

Now *the* fundamental, or at least *a* fundamental error characteristic of all these various efforts after a solution is to be found in the fact that they view the World as a static thing rather than as a kinetic process.

The World to vision seems a great still thing in or on which no doubt innumerable bodies are moving to and fro, but which itself—the fundamental thing—is solid and unchanging. But this is an illusion. The seemingly unchanging features are changeless only in the monotony of their constant mutation.

Cohering masses are rigid in respect only of the constancy of the dynamic process of transmutation in which cohesion consists. The sun shines eternally steady only in consequence of the ceaseless kinetic energies which give it being.

What we are ever doing in rational Discourse, what Knowledge constantly accomplishes, is to furnish an account, a reproduction of a series of operations. The World is a process—an activity. That was recognised as long ago as the days of Heracleitus, but his disciples did not—although we think there is good ground for believing that he did [60:1]—his disciples did not realise that a process, whilst it implies constant flux and change, implies also something permanent even in its mutations, something which undergoes the change and sustains the flow. [60]

To understand a thing is to discover how it *operates*. The eternal forms of things are laws of natural action. Such are the law of gravitation, the laws of optics or of chemical combination. A static picture unless so interpreted must be at once valueless and meaningless.

It follows that Thought and Discourse, in furnishing us with Knowledge, must themselves be active, and must in some way or other reproduce the activity of Nature. Thought, in short, *is* an Activity which reproduces the activity of things, the activity in which the phenomena of Nature arise.

But how do we arrive at any apprehension of Natural Action? What informs us that Nature is a potency ever operative? What suggests to us the conception of potency at all? We reply that we arrive at the idea of potent action because we are ourselves active beings. Our organism maintains itself by constant physiological activities. These are the permanent constancies of transmutation which *constitute* the organism. [61]

But superimposed upon these there are our voluntary exertional activities. By these latter we necessarily mingle with and indeed participate in the action of the natural forces which (as we usually say) surround us, but which in point of fact do more than surround us. The disparate grouping of natural bodies in vision blinds us to the fact that we are really not merely surrounded by but are mingled with and participate in the dynamic system. [61:1] We are continually pressing with our weight upon the bodies on which we rest, we are continually exerting or resisting the pressure of so-called adhering masses—resistance-points in one dynamic system of which we are ourselves a part. Thus it is that in our exertional action we reveal to our consciousness not only the forms of our own activity but the forms of the dynamic system which contains and yet transcends the Sensible and the Ideal.

The theory we have suggested enables us to proceed at once to a rational explanation of Sensation. [62]

Sensation is *obstructed action*. A detailed consideration of as many as you like to take of the myriad constituents of our sensible Experience will continually and without exception confirm this simple fact.

In Nature it is the potent action which is real. It alone can be directly represented by the activity of Thought. The mere obstruction of activity is not a real thing, hence the unreal character of Sensation. Yet the obstruction being an obstruction of the real action of Nature is, if not real, at least actual and immediate. Nay, its presence in our Experience, however mutable and unstable it may be, is the only sure test and guarantee of Reality.

Each of the two leading theories which have dominated speculation presents one partial aspect of the truth.

The eternal cognisable element of Reality *is* apprehended, as the Platonist holds, by the intellect and by the intellect alone. To that extent the Platonist is right. That cognisable element is Action. But Action is denoted for us only in the obstructions which it encounters. These obstructions constitute our World of Sensible Experience, which is therefore for each of us the sure indicator [63]

of the Real. In recognising this fact the sensationalist is right in his turn.

Not only does the dynamic conception of Nature enable us to account for Sensation, but it lets us see how the Sensible World becomes a constituent of Experience. It is by and through its obstructions and these only that we featurise or denote our Experience. It is by the breaks, the turnings in the road that we cognise its course. It is by the line of rocks and breakers that we define the shore. But we must not mistake the turnings for the roadway nor the shore for the ocean.

It is in and by our activity that we discover this World of sensible obstructions. The features of the Sensible World correspond therefore to the laws of our exertional activity, but the correspondence is relational, not resemblant. Just so, it is by the reflection of Light that we discover the forms of the obstacle which solid bodies oppose to the radiant undulation. The resultant colours correspond to the form of these obstructions; but the correspondence is relational not resemblant. The same is true of sounds, of tactual sensations, of every other sensible obstacle to pure activity.

By the clouds of smoke we follow or used to follow the progress of the battle, but the battle is something other than a cloud of smoke. [64]

We are, as Plato told us in his famous allegory, like prisoners in a cave—our attitude averted from the aperture, and it is only by the shadows cast upon the cavern wall that we can interpret the events which are transacting themselves outside.

In one sense, therefore, the whole sensible and spatial World is real. At least it is actual; and it affords us the materials from which we construct our scheme of phenomena, and by which the kinetic process of Reality is denoted and conceived.

The question ever and anon occurs to us—How upon this view can we solve the problem of transcendence? How even on this view of the case do we manage to get beyond ourselves? How are we in any way helped thereto by the fact that Reality consists in potent action rather than in Sensation?

Again, the answer is significant. In action, that is, in exertional action, we are really *part* of a larger *whole*. Our exertional action is *ab initio* mingled in and forms really an integral part of the dynamic system in which our life is involved. The ever operative forces of Gravity, Cohesion, Chemical Affinity, and so forth are the phenomenal expression of the laws of energetic transmutation in which we partake and of which we are organically a part, however apparently separate and disparate our bodies may seem to be. It is life and feeling, not action, which really distinguish the individual from his environment, at least from his material dynamic environment. Be it noted that what is required is not an explanation of how we transcend Experience. That by no effort can we ever do in Knowledge. All we are required to explain is how we transcend our Thought and our Sensibility. The answer is: Our Experience begins in action, and it begins therefore in a sphere which is beyond the mere subjective Consciousness, and yet is *organically one* with the organs of Cognition and Feeling. [65]

It is only by a visual fiction that we come to regard our active selves as distinct from the dynamic system. We cannot, in fact, shake off the bonds of corporeality, of gravity, of all the various restraints of our organic activity.

Relatively, however, the cerebral activity of Thought is liberated from the stresses of the dynamic environment; hence the apparent freedom and independence, under certain conditions, of Thought, Imagination, and Volition.

A great difficulty in realising this view of Experience is to be found in the apparent Solidity and Inertia of material bodies. Sensible experiences group themselves round these *constancies*. But a material body, when its sensible concomitants are abstracted, is nothing more than a permanent process of energy transmutation the interruption of which in one form or another may originate Sensation. It follows that the world of spatially extended bodies is a homogeneous and consistent whole, reflecting in its laws and forms the real operations by which it is constituted and sustained. But all this actual World is nevertheless phenomenal only, albeit the phenomena are derived from and related to the Real as change is to the thing which changes. [66]

To a large extent we are misled by the impressive prominence of the visual data. In vision we are presented with a system of inter-related and simultaneously occurring sensations which we find by experience to be the sure and certain indicators of the potent obstructions which our activity encounters. For this reason we habitually make use of the visual sign as the guide and instrument of our exertional activity, and this habitual use leads us to regard the visual presentation as the essential form of Reality. However sure we are that that is a false view, it yet is very difficult to retrace our steps and re-enter the elemental darkness which involves the blind.

The philosophic value of the interpretation of Experience by the blind ought therefore to be very great. Observations made on the experiences of the blind and of those to whom vision has been restored are not very numerous, but many of these recorded by Plainer, the friend of Leibniz, and others are of the highest value, and remarkably confirm the view for which we have been contending. [67]

Undoubtedly, so far as we are aware, the most valuable contribution to this aspect of the discussion is to be found in a little volume recently published in Paris under the title *Le Monde des Aveugles*. The author, M. Pierre Villey, is himself blind. In the interests of Science he has cast aside the delicacy and reserve which have generally prevented the blind from analysing or at least from discussing the import of their experiences. He is also fortunately possessed of a philosophic and highly cultivated intellect, and has not failed to make himself acquainted with the general course of metaphysical speculation.

The present writer has been in correspondence with M. Villey, whose conclusions remarkably confirm the view for which this essay contends, and he finds that M. Villey recognises the truth of that view. Individual quotations would only detract from the cumulative effect of his argument, but we may refer in particular to the interesting discussion as to the relations between the space concepts of the blind and those of the vident. The blind can be taught, and are taught, geometry, and can discuss and understand spatial and geometrical problems. The sensible furniture by which the spatial conceptions of the blind are denoted obviously cannot be visual, and are no doubt largely tactual, whilst on the other hand the vident utilise the visual data to the almost total exclusion of any other. There must therefore be some common measure by means of which a community is established between the spatial conceptions of the blind and those of the vident. M. Villey concludes and clearly shows that the common medium is to be found in the fact that our spatial conceptions are fundamentally based upon and are expressive of the discoveries of our exertional activity. Touch, in short, is an ambiguous term and includes both passive sensations and those forms of Activity which we describe when we use the term "feel" as a transitive verb. Just as we distinguish between seeing and looking or between hearing and listening, so should we distinguish between touch passive and touch active or palpation.

[68]

The view of Science which we have endeavoured to explain has received a notable confirmation from the establishment during the latter part of the nineteenth century of the scientific doctrine of Energy.

[69]

The culmination of the scientific fabric of which Galileo and Newton laid the foundations was reached when it was demonstrated that the whole physical universe must be regarded as composed of Energy, either kinetic and actually undergoing transmutation from one form to another, or potential and quiescent yet containing within itself the quantifiable capacity of transformation. The objective correlatives of the different classes of sensible experiences are found to be different forms which this Energy assumes—the kinetic energy of a mass in motion, the radiant energy of Light, the energy of Heat, the potential energy of chemical separation, etc.—all these have now at length been shown to be forms of one real thing capable under appropriate conditions of being transmuted into each other and of which not only the inter-transmutability but the equivalent values can be calculated and have been found by experiment to be fixed and definite. Thus the mechanical equivalent of heat is a fixed and definite quantity. The Energy of a body in motion can be measured and stated in terms of mass and velocity.

[70]

The profound conception of Aristotle, under which Nature was regarded as a potent Energy containing within itself the capacity of generating the phenomenal World, has again been revived and realised—but with great additions. The theory in the hands of Science is now not only confirmed by incessant experiment, but the relation which it affirms between reality and phenomenon has been *quantified*.

Moreover, the actual operations under which the potential generates the actual have, so to say, been laid bare to view; and lastly, the inter-transmutability of all forms of Energy and its real unity have been established.

The doctrine has therefore received a confirmation of which Aristotle did not dream, and its explanation has at the same time received an illumination which his vague if profound adumbration could never afford. With this added support the true conception of human knowledge has received new strength. The theory is still, nevertheless, not to be grasped without a resolute effort of reflection. It involves an inversion of our everyday conceptions more radical than that which was demanded by the Copernican theory of astronomy, and we know that that theory—offered to and rejected by mankind before the beginning of the Christian era—had to wait through sixteen or seventeen hundred years before it secured an acceptance, at first grudging and even now not always adequate.

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The ordinary metaphysical student has hitherto rather resented the idea that in order to a true solution of the problem of Knowledge he must acquaint himself with the fundamental conceptions of physics. Yet so it is. It may perhaps be hoped that when the first strangeness of the new position has disappeared the conditions may be accepted with greater readiness. At any rate, a correct apprehension of our fundamental conceptions of the world of our external experience is indispensable. No theory can wholly dispense with such conceptions. It is therefore essential that, however elementary, they should be clear and not contradictory. Philosophy has always vaguely realised and exacted as much. The need is now imperative.

Some years ago, in an essay on Schopenhauer, the author, Mr. Saunders, remarked, "How the

matter of which my arm is composed and that state of consciousness which I call my Will [imagine anyone calling Will a state of consciousness!] are conjoined is a mystery beyond the reach of Science, and the man who can solve it is the man for whom the world is waiting."

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Well, if that be so, then the world need not wait any longer. The required explanation is offered to metaphysics by the scientific work of the physicians who built up and consolidated the modern doctrine of Energy. It is true that most of them have continued to postulate the reality of material bodies. For their purpose there was no real difficulty in doing so. What they required was a datum of configuration, a phenomenal basis upon which their calculations could proceed and in terms of which, as a point of origin, their statement of transmutations was made. The persistence of material bodies is a condition precedent to the phenomenal manifestations in which our Experience arises. Organic existence in every form and the world in which it arises presuppose the actuality of these. But dynamically they are merely the phenomenal result of certain permanent forces constantly in operation. To beings, if there be such, inhabiting the Ether there is little doubt but that a gravitation system like that of the sun and its planets must present a corporate rigidity and identity somewhat similar to that which cohering masses present to our intelligence. But, in terms of reality, Energy, potential and kinetic, containing within itself the potency which generates the actual and sustains the constant transmutation in which phenomena arise is the sole and only postulate.

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The rise of meta-geometrical methods and other branches of scientific speculation have led in recent years to a considerable amount of very interesting inquiry into the nature of our fundamental geometrical conceptions. Strange to say, a large body of respectable mathematicians have been found to favour the extraordinary view that our mathematical conceptions are derived from Sensation. We do not propose here to discuss at length this idea. It is merely another form of the old sensationalist view of Knowledge, but we suggest that the conditions of the problem will readily appear in their true light and real nature whenever such inquirers realise the fact that our exertional activity is the source of our cognitions of the external, and that therefore our pure exertional activity is the source of the basal concepts of geometry.

Here lies the root of the distinction between pure and empirical science. The propositions of geometry, being derived from our own pure activity, are of the former class; the inductive conclusions of physical experimental science, being gathered by observation and measurement from sensible data, are empirical and approximate. A geometrical proposition—such, for example, as the assertion that the three angles of a triangle are equal to two right angles—is not merely approximate. It has no dependence on measurement. It is absolutely true. It is ascertained deductively, and therefore measurement is not involved, and is never employed. Its truth is not ascertained by measurement. It is not verified by measurement. It in no degree depends upon the sensible figure. It is equally true for every human being whatever be the degree of accuracy of the figure by the aid of which he studies it, or indeed whether he studies it by figure or otherwise, as must necessarily be the case with the born blind.

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There may be many different forms of energetic transmutation which may determine many other forms of space besides that form of tridimensional space in which our Activity is involved. For such, a different geometry may and will be applicable; but for the tridimensional conditions of *our activity* the proposition is necessary and absolute. No measurement of any stellar parallax, however minute and whatever the result might be, could have any bearing on its truth. Geometry is the science of the pure forms of our motor activity amidst corporeal bodies.

A useful illustration of our argument is to be drawn from a consideration of the question of phonetic spelling. Occasionally we find persons urging that all spelling should be an exact reproduction of sound. Indeed, an improved alphabet has been designed to enable the idea to be carried out with greater accuracy.

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Now it is quite true that it is by their sound that we recognise or denote our words. Hence our alphabet was originally phonetic in principle, and indeed still is so, although the correspondence is imperfect. As the use of visible signs develops spelling seems to fall into certain fixed frames and to deviate more and more from pure phonetic simplicity. But why is this so? It is because the sounds are merely the symbols or indicators of the different forms of vocal articulation (vocal acts), and it is really as the symbols and indicators of these actions that they possess any meaning and acquire such permanence and identity as they have. The phonetic system, therefore, becomes in use subordinated to the expression of the acts by which are produced these radical vocables which constitute the essentials of rational Discourse.

In all this the process of the expression of words in spelling is a microcosmic counterpart of the process of cognition as we have tried to explain it.

It is noteworthy that the same thing necessarily happens in the case of any new system of spelling.

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The most prominent advocates of phonetic spelling have been also the authors of a system of phonetic shorthand.

Like the written and printed alphabet of Europe, the alphabet of Phonography was made phonetic. Indeed it started off as a more nearly perfect phonetic system than the ordinary European alphabet. But as its use advances its employment undergoes the same change. The phonetic symbols are abbreviated by grammalogues and contractions, and this proceeds in

accordance with a principle unconsciously recognised but which really depends on the same inherent necessity to preserve in a consistent form the expression of the radical vocables of Speech. Finally, in the hands of the expert stenographer the system of phonetic shorthand (though he still uses the sound as the guide and indicator of his actions) is as far removed from a pure phonetic representation as the ordinary method of spelling. Indeed, unless some such suprasensible and unifying principle were available, phonetic spelling would speedily perish in an infinity of degenerate variations.

We adduce this illustration as one which very well confirms our main argument. We have no desire to discuss on its merits the general question of Spelling Reform, which of course is quite apart from the attempt to establish a scheme of spelling on a purely phonetic basis. A more rational system of spelling is nevertheless an object worthy of all consideration.

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Intellectualism and sensationalism have both broken down. The world of speculation is anxiously looking for a new clue. Witness the pathetic eagerness with which it clutches at every floating straw. The innumerable "isms" by which it seeks ever and anon to keep itself afloat are most of them but the sometimes unrecognisable wreckage of the old systems drifting about under very inappropriate names. Such terms as Realism and Idealism are freely used (generally prefixing the adjective "new") by writers in philosophic periodicals in a sense which might make Plato, Aquinas, or Kant turn in their graves.

We see their votaries encumbered with the trappings of a futile erudition of the insignificant or clinging pathetically to the insecure relics of teleological doctrine, or, still less virile, seeking support in a return to the unscientific tales of supernatural spiritualism. Such efforts are vain.

Only by facing the facts with all their consequences, whatever these may be and whatever they may involve for the proudest aspirations of mankind—only thus can truth be attained. And lest any should say that we preach an unrelieved pessimism, let us remind such that Knowledge is not after all the source of Life, that another category and a different principle—that, namely, which we indicate under the term Love-divine—must have generated the potent current of Life, and that no one should close the door against the hopes of the human Intelligence until he has discovered what are the limits imposed upon what Perfect Love can do.

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The question still remains whether mankind will be equal to the effort required to assimilate the essential truth. They very nearly failed to assimilate the Copernican cosmogony. For sixteen hundred years after it was first offered to mankind the race preferred to grope in the darkness and confinement of a false conception.

If they succeed in accomplishing the reception of the new truth, unheard-of progress may be looked for. If they fail, civilisation must disappear and humanity decline. There is no middle course. As Bacon remarked, in this theatre of man's life it is reserved only to God and angels to be lookers-on.

We know how stubbornly the Ptolemaic cosmogony still clings to our conceptions, how largely it still dominates—or till recently did dominate—the religious cosmography of the most civilised peoples.

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In Philosophy our leading teachers seem as yet to have a very feeble appreciation of the new conditions. They turn greedily to the eloquent pages of *L'Evolution créatrice*, but however earnestly they search they cannot find there any definite solution of the difficulties of the age-old problem. They wander wearily through the mazes of psychological detail or wage almost childish logomachies over the interpretation of each other's essays. Philosophical magazines are filled with articles which reflect this state of the philosophic mind. Philosophical congresses meet and argue and go home; Gifford lecturers prelect; yet so far as can be seen there is little sign that the key has been grasped. The great fact remains obscured amidst a mass of words.

The elucidation of the problem of Knowledge demands certain improvements in our philosophic terminology. Language as a rule is a very unerring philosopher, and words shaped and polished by long usage generally express, more truly than those who use them realise, the essential reality of things. Yet these long-enduring errors of the ages which we have been discussing here have left their impress too on the terminology of Metaphysics.

Thought and Action are in common speech contrasted, and the distinction expresses an essential truth. But when we seek to say further that both of these are Activities, we are stating another truth in terms which are hardly consistent with the previously contrasted distinction. It might be better if Action and Active could be applied generally to both and if the term *exertion* could be substituted for Action in describing the forms of activity which we denominate *motor*. To that suggestion, however, there are also serious objections. The words derived from *ago* have historically a special application to the exertional and dynamic. We leave the question to our readers as one of which it is of considerable importance to find a satisfactory solution.

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In the foregoing pages our object has been to illustrate the erroneous conceptions by which the theory of human cognition has been obscured and to explain briefly what we conceive to be the true solution. The argument in support of the doctrine here explained has been more fully presented by the present writer in an essay entitled *The Dynamic Foundation of Knowledge*, to which the reader who desires to study the question further must now be referred.

FOOTNOTES:

- [60:1] Κόσμον τόνδε τὸν αὐτὸν ἀπάντων οὔτε τις Θεῶν οὔτε ἀνθρώπων ἐποίησε, ἀλλ' ἦν αἰεὶ καὶ ἔστι καὶ ἔσται πῦρ ἀείζωνον ἀπτόμενον μέτρα καὶ ἀποσβεννύμενον μέτρα. Quoted by Clement of Alexandria, etc. (*The First Philosophers of Greece*, by A. Fairbanks, p. 28.)
- [61:1] "La subdivision de la matière en corps isolés est relative à notre perception" (*Evolution créatrice*, p. 13).
- [69:1] For a clear brief summary of the theory the reader may be referred to a little work by Sir William Ramsay, F.R.S., entitled *Elements and Electrons*, pp. 8-15.

IV

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THE DOCTRINE OF ENERGY^[81:1]

The problem of Metaphysics—the nature of Reality—still presses for a solution. Agnosticism is but a cautious idealism—a timid phenomenalism. That philosophy, however named, which proclaims that the experience of life is nothing more than a vain show, a pantomime of sensations distinguished only from ideas by their greater intensity and distinctness, is not only a confession of failure. It is a denial of fact.

To know the nature of the Absolute as such, to present the Absolute to finite minds as it must be presented, if that be possible, to the Absolute itself, must ever remain impossible to man. But it is equally true that to attempt such a task has never been the urgent mission of Philosophy. The distinction between the Ideal and the Real, between the conceptual and the perceptual, is quite certainly and incessantly recognised. Agnosticism can neither deny the fact successfully, nor solve the speculative difficulties which its recognition raises up. The Real and the Ideal, essentially distinct yet mockingly similar, for ever blend and intermingle in the composite experience of life. Truly to discriminate and unravel these,—validly to separate the Ideal element which impregnates that Reality which we are for ever compelled to postulate and recognise, still remains the great problem of Philosophy—humbler perhaps and more practical, but not less profound than any vain attempt to discover to finite conception the Absolute as it is in itself. Therefore it is that the efforts of negative and agnostic criticism to dispense with the recognition of Reality as a necessary postulate of our activity are foredoomed to failure. They leave us not a solitude which we might pretend to be peace, but a seething sea of troubles urgently demanding a new attempt to reveal the unity which must underlie the infinite diversity of experience.

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Such, indeed, seems to us the present position of Metaphysics; and, what is more important, it appears to react with increasing force upon the theories and investigations of Science.

The problem of Reality is thus at present not without a special and increasing interest for the students of Physical Science. Until lately they have been taught and have always maintained that Matter is the direct object of sense-perception. No doubt it is long since Philosophy has urged that our conceptions of the external world are a mentally constructed system. But this doctrine has made but little impression upon the students of Natural Science. The objective origin of our sensations and the apparently objective reality also of the intelligible qualities and operative laws of the external world are too strongly impressed upon their minds. Idealism and Transcendentalism have carried no conviction to them. Still, the difficulties of common sense have continued to grow. Recent developments of scientific theory have increased the urgency of the problem, but they seem to us also to suggest a solution the beneficial results of which affect the whole of Metaphysics.

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We refer to the doctrine of Energy, which occupies now as great a place in the physical sciences as the doctrine of Evolution does in the zoological sciences.

Natural philosophers have for some time taught that there are two Real Things in the physical universe—Matter and Energy. It seems a very striking theory. Has it received the attention it deserves from the student of Metaphysics? We are convinced that it has not: and the reason he most frequently gives for this neglect is that, being a purely scientific doctrine, it does not come within his sphere. Science, we are told, deals with the phenomenal world internally considered; Philosophy with the relations of the phenomenal world to Reality, and with the nature of the transcendental elements in our Knowledge.

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This may be generally true. Nevertheless, Philosophy and Science have surely concepts in common. They both refer to the same thing when they speak of Space; we presume also when they speak of Matter. Indeed, Philosophy analyses the conceptions involved not only in scientific reasoning, but in the most common and ordinary mental processes. It analyses them with special reference to the relations between the Phenomenal and the Real—a question which, though it always lies latent, does not in ordinary circumstances arise in urgent form. It is therefore evident that the fundamental conceptions of Science *do* fall within the purview of Philosophy.

The study of Physics *can* be carried on practically as a study of phenomena—of Heat, Colours,

Sounds, Forces, etc., all of which are kinds of phenomena—without the expression of any dogmatic and formulated opinion as to their relation with Reality. Physics can speak of mass and weight and avoid all reference to Matter; but there always is, in scientific reasoning, an implicit reference to Reality, and it facilitates, therefore, the expression of scientific reasoning, when the account of a physical process is stated with reference to a supposed reality, such as Matter. And in making such reference Science *is* thinking of the thing-in-itself. It *is* a reference beyond phenomena.

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Heat, Light, Sound, Force, are names of classes of phenomena, and the great discovery of Physics during the nineteenth century has been that these are all transformable into each other, and bear definite numerical relations to each other in proportion to which such transformations take place. Science availing itself of this discovery, unifies its conception of Nature and gives expression to the doctrine of the inter-transmutability of the various classes of physical phenomena by postulating an entity called Energy, and regarding the various classes of phenomena as transmutations which this entity undergoes. But Science has been reluctant to recognise that it is now entitled to dispense with the postulation of Matter. The theory, as announced by the leading men of science, has therefore been to the effect that there exist in the physical universe *two* real things—Matter and Energy—in place of one only, as commonly supposed for so long.

Now we maintain, on the contrary, that such a statement of physical theory is erroneous and redundant; that Science is not obliged to postulate *two* such entities; that the concept of Energy supplies all her requirements; and that the employment of that conception obviates the very serious contradictions which are involved in any assumption of a real entity of the nature of Matter as ordinarily understood—a conception of which the very description involves difficulties which have perplexed thinking men for more than two centuries.

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Our argument on this point involves consideration of the place occupied by Energy in a potential form.

Whilst the transformability of Heat, Light, Sound, and other physical phenomena in definite numerical ratios has led to their being all regarded as actual manifestations of transmutations proceeding in one real thing, occasionally there is a seeming break in the catena; no phenomenon can be detected into which the heat or light or other immediately preceding manifestation has been transformed; but, later on, the co-relative reappears, and by an argument as strong as that which asserts the continuous identity of an intelligence before, during, and after a temporary suspension of consciousness, the student of Physics maintains the continued existence *in posse*, if not *in esse*, of the Energy which by appropriate action he can again reveal in an active or kinetic manifestation. Hence arises the conception of potential Energy. The Energy to which we attribute the force of cohesion which any particular body can on occasion manifest, we believe to exist potentially whilst that body continues unacted upon. Our belief is confirmed by our experience of the certainty with which, on the recurrence of the given conditions, the force always again manifests itself. In like manner the potential Energy to which we attribute the Force of Gravitation we believe to exist at all times, even when not kinetically active. Indeed, it only manifests itself when a transmutation is taking place into some other form of Energy. Now it is the universal association of these two forms of potential Energy with the common and fundamental data of our sense-experience that has suggested the construction in our minds of the conception of Matter, and furnished us with the ideas of solidity, impenetrability, and weight which constitute its groundwork.

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Our view, therefore, is that the concept of materiality can, in the way just indicated, be in all cases analysed into, and derived from, the conception of Energy; and that Science, if consistent, cannot postulate the reality of Matter as well. Potential Energy adequately supplies the demand for a real substratum of which phenomena are the manifestation.

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The whole question is very well worth the attention, not only of scientific students but of metaphysicians. The inquiry will distinctly gain if it receive the auxiliary attention of those who have studied the process by which we form our mental conceptions, and whilst the students of Physics deserve the honours of discovery, they cannot safely dispense with such assistance, for which the present confused and inconsistent state of the fundamental definitions of Physical Science most urgently calls. There is here a neglected but very interesting field for the metaphysician's efforts.

Recent scientific writings contain enough to show us that men of science are already beginning to recognise not only the inconsistency of the theory of two real things, but the dominating significance of the conception of Energy, and are gradually coming to claim for the conception of Matter little more than recognition as the vehicle of energetic transmutation. Let us then for the moment accept the position that Science—ridding itself of redundant theory—postulates Energy as the real thing-in-itself, in terms of which it frames its statement of physical phenomena, and let us examine briefly the effects which the acceptance of this new postulate is likely to have on philosophic speculation.

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All my Presentment, all the content of my sense-experience, according to this theory, I attribute to a multifarious continuous series of transmutations constantly proceeding in some portion of the system of Energy which constitutes the real substratum of phenomena. I study, measure, and classify the different species of these transmutations; I associate particular sensations and classes of sensations with particular transmutations, and I thence infer the existence *in posse* or *in esse* of more or less Energy in some particular form transmuting itself according to some one or other definite physical law. I infer also the existence of various supplies of potential Energy

constantly available, and of other intelligent agents like myself.

I associate every such intelligent agent with a particular series or group of sense-experiences, and further I assume that the world at his Presentment, consists for him in a similar series of transmutations continuously going on in that portion of the energetic system which I believe in a similar way to constitute such person's bodily organism. Thus by the same process of reasoning by which I am led to believe that my own Presentment consists in the energetic transmutations proceeding in my organism, I explain the universality of the experience of all intelligent agents. In my own case, by that union of consciousness with physical energy which accompanies the manifestation of life, I am immediately related with that portion of the energetic system which is the real substratum of my organism, and am made conscious of the series of transmutations occurring at that particular point in it which is represented by my sensory system. In the case of others, from certain of the transmutations occurring in my Presentment, I am led to infer the existence of other similar microcosmic systems in the energetic macrocosm of the physical universe.

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This is all very well as a theory, but if all I know is the series of transmutations occurring in the portion of the system of Energy related directly to my intelligence, how did I ever learn to infer from these transmutations the existence of that Energy underlying them, and still more of the whole energetic system extending far beyond my organism? How do I deduce from transmutations proceeding in the portion of the energetic system which constitutes the real substratum of my organism the existence, not only of that substratum itself, but of other portions of the system similarly related to other intelligences, and of the energetic system as a whole? How do I get beyond my Presentment? How pass from Ideality to Existence?

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I answer that I never could by any chance or possibility have got beyond it or got any suggestion of the Reality had I been merely related to my Presentment as a passive and percipient subject. In point of fact, however, I am in relation with the energetic system not merely or primarily as an Intelligence percipient of the transmutations proceeding in it at a particular point, but also as a Will initiative to some extent of such transmutations and capable of influencing and directing the physical process. Life necessarily involves a process of energetic transmutation constantly proceeding at that portion of the system of Energy which constitutes my organism, and I am there related as Will with a larger system which embraces the part in which intelligence is developed.

Fundamentally, life manifests itself in all grades of the zoologic hierarchy as a union of Volition (or what appears in action as Volition) with some particular point in the universe of physical Energy, the union constituting what we call a living organism.

Despite its profound importance to us personally and to our race, we should not forget that, objectively considered, the brain in man and the higher animals is merely a special organ highly developed by use, as the trunk is in the elephant, the middle phalanx in the horse, or wings in the bird. Intelligence is hardly to any extent a necessity of the vital union of the Will with the energetic system. It is not at all developed in the vegetal kingdom, hardly at all in some branches of the animal, and there may conceivably be an infinite number of other "kingdoms" in which it may be either undeveloped, or very differently developed, or superseded by some other manifestation by us unimaginable. Its development indeed seems to be concurrent with the development of a locomotive faculty—a striking confirmation of the theory that it is in our activity that we derive the suggestions which call forth the exercise of the Understanding and transform sensation into perception.

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It is only with a comparative fraction of the organism that I am related as a passively percipient intelligence. I am directly or indirectly related as Will, as an originative cause of activity, with a larger portion of my organism, many parts of which are quite distinct from the cognitive portion. Now it is from my relation as Will with Energy other than and beyond the energetic transmutations which constitute my Presentment that I discover the energetic system of Nature, as a real thing—beyond, underlying, and by its transmutations constitutive of my Presentment. Many of the transmutations which occur in my Presentment I recognise as attributable to my own volitional activity operating upon my energetic organism, and *in my own activity there is thus suggested to me a source of phenomena lying beyond these phenomena themselves*. A transmutation initiated in my brain is a pure idea. The key which suggests to me the real world is the occurrence of transmutations ascribable to my activity operating beyond the sphere which constitutes my Presentment.

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It is in this way that I originally discover the real energetic substratum to the phenomenal world of my Presentment. I learn from the transmutations to infer the agency and operation of the underlying energy, and thus gradually construct my whole systematic conception of the real world in which I live and move and have my being.

This view of my activity and of the consequences of my relation as Will to the energetic system represented by my organism, including the portion thereof related to my intelligence, supplies us therefore with a key to the inevitable reference of thoughts to things.

I distinguish in my active experience a clear difference between wishing and willing, and further between willing and effective action. My Power—the Energy related to my Will—the exertion of which is necessary to translate Volition into an overt result—is a limited and quantifiable thing, but that such a hidden energetic medium or substratum underlies all phenomena is evident from the fact that I do not will directly the appearance of any given phenomenon. I may wish that. But

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when the Volition is reached and the wish transformed into overt exertion I find myself involved in the multifarious processes of an energetic system which I may so far influence, but which is nevertheless in many ways constantly going on irrespective of my Volition. I may wish to avoid pain and may will certain exertions with that view, but the consequences may be the reverse of what I wished. This shows that the Volition operates immediately not on the sensation but on the energetic system.

In all cases between Volition and overt result there seems to be erected and constantly maintained around me a vast energetic system, a part but only a small part of which, namely the Energy of my organism, can be influenced directly by my Will, whilst, even in immediate relation with that part, transmutations beyond the reach of my Will are constantly going on. Indeed, what fundamentally distinguishes Volition from Desire is its relation to the energetic system.

The doctrine of Energy therefore puts in a new and clearer light the whole theory of Causation. [95]

It is common for philosophers to talk of invariable sequence as the criterion of Causality. But, in fact, that is quite fallacious. No one ever regards a phenomenon as the cause of another phenomenon. We ascribe Causality to the energetic transmutation which in some form or other we inevitably believe to accompany the appearance of every phenomenon. We never postulate a causal relation between day and night—the most notable case of invariable sequence. When we say the fire warms the room, or the horse draws the cart, or the sun ripens the corn, it is the Energy which we rightly or wrongly associate with the visual sensation referred to in the words "fire" and "horse" and "sun" of which we are thinking, and by no means of these visual sensations themselves. As has been well said, we never suppose that the leading carriage of the train draws those behind it, although their relation of sequence is quite as close to it as to the engine.

True, it is and must be from and by phenomena only that I infer and measure the transmutations of Energy, but the transmutations measured are operations of the real thing-in-itself postulated by Science. The existence of such Energy is suggested to me primarily in my experience of my own activity in which I recognise my power of doing work—a quantifiable and measurable thing, homogeneous with the Energy in respect of which Science states the relations and conditions of all physical phenomena. My most incessant mental act is that by which, on the analogy of my own active experience, I refer all phenomena to the underlying energetic system. This reference it is which transforms sensation into perception; and the constant affirmation of this reference is the great function of the synthetic mental activity of the understanding, and is at once the origin and explanation of that imperative mental tendency which metaphysicians call the law of Causality. [96]

How, then, does this doctrine affect the theory of the nature of Space?

If it be true that the world as my Presentment consists in the transmutations occurring in that particular part of the energetic system which constitutes the real substratum of the brain, then phenomena as a whole must arise in transmutation, in a process of Becoming rather than in a state of Being, and Space must be the content, the condition, in which that process proceeds. The laws of Space, therefore, are laws, so to speak, of motion, not of position. The most absolutely still and motionless visual presentation is really a series of constant transmutations of Energy and the form of Space is constituted by the laws of transmutation, which are thus at once the necessary conditions of my perception and the universal conditions of all sense-perception. Space, therefore, does not contain the real thing which sustains the phenomenal world any more than it does the reality which underlies my conscious self. It is the universal condition of the transmutations which constitute phenomena; and it therefore "contains" all these phenomena, including my body as phenomenon and only as phenomenon. Its form is discovered by my organic motor activity, and in representing this activity the mind constructs its concepts of Space and Extension. [97]

This view of the nature of Space, by relating its forms and laws with the objective, and a-logical thing-in-itself in virtue of the transmutations of which our sense-experience occurs, relieves an obvious difficulty which must always have been felt in accepting without qualification the purely Kantian view which regarded it as a category imposed by the Intelligence upon the otherwise unknowable world of sense.

The most ardent assertors of the ideality of Space have hitherto apparently had difficulty in avoiding the tendency to conceive it as the persistent all-embracing objective content of the thing-in-itself, not merely of the phenomenon, although the latter only might enter into Knowledge. The doctrine, however, which presents our conception of Space as discovered in our activity amid resistant transmutation-processes not only establishes its ideality but at the same time explains the relation which its form nevertheless bears to the objective material laws of the sensible presentation. It liberates the mind from the oppressive necessity of regarding Space as still somehow objectively extending and containing the real world. It also relieves an obvious difficulty which confronts the Philosophy of Schopenhauer in locating those transcendental forms of the phenomenon which are imposed *a priori* upon the presentation, and yet are not to be found in the pure Volition. [98]

Of course, it must never be forgotten that my whole sentient experience consists primarily of the series of energetic transmutations occurring at that part of the energetic system which is in immediate vital relation with my consciousness. It is my experience of active exertion, of moving, speaking, etc., which gives a suggestion of the real energetic world. The transmutations of the real Energy of the world beyond my organism never enter my Consciousness. Transmutations arising beyond my body only enter the presentation by influencing the cerebral process. The [99]

luminous undulation and the sound-wave must both produce transmutation of the cerebral Energy in order to affect Consciousness. Yet the various characters of the transmitted impulses are distinguishable in the resultant cerebral transmutations. Thus I feel sensations of hardness, roughness, pain, colour, sound, etc. It is by a process of mental construction that I associate these with the forms of my exertional activity, and thus frame my conceptions of real bodies in the world around me—those which I more directly associate with the Energy subject to my Volition being conceived as representing my body. For reasons of convenience, I refer those conceptions chiefly to the co-ordinated visual presentation, and thus build up my conception of the extended world of material things. Science is possible because all transmutations of Energy take place according to definite numerical laws and ratios. The whole work of Science is to explain every phenomenon in terms of its definite transmutation of Energy. These definite numerical laws and processes are characteristic of all Energy transmutation, and thus regulate the experience of every intelligent being. It is in virtue of these that our separate systems of knowledge correspond, and that we are thus presented each with corresponding aspects of one outer world. The laws which regulate the cerebral changes that accompany sense-presentation are for me the necessary *a priori* laws of perception. It is because these laws operate in common in all brains that community of intercourse is possible amongst mankind. It is because of the further fact that the whole of the transmutations of Energy which constitute physical phenomena compose a numerically inter-related and regulated system that Science and rational knowledge are possible to the intellect of man. Our knowledge is what we are obliged to think and assert regarding experience; but the universality of experience is not explained merely by the common nature and general laws of Intelligence, but depends also on the generality of the laws under which the transmutations of Energy proceed.

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We are now, therefore, by the aid of the doctrine of Energy, better able than before to distinguish accurately between the Ideal and the Real as contrasted elements in our experience.

My Presentment as a whole consists in the transmutation-processes—in the sensations, feelings, perceptions, images, ideas—in short, in all that is going on at the point where (I necessarily express myself in terms of spatial relations, though in this connection these are figurative) my sentience and intelligence are developed.

[101]

My whole Presentment is, therefore, in one sense subjective, or, as some would say, ideal. For me, my Presentment is the impression produced on, the condition established in, my Consciousness in virtue of what is going on at this so-called point of contact.

What we mean, therefore, by the subjectivity or ideality of the Presentment is the aspect of energetic transmutations when viewed as affecting my Consciousness in contrast with their obverse aspect when viewed as transmutations in the objective system. As my Presentment, they are all subjective or ideal, and it is in this reference that Berkeley and Hume, for instance, speak of ideas of sense, such as the colour blue, the heat of the fire, the pain of a blow. These, constituting the bulk of the Presentment, they distinguish from what Berkeley called ideas of the imagination—those stimulated or originated, or, as he said, "excited," by the intelligence itself. Whilst he contended that both classes are ideal or subjective, in respect that they are constituents of the Presentment, the latter have an additional title to subjectivity in respect of their origin, and constitute what are called "ideas" when the word is used in contra-distinction to "sensations"—such pure ideas occurring in response to a subjective impulse.

[102]

On the other hand, there is a sense in which the Presentment is, if not real, at least actual and objective.

So far as we know, Intelligence never develops except in conjunction with an organism—that is, in vital relation with physical Energy. My Presentment is constituted by the occurrence and depends upon the continuance of the transmutations or operations proceeding at the related point in the energetic system. Even pure ideas, though subjective not only in regard to aspect but in regard to their origin, are objective in respect that they also consist in an energetic transmutation.

Herein lies the germ of truth to be discovered even in the unintelligent dogmatism of those philosophers who assert the absolute Reality of my Presentment, as such—not merely its actuality. It is comparatively seldom, however, either in Science or Philosophy, that we meet a thinker prepared to go as far as that. Most take refuge in a distinction between primary and secondary qualities of bodies, classing my sensations as non-resembling secondary qualities, which they admit cannot be conceived to exist without the mind in the form in which they make up my Presentment, but reserving five or six primary qualities—solidity, extension, figure, motion, rest—which they conceive to exist independently, just as they enter into my Presentment. In point of fact, however, these so-called primary qualities are not the names of intuitions, but are abstractions or generalisations of the most general and necessary elements of my active Experience by reference to which I mentally construct my world. The transmutations of Energy are not a never-repeated accidental kaleidoscope. They proceed according to constant, definite, measurable laws, and though subordinate variations are infinite and make up the details of my Presentment, the general laws and conditions according to which all Energy transmutes are definite, and constitute the general features or qualities of my Experience, and these are the so-called primary qualities of bodies regarded in the light of the doctrine of Energy.

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The primary quality of extension, in particular, is a conception resulting from the association of my visual Presentment with my power of active exertion, and the delusive tendency to regard this quality as in some sense primarily and fundamentally real is due to the unconscious recognition

of the fact that it is in virtue of my power, or association as an agent with the energetic system, that I derive a suggestion of the real world beyond the phenomena which constitute my experience. [104]

I cannot exist without some development of activity. Hence are derived my conceptions of free space and of resistance between bodies. My primary sensations are the sensations of touch, and the primary impulse of thought is to relate these with my active exertions. When sight is first restored to the blind the first impulse is to regard the new sensation as a form of touch. Its intellectual suggestiveness is a development. The system or stream of transmutations in which my volitional activity principally takes part is that represented by the operation of the forces of Gravitation and Cohesion; the system which influences my visual sensations is a quite different series. The changes in this latter series, by their greater rapidity, enable me to anticipate the other series, and for this and other reasons I employ these sensations to signalise and symbolise the transmutations proceeding in the series with which I am more immediately related as an active and "willing" agent. All transmutations, if they result in sensations, must do so by producing changes in the Energy of my organism, and must therefore be conditioned by the general laws which regulate the changes which occur there, or, in other words, must be contained within a self-consistent spatial condition; but the differences in the characters of visual Space, as it is called, and the spatial content of my activity, reflect the differences in the series of energetic transmutations with which they are respectively connected. [105]

We see more clearly, therefore, with the aid of the doctrine of Energy, the import of the theory of transcendental æsthetic enunciated by Kant, who first pointed out that there are elements, and those the most necessary and universal, in the sense-presentation which bear the character of ideality as fully as the most subjective efforts of our ideative activity. More particularly do we illustrate the ideality of Space as a cognition precedent to experience. It is because general laws constantly operative regulate the transmutations which constitute the individual's Presentment that it is possible for him to abstract from and generalise the data of sense; and it is because the subjective process of Ideation, by which we mean our representative mental activity in its widest sense, consists also in transmutations under the same general laws of the same portion of the energetic organism, that it is possible to frame general ideas. These general laws of organic transmutation are the *a priori* conditions of the necessary determination in time of all existences in the world of phenomena.

The form, therefore, of the phenomenon, in the language of Kant, is constituted by the transmutations of the Energy immediately related to consciousness; the matter of the phenomenon is constituted by the varieties produced in these by the transmitted transmutations from the Energy beyond—just as the musician may produce a constant variety of harmonies upon his instrument, but all must be conditioned by the relations fixed and established between the notes of which the instrument is composed. Transmutations of the cerebral Energy may be stimulated not only from without, but by subjective impulse from within; but in either case the laws of these transmutations are the necessary form of experience, and it is the possibility of transmutation upon an internal and subjective impulse which makes possible the formation of synthetical judgments *a priori*. It is as if the organ were not only responsive to impressions upon its keyboard from without, but were also automotive and could originate harmonies in its own notes; and as if, moreover, it were endowed with consciousness so as to receive an intuition of both classes of music. The former would correspond to sensations, the latter to ideas; and we might imagine such an instrument by presenting to itself its own system of notes, contriving thus to frame *a priori* a synthetical system of these general musical laws which would constitute the necessary and universal form of its whole musical experience. To complete the perhaps fantastic analogy we must imagine the world to be one co-ordinated musical system, and our instrument to be endowed with the power of playing upon the other keyboards; of thence deriving the suggestion of the distinction between the internal and external impulses which respectively awakened harmonies within itself; and lastly, of thus at length conceiving in the spirit of science that the necessary and universal laws which it recognised as the most subjective and fundamental conditions of its own operation, at the same time regulated the activity of the entire musical universe. [106]

How natural it would be for such an intelligent musical instrument, if unhappily endowed with common sense, to believe and assert that the real substance of the universe consisted solely of sounds. Yet how evident would it be to us from our standpoint of more absolute knowledge that the whole orchestra of sounds, although actual and quite distinct from consciousness, was still merely phenomenal, and yet withal, in its every expression, revealed the laws and structure of reality—of the system of things in themselves—a system the reality of which was dissimilar to those appearances, though all its laws and structure could be studied and derived from them. [107]

Berkeley, therefore, erred seriously when he described the idea as a fainter sensation. Faint subjective reproductions of our sensations, as of blue, green, or the like, constitute a very insignificant element in our mental furniture. We seldom pursue so far into detail the ideative effort. Severely and effectively as Berkeley criticised Locke's account of abstract ideas, the fact remains that abstraction is a primary feature of our whole conceptual system; and the abstractable elements of the sensible presentation being the necessary constituents of all ideative representation are properly denominated ideal. The one element of particularity which every idea lacks is the reference to the transmitted transmutation to which the sensible phenomenon owes its origin. We derive such reference to the external solely from the obstructions which our free activity encounters and without which we could receive no [108]

suggestion of the non-ego, and in particular no suggestion of the dynamic element which fundamentally distinguishes things from thoughts. The empirical content of experience—the so-called secondary qualities of bodies—are often called in their subjective aspect "ideal" because the mental impression is obviously very different from the transmutation objectively regarded. But this is to confound the ideal with the subjective, which latter term is that properly applicable both to the sensible impression and to purely mental activity. The primary qualities, being the general laws or forms of organic Energy-transmutation, are in a higher sense ideal, for they are the necessary conditions under which both sense-presentation and ideative representation proceed. Whilst, therefore, as Kant maintained, they are the *a priori* element in perception, they at the same time constitute the laws which regulate all Energy-transmutation within our experience both organic and extra-organic.

[109]

We hold, therefore, to the Platonic doctrine that whilst, on the one hand, the sensible is only an object of thought in so far as it partakes of the intelligible, on the other hand the idea is not only a type for the individual mind, but is partaker also of the laws which penetrate the system of things. Idealism as a Philosophy, in denying the validity of any reference of the content of the Presentment to a further existence outside of the subjective experience, has induced that wider use of the term idea which applies it to the whole actuality of experience in its subjective aspect. With the advance of Philosophy we must revert to that more ancient use of the term idea which confines its extension into the realm of the perceptual to those elements of the sensible presentation which can be reproduced by the conceptual activity of the subject, and which in asserting, for instance, the ideality of Space, reminds us at the same time that Ideality implies not merely subjectivity, but the expression or representation also of some aspect of those laws which regulate the system of Reality.

[110]

But is not common sense right, after all? Do I really mean to say that tables, chairs, houses, mountains—the whole world of my Presentment, are to be regarded as shrivelled up and located in my brain, or in the energetic correlative of my brain? Is the whole Universe, as known to me or conceived by me, contained within a minute portion of itself—the brain? Now Science does say something very like this, and the logical difficulties of the position are very pressing. But they cannot be got over by attempting to revert to common sense, because to assert that all my conceived Universe is immediately perceived by me as it exists, would seem to involve a diffusion of my intelligence throughout Space which is still more inconceivable and self-contradictory. Even apart from this implication, the assumption of the Reality of the phenomenal world destroys itself. To assume the reality of so-called material particles is to lay the foundation of an argument which surely leads to the conclusion that the whole world of my consciousness is produced by and consists in motions in that certain small group of these same molecules which is assumed to make up my brain. The solution is only reached when we discover that the error lies in forgetting that the Reality which is the seat of my Presentment is itself unperceived, and that what I commonly call a body and a brain are the phenomena occurring in my Presentment, and which I associate with such real substratum. The real substratum of my Presentment is a part of the energetic Universe, which is constantly undergoing transmutations. Wherever such Energy is united, in an organism, with consciousness these transmutations, as affecting and perceived by such consciousness, constitute its Presentment or sense-experience; and aided by the constructive activity of thought expand, as it were, subjectively into a whole world of experience, as the electric current vibrating darkly along the narrow confines of the wire suddenly expands at the carbon point into the luminous undulations which light a city.

[111]

We admit, therefore, to the full the actuality and objectivity of the sensible presentation. We only deny that it is the real thing-in-itself. The latter is not discovered by sense. My energetic organism is like a well-fitting garment; I do not feel it at all. I feel only changes or transmutations taking place in it. Be not alarmed, therefore, for your common-sense world. We leave it to you intact and actual—not deducting even a single primary quality. Allowing fully for the extent to which, little suspected by you, it is a mentally constructed system, its elements are still actual and objective; they are modes of Reality; extension and the other primary qualities are qualities of these modes. Moreover, the Ego, I, myself, as Will, as a continuously identic intelligent agent, am not given to myself immediately in my Presentment, any more than is the real object. The existence of my Ego, of my cogitant self, is an inference which I am compelled to draw from the facts of my mental activity. *Cogito, ergo sum*. Similarly, my energetic organism is the real a-logical thing-in-itself which I am compelled to postulate in order to explain my perception of physical phenomena in the light of my physical activity; *ago, ergo possum*.

[112]

We must not overlook the unique position in our Presentment occupied by the visual presentation. Its universality, simultaneousness, minute accuracy, quantifiability, etc., are such that it is really to the visual Presentment that I refer all other elements in my sense-experience. I think of them with reference to it. In connection with it I mentally construct my world. I associate with some modification of the visual presentation the phenomena resultant upon the energetic activity of my own organism, and the other forces and potential Energies which that activity reveals and suggests. It is thus that I derive the compound idea of Body as consisting of Figure, Extension, and Solidity. The continued appearance in my visual presentation of the grey colour which I am now seeing is to me the sign of the continued persistence of that potential Energy in virtue of which I regard it as the appearance of a solid extended stone wall. Everything is referred to the visual presentation, and it is in reference to it that the mind works in constructing its world.

[113]

The whole theory of molecular action is a theory constructed in reference to the visual

presentation—the reality of which, strangely, it seems to result in overthrowing. A born-blind man could never have invented the conception of atoms or molecules. This is well worth thinking over. The visual presentation is not really fundamental; and we must undo the inversion induced by its great convenience whereby we refer to it all the other elements of our sense-experience and conceive of our activity and our whole actual world by reference to the visible sign. It is in consequence of this reference to the visual that bodies are thought of as discrete units, so that it is difficult to conceive that the real thing in virtue of which we experience the perception of, say, a heap of stones, is truly more or less potential Energy—just as the continuous process of thought is very different from the disparate symbols of speech.

[114]

I habitually refer to the visual extended image as the primary basis of my idea of the world, or of any particular part of the world, such as my dining-room. Why? Simply because, for the reasons already noted, the sense of sight is the sense of universal reference. In principle it is the same habitual tendency which makes me associate every element of my world with its appropriate name. It is different in the case of other sensations. When I am absent from Niagara I do not, in thinking of it, primarily conceive of it as a roar of sound. I think of certain motions of mass which, if I were present, would occasion the subjective sensations of sound. But for the habitual tendency arising from the universal reference to the visible I would do the same in the case of the visual image. All I am necessitated to think is a real event—a real, physical, dynamical transmutation—proceeding quite independently of my perception or presence; and if I can only manage to realise that I must, for philosophical purposes, eliminate my reference to visual as well as to audible or other sensations, I will understand that all I am entitled to, and all I can, without hopeless contradiction, postulate as real thing existing independently of my perception, is a transmutation of Energy. This energy is imperceptible, unextended, unfigured, yet it is by no means a mere logical or mental necessity or associative tendency. On the contrary, it is very real. It sustains my every act. By an imperative mental necessity I am obliged, by inference from my experiences as an active and percipient agent, to postulate the energetic system in which I am involved, and with one particular centre in which I am organically related.

[115]

But we recall at this point that Science says she must still postulate Matter as the vehicle of Energy. But what does that mean except that the subject of her studies is the sensible presentation which itself consists of energy transmutation in part constantly changing but with relatively permanent and recurrent elements? These more permanent elements constitute what we call bodies. If the sensible presentation consisted exclusively of one continuous, unchanging phenomenon, Reason would never be stimulated, and Personality, Cause, Power would never have been postulated or conceived. But the transmutation is constantly "accelerated"—incessantly fluctuates and varies. Certain of these variations I recognise as related to my own volitional activity, and I am thus furnished with a key which enables me, by a sympathetic analogy, to attribute all the changes in my experience to various agents, each related to the other by the intervention of this system of physical Energy. Some of these I can further trace to the initiative of Volition of myself or other persons; others I can only recognise as integral parts of the vast energetic system of Nature, the stimulus of which I cannot follow further.

[116]

The reality of Matter is said to be proved by its indestructibility; but this characteristic can easily be resolved into (1) the indestructibility of Space and Extension which we have seen to be merely another name for the necessity or inevitable universality of the general laws and conditions of Energy transmutation, and (2) the indestructibility of the Energy to the transmutations of which we attribute the forces of Cohesion and Gravitation.

All vital activity is but a producing of changes in the stream of transmutation. We never do, nor in the nature of things do we ever try to, increase or diminish the quantity of the real Energy itself. We instinctively recognise the objective source of our physical power, and this has led some thinkers to suppose that the indestructibility of Matter is an *a priori* datum of thought. But such a belief is quite unfounded. All it amounts to is a recognition that the destruction of Matter is *beyond our power*—a necessary consequence of the fact that we merely act upon the transmutation-process. Many a long contest between the supporters of *a priori* and experiential knowledge can be set at rest by this view of the mediating functions of the energetic organism.

[117]

The reflections which we have thus briefly noted and illustrated open a wide field for inquiry. The scientific doctrine of Energy would seem to be pregnant with momentous consequences for Philosophy, and it is worth while for metaphysicians to devote to this subject the deepest and most deliberate thought. The results cannot easily be grasped by a mere cursory perusal of memoranda, in which we have only sketched a few salient aspects of the doctrine. We deprecate unwarrantable assurance, and are fully conscious of the difficulty of adequately expressing thought on such a theme; but we have not written rashly nor without good grounds for asking attention.

[118]

Science, it seems to us, postulates in Energy an a-logical, unextended, real thing-in-itself in terms of which the phenomena of Physics can be adequately and quantifiably stated. At the same time it furnishes Philosophy with a theory of the objectively real thing-in-itself which satisfied those necessities of thought by which we are constrained to interpret our sense-experience by a constant reference to a Reality beyond it—a necessity due to our association as Actors with an Energy beyond that which is the seat of our Presentment. Such a view avoids the incurable difficulties and contradictions involved in the theory of the reality of extended material substance, or in any theory, indeed, which asserts the reality—as presented—of the sensible presentation. Physical Reality thus conceived is consistently thinkable as co-existent with the thing-in-itself—be it ultimately Intelligence or Volition—of which our cognitive and conative

existence is a manifestation. And such a doctrine, by explaining all phenomena as transmutations proceeding (according to the definite mathematical laws prevailing throughout the whole Universe of Energy) at that point in the system which is organically related to Consciousness, accounts at once for the apparent apriority and necessity of the qualities of Space, and at the same time for their evident universality and objectivity.

[119]

In a word, it would rather seem as if Science, unconscious of its pregnant possibilities, has not only formulated a theory which co-ordinates and unifies the entire fabric of physical knowledge, but has also at length furnished Philosophy with the key to that problem the solution of which has, in the words of Schopenhauer, been the main endeavour of philosophers for more than two centuries, namely, to separate by a correctly drawn line of cleavage the Ideal—that which belongs to our knowledge as such—from the Real, that which exists independently of us; and thus to determine the relation of each to the other.

To us it seems not strange that Philosophy should in the end be indebted to Science for this solution—nor should Science, in the hour of her greatest speculative victory, object too hastily to the assistance which the thinker, trained to the study of the process of thought, can render in clarifying and restating in its metaphysical aspects a theory which, if profoundly conceived, and formulated by men of science from Rumford and Davy to Stewart, Tait, and Kelvin, was partially anticipated by the metaphysician who conceived the world as will and idea.

We maintain, therefore, that the presentation of sense, the continuum or manifold, or what you will, consists in the transmutations of a real substance itself unextended and unperceived; that the laws of these transmutations are what constitute the geometric all-containing Space; that at a point in this real energetic system organically related to the intelligent self, the transmutations occurring there constitute the individual's sensible experience; that his mind, by also actively influencing the system at that point, can stimulate the train of transmutations which constitute his world of ideas; that the mind can discover itself as Will influencing transmutations in the organism which are transmitted through a wider, larger portion of the system; and can recognise the transmutations at the related point as influenced sometimes by its own Volition and sometimes by other agents. We seek to bring the added light of scientific theory to reconcile the conflict between the law and the fact, between the objects of reflection and the objects of sense, between the world of thought and the world of phenomena,—the problem which Plato raised and which has since been the central problem of Metaphysics. In doing so we present a doctrine which not only maintains the truth of the Ideal, and the actuality of the phenomenal, and the relative reality of both, but which proves, with all the cogency of Science, how it is that the Sensible is permeated by and made knowable only by the Ideal, by the laws of the transmutations which constitute actuality, and that, on the other hand, the Ideal only enters experience as the regulative principle of the ever-transmuting Reality.

[120]

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The world consists not merely of phenomena, nor of phenomena and laws which regulate them. These are but transitional and imperfect aspects of Reality. "Our standard of Truth and Reality," says a recent writer, "moves us on towards an individual with laws of its own, and to laws which form the vital substance of a single existence." We approach such a goal in the conception of Energy—the laws of whose constant transmutations are what we call Nature.

We must distinguish Energy as Absolute Reality from such conceptions as Activity, which is its subjective aspect, or as Force, which is really the rate at which Energy is, in certain cases, transformed. Dynamics, which investigates Force, is a study of the fundamental transmutations of Energy. It postulates Energy as the Real Entity in terms of which it can frame a satisfactory theory of dynamical phenomena.

The metaphysical labours of the century which has elapsed since Kant have not been altogether in vain. The deeper thinkers are pretty nearly agreed that the Absolute is not to be identified with its appearances. How far they can bring home this view in practical form to the intelligence of man is another matter. Plato doubtless saw the truth in a sort of beatific vision, but the tide of speculation ebbed after his death, and its healing waters never inundated the deserts of mediæval thought. The discursive weakness in which the speculation of the transcendental Philosophy seems to dissipate itself makes us fear a similar decline. Metaphysics must receive the assistance of the great speculative achievement of Physics. It must realise that Science can postulate a Reality unperceived and unqualified by the conditions of sense, but in terms of which Science can explain the whole phenomena of the sensible presentation in their objective aspect,—explain these as transmutations of Reality, proceeding in accordance with the general mathematical laws under which Reality transmutes itself.

[122]

It may be said that reason requires us to think that the Universe is a unity. Where do you embrace within Reality, in such a view of it, Intelligence, Volition, Feeling? We answer: Of course, obviously Reality, as postulated by Physics, does not contain these. But the Real Thing postulated by Physics is but one aspect of the whole, and may be, must be, merged in a higher Reality—of which phenomena, on the one hand, and Thought, Conation, Feeling on the other, are the appearances. That involves a further advance, the attainment of a higher degree of Truth which would bridge the Dualism of Thought and Existence, of Self and Not-self, of Spirit and Nature, and whilst, on the one hand, such Reality must fundamentally be a-logical, on the other hand Energy may owe its energy to Spirit.

[123]

In the dualism which we must, in experience, recognise, we notice one fundamental distinction: quantification, measurability, appear the attributes of the physical; quality, ideality, of the spiritual. The apprehension, therefore, of the doctrine of Energy should accomplish in clarity and

security the abolition of the intolerable contradictions which have hitherto involved the search for Reality amid its appearances. We think it suggests the most satisfying explanation of the distinction which separates, and the principle which relates Ideality and Externality, and should obviate the almost childish efforts of transcendentalists to expound the relation of the Mind to a body which is involved in, and which is yet—for the individual—distinguished, they cannot tell us how, from the whole system of Nature. [124]

Of course, neither Thought nor Volition, as such, can be the absolute Reality. They, like Physical Force, are but transmutations, affections, phases of Reality. Nor, again, is Energy, as a quality, a correct description of the Absolute, as such. The Absolute, as such, we cannot describe; but in studying, as Physics does, the relations of physical phenomena and stating these in terms of Reality, it conveniently gives Reality a name appropriate to its own standpoint.

Metaphysics rightly declines to be required to study special branches of Science. Nothing but grotesque absurdity ensues when this precaution is overlooked. Yet Metaphysics has hitherto thought itself the better of a little logic, and in the future it will have to grasp the scientific conception of Reality. There is nothing else for it; and, after all, it is remarkable how far the most fundamental conceptions of Metaphysics are dependent on a physical origin.

Surely it is of primary importance to realise the effect upon our conceptions of Space and Extension of the doctrine of the transmutations of Energy. Even the profoundest metaphysicians have seemingly failed to explain how Space, Matter, and Extension are related with Reality. You cannot ignore this difficulty by saying that these are the working conceptions of particular branches of Physical Science. But when you realise that physical phenomena, even the most permanent and rigid, are by scientific demonstration but transmutations of the real thing, you may then understand that Space, Body, and Extension are but the laws and conditions of the process. As appearances, and within the realm of phenomena, they seem still what they have always seemed. So much we still concede without diminution or obscurity; and at the same time we can harmonise them as they could never be harmonised before with postulated Reality. [125]

It is the same with Time. The facts of memory would seem to imply that there is no succession in the Absolute. We are always present at all times of our life. In recollecting a past event we are contemplating no mere image, but the actual past event itself. Our chronometry depends on the annual motion of the Earth round the Sun. It has thus a purely physical basis.

We might illustrate the application of the doctrine of Energy to every department of Metaphysics. But such is not the object of the present essay. We merely desire to indicate briefly some of the many aspects of the theory, and if only we have been able to suggest a line of inquiry, the primary object of this essay has been attained. [126]

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FOOTNOTES:

[81:1] Originally printed in 1898, now revised and rewritten.

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