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PRESIDENTIAL ADDRESS.—MATTER.

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I.

It may seem somewhat of a leap from *Logic* and the *Laws of Association*, which some of my hearers may perhaps remember were the subjects of my two last annual Addresses, to *Matter*, which I have chosen as the subject of the present one. But in a field so comprehensive as Philosophy, when once we have got a clear general conspectus of its divisions and articulations, it may often be advantageous, for the purposes of a somewhat closer examination, to go directly from one distinctly marked division, or group of questions, to some other which stands in a marked contrast with it, thus approaching the subject of Philosophy as a whole from a diametrically opposite point of view.

The treatment of the subject, the method of approach and examination, will of course continue as before to be the treatment and method of philosophy. You will not expect from me a physicist's dissertation on potential and kinetic energy, the mechanical equivalent of heat, the medium and *modus operandi* of electricity, the ultimate structure of living protoplasm, the true nature of neural action, or even on the comparative claims of atoms and the void, of mathematical centres of pure force, of vortex-rings rotating in a perfect fluid, or of any other analogous hypotheses, to account for the ultimate or original structure and properties of that which the common-sense world, the scientific world, and the philosophical world, with one consent, agree to designate as Matter.

This common existent, this given reality, the *that which* all men perceive in touching, seeing, and moving, is the primary object of our examination this evening. Matter, not consciousness, is our primary

analysandum; and only in a secondary place, and as subsidiary thereto, the perceptions out of which our knowledge of it may be built up, and the modes by which those perceptions may be combined into an unified perception of it. We are here approaching the world of philosophy from the diametrically opposite direction to that of consciousness. Real matter is at one pole of that total world, and consciousness at the other. The same thing would be true of Mind, if it existed, which is now true of Matter. It would be at the opposite pole of the philosophical world to consciousness. It would be a *that which* we perceive as the Subject of consciousness, just as matter is a *that which* we perceive as an object of it. Mind and Matter are both objects of consciousness, though whether Mind, like Matter, is a *real* object, may here be left undecided. About the reality of Matter there is no sort of doubt, except such as may be thrown upon it by the assumption of the reality of Mind. For if Mind is a reality, then the perception of Matter may well be its creature, and as perception of it is the only ultimate evidence of its reality, its reality sinks back into the position of an idea. This is what is meant by *Idealism*, at least in its earlier and more intelligible form; though not, perhaps, when based upon such vapoury catch-words as *The Real is the Rational, and the Rational is the Real*.

But here I put aside the question of the reality of Mind, and take Matter, as it is taken alike by common sense and science, to be a perceived reality, the *that which* is perceived in touching, seeing, and moving simultaneously. In that sense it stands at the opposite pole to consciousness, the world of knowledge or knowability being that which is then figured as having two poles, each at the centre of its own half, or aspect, of the philosophical globe.

Not that Matter is the only object which stands at the opposite pole of the philosophical globe to consciousness. That position is shared by all the particular states, or process-contents, of consciousness itself. Consciousness is a process objectifying itself. The content of consciousness is the object of consciousness, a percept-consciousness, the object of a perceiving-consciousness. Being conscious or, what is the same thing, having awareness, is a process in time, every preceding part or content of which becomes, or may become, object as well as content to a subsequent part or content, when that subsequent part arises. This is the fundamental fact of Reflective Perception. The Unity of Consciousness is a continuity in awareness of a content. And to recognise, as well as experience, this fact is to distinguish object-consciousness, or percept, from subject-consciousness, or perceiving, but at the same time to distinguish them as parts of the single continuity of consciousness or awareness as a whole. Every empirically discernible portion of this continuity of consciousness as

a whole is both a percept and a perceiving; it has a part which is a percept to the portion which follows it, and a part which is a perceiving to the portion which precedes it. Consciousness therefore stands at once at both poles, objective and subjective, of the figurative globe of knowledge, and therefore of philosophy.

It is this fact alone, the fundamental fact of Reflective Perception just described, which legitimates by giving meaning to the figure of a globe with opposite poles at all. The perpetual self-objectification of consciousness (not, be it observed, of the conscious agent or Subject) is the fact which we describe metaphorically by a figure transferred from space, the figure of a globe, the opposite poles of which are relative to one another, and inseparably united by the globe to which they belong. Without the globe, no poles; without consciousness, no perceiving and no percepts. When once we adopt the image of a globe with poles as a figurative mode of expressing our meaning, whether to ourselves or others, we place all percepts alike, as well as Matter, at its objective pole. In fact, it is only as a percept that Matter can be placed figuratively at the objective pole. If Matter were not a percept, we should have no evidence for its existence at all, consequently none for its existence as a reality. It is Matter as a reality which we are considering to-night, and which I am assuming that we accept in the same full sense in which it is accepted by common sense and by science. Nevertheless, in order to treat of it philosophically, it is necessary to advert, as I am now doing, to the kind of evidence which we have for its reality, that is, to its connection with consciousness as a perceiving process. It is as a percept that we know of its existence, and its reality is an inference founded upon that percept, taken together with its harmony with other percepts, which are not included in the percept of Matter.

Now just as the reality of Matter is inferred from the percept of it, that is, from its objectivity to consciousness, so the percept of Matter is, not strictly speaking inferred, but composed, or constituted, by associative processes guided by thought, out of percepts of different kinds, which are immediate, that is, immediately objectified in the process of consciousness. It is mediate in the sense of being a compound of elements which stand in immediate relation to consciousness as a perceiving. Till those immediate percepts have been put together by association and thought, and perceived in combination, we have not the percept which we afterwards call Matter. Without going minutely into the analysis of that percept, it may be stated broadly, that its elements are those percepts which we perceive immediately in seeing, touching, and moving our eyes and limbs. Their combination into a single compound percept requires association and thought; that is, representation as well as presentation of percepts is involved

in the combination. Then, but not till then, we perceive Matter, or Matter as a percept becomes an object of our consciousness. Of course, this does not imply that we recognise our percept as Matter, or contradistinguish it from its component elementary percepts as their resultant, or again from the perceiving process generally. The percept Matter is antecedent in actual order of knowledge to the recognition of its difference from all these things. What it is recognised as different from, in the perception of it, are other percepts or groups of percepts, such as those of the other senses, external or organic, which are not included as components of itself. We sever it from the rest in consciousness as a distinct object, and that is the initial step towards ascertaining any further relations concerning it. The question of its reality as distinct from its perceivedness is not raised, nor even remotely suggested. Percept and reality as yet are one.

So much it is necessary to premise concerning the perception of matter, in order to put in a clear light the reality of that percept, which is our main subject this evening. This, as already said, I propose to assume, in the same way as science and common sense assume it. But I wish to make clear *what* it is which I assume, and ask you to assume with me. Moreover, as will presently appear, some such brief account of the relation of Matter as a reality, to our perception of it as a percept, is necessary to our comprehension of another relation in which its reality stands to consciousness, besides that of its being the reality inferred from the percept. When we come to see what this second relation is, it will also be evident that a wholly different figure is required to represent it, from that of a globe with opposite poles and opposite hemispheres, objective and subjective, which I have just employed. This will shortly appear in its proper place. The only way to arrive at it is by considering Matter as a reality, a conception to which we attain by first considering it as a percept.

We see, then, from what has been already said, that Matter is a double object, has a double mode of existence, first as percept, second as reality; and that we infer the reality of *that which* we directly know only as percept. And since all that we know of it is included in the percept and in the act of inferring from this and other percepts, it seems as if the *that which* we infer, namely, the *reality* of Matter, must be for ever unknown to us. We cannot have solid bodies, or anything else, in consciousness, in any other shape than as percepts or concepts which are part and parcel of consciousness itself. This view of the unknowability of the Reality has been adopted by certain famous Germans, and formulated as the doctrine of the *Erscheinung* and the *An sich*, the phenomenon or manifestation of the

Thing-in-itself, which latter is conceived as an underlying reality, of which nothing whatever can be known, save the fact that it exists. Whatever we know or possibly can know of the reality of Matter (or of anything else) is phenomenon, and not reality.

This very neat view, which sets up an impassable barrier between knowledge and reality, since, according to it, whatever we know is phenomenon and not reality, is wholly at variance with the view taken of Matter both by common sense and by science. To speak only of the latter, it is evident that by physicists the percept-Matter is taken as itself real. It is percept and reality at once; the inferred reality is not a numerically different thing from the percept-Matter, from and concerning which it is inferred; but the percept-Matter is real as well as perceived, not the phenomenon of an underlying reality numerically different from it. To physicists, supposing they should trouble themselves about such questions at all, percept and reality would be truly figurable as opposite aspects of one and the same thing; one and the same thing would be at once phenomenon and reality.

But without troubling you farther just now with the fallacy of the great German fog-generator, the *Ding-an-sich*, which will probably meet us again later on, I content myself with saying that I adopt the view of science and common sense concerning the reality of Matter. By the reality of Matter I mean the reality, in the world of real existence, of *that which*, in the context of consciousness, has reality only as a percept. The question is, What further do we know of this reality, over and above what is included in the perception of it, that is, in the compound percept which has been already described? If we know anything of this, it is plain that real Matter must have a second analysis, different from its analysis, as a percept, into perceptions of sight, touch, and sense of effort, the combination of which by association and thought gives as result the compound percept of Matter. Two different analyses, different in kind, must correspond to the two different aspects, as percept and as reality, which Matter presents when assumed as real.

Now this is just what we find. There is a physical analysis of Matter, over and above its analysis into perceptions, and quite different from it. And I mean by analysis here analysis in its strict sense, just as in the former case; I mean an analysis into component elements, no one of which by itself is Matter, but which are Matter only in combination. An analysis into elements, any one of which was the *analysandum* over again, would not be an analysis at all; the *analysandum* would continue an *analysandum* as before.

Neither do I mean by analysis of Matter a distinction and classification of it into kinds or modes of Matter, such as ponderable,

ethereal, and living or organic matter; nor again into Matter as displaying mechanical, or chemical, or electrical, or magnetic, or vital properties, affinities, or energies.

Nor again do I mean by it a discovery of what may perhaps be called the Evolution of Matter, that is to say, a distinction between the primordial form or mode of it and later derivative forms, such as would be a derivation of other forms of Matter from vortex-rings rotating in a perfect fluid, or from Atoms swimming in a vacuum.

Investigations in these directions, which are part of the business of physical science, are not what I mean by an analysis of Matter. They still leave Matter as an *analysandum* behind them; the question, what physical or real Matter is, continues still unanswered. The Matter which enters into all these shapes and modes, and has these several properties and affinities, and exerts the influences, or operates in the ways, which we call the correlated forces of Nature, is not itself analysed, however many Laws of Nature may be discovered in pursuing the investigations. An analysis of Matter simply as Matter must be something different from this.

Now it is Matter as an inferred reality that we have to analyse, a reality inferred and not directly perceived. But at the same time the analysis of the reality must correspond to the analysis of the percept, and be its counterpart in thought, since otherwise it would not be the reality, or opposite aspect, of that percept, nor capable of verification by means of direct perception. The *whatness* of the reality must be in concordance with the *whatness* of the percept. Moreover, as inferred, the *whatness* of the former must be derived by thought from that of the latter, since we have nothing else than perception from which to infer it, unless we have recourse to another German fiction, namely, that of *a priori* forms of thought.

Now this inference is performed partly by means of abstraction and generalisation. Abstracting from what is particular to the several cases or instances of our perceiving Matter, we generalise the remainder common to all of them. In all cases, we perceive three-dimensional extension offering resistance to touch; whenever three-dimensional extension is *felt*, we have Matter. But three-dimensional extension, which briefly described is *space*, is divisible in thought *in infinitum*. In any part of it there are parts within parts, simultaneously existing, and limiting one another. Occupancy of space, whereby space is filled, and can be *felt*, means cohesion or these parts; those, namely, into which the space occupied may in thought be divided. But since any portion of space is divisible *in infinitum*, we have, on the part of space, no limit to the number of the parts occupied. Matter, then, or occupied space, is in thought capable of division *in infinitum* also; but we cannot therefore say.

that it is so in reality, because space and the occupancy of space are not the same thing. Indeed there is reason, as will presently appear, for holding that there is a minimum limit to the space-magnitude, which can be thought of as occupied. So that all we can say of Matter, or occupied space, is, that it is divisible in *indefinitum* (meaning by this, not that we do not know whether there is a limit to its divisibility or not, but that, although we know that there is a limit, yet where it comes in is unknown), and that, into whatever parts, above that limit, it may be divided, these parts must be conceived as coherent. Without cohesion no occupancy of space, and consequently no Matter. The occupancy of space must be subject to the nature or laws of space, but we do not know whether all space, or all parts of it, are occupied. What we do know is, that whatever parts of it are occupied, that is, wherever there is Matter, the Matter has cohesion of parts, and offers resistance to other parts of space outside it, which are similarly occupied, and similarly coherent *ad intra*.

In so thinking of Matter as a reality, what we have done is this, —we have abstracted from all the particular modes in which occupancy of space is actually perceived or felt by us, and we have laid the foundation for the further abstraction from our own actual perception or feeling in presence of it, for we have now brought Matter before ourselves as an object of pure representation. The final inference of its reality lies in the thought, that Matter, as *coherent occupancy of space*, which to us is an object of representation, and *not* of actual presentation, continues to exist, whether we are, or are not, actually perceiving or feeling it. The representation covers all cases of Matter, those which we actually perceive by sense, those which we might perceive by sense if we were in presence of them, and those which from their minuteness or fineness are actually inaccessible by our sense perception, which latter is the case of the supposed atoms and vortex-rings.

We thus change the presented relation between the percept-Matter and our perception into a represented relation between the parts of the percept-Matter, independent of our sense-perception, that is, abstracting from the circumstance of sensitiveness, or presentative consciousness, on our part, which the former relation involves, and make of the represented relation, and the parts which stand in that relation to one another, a new object of thought, not perceived in the percept-Matter with which we begin. The reality of the percept-Matter means its non-dependence on our sensitiveness, at the same time that it retains the essential properties which we perceive in it. We thus exclude sensitiveness of its parts to one another from the properties which are essential to real Matter.

What, then, in brief recapitulation is the analysis of Matter as a reality, to which we are conducted by this reasoning? What does a real occupancy of space involve? It involves cohesion of parts (in any portion of it) *ad intra*, and exclusion of parts (of other portions) *ad extra*. But cohesion between parts *ad intra* is a mode of what we call *Force*. This is Newton's *vis insita* and *vis inertiae*. And exclusion of parts belonging to other portions *ad extra* is a condition of Force coming into play, when any two or more portions, separate from one another, stand in certain definite space-relations to one another. This is Newton's *vis impressa*. Thus occupancy of space cannot be conceived without force, nor force without occupancy of space. Each necessarily supposes the other; neither of them alone is Matter; but being thus ever distinguishable, and never separable, they are in combination the analysis of physical Matter, or Matter as the reality of its percept.

The reason alluded to above for thinking that there is some minimum limit to the magnitude of Matter, in the direction of its divisibility, lies in the cohesion of parts which is requisite to constitute an occupancy of space. The parts into which any portion of space may be divided are each of them space, but the parts into which any portion of space-occupancy may be divided are not each of them space-occupancy, since space is only occupied by their cohesion. Space, therefore, is divisible to a further extent than Matter; that is, Matter is not divisible *in infinitum*. When we contemplate its least conceivable constituents, it seems to spring into existence, we know not how or whence. That is to say, its coming into existence is a problem, and one which we have no apparent means of solving. Its real as distinguished from its known existence is a final inexplicability.

For the analysis of real and physical Matter we thus refer to Newton, not to Aristotle. Aristotle's conception of Matter, as a potentiality which acquired reality only by the supervening of Form, is a conception to which there is nothing real, that is, no percept, to correspond. Occupancy of space apart from force is not a potentiality in the order of real existence, but an abstract conception in the order of knowledge, and a conception, moreover, which is formed only to be denied, as one not positively conceivable. Similarly with the other element of the analysis, Force. Here again we refer to Newton, not to Boscovich; at least, if it be Boscovich's conception, that pure force, acting from mathematical points along mathematical lines of direction, can either be or generate physical Matter. Pure force, like pure matter, is a conception which can be formed only to be dismissed as not positively conceivable. Force is only positively conceivable as acting either within or between parts of occupied

space, and becomes inconceivable the instant we try to conceive it acting *in vacuo*. The parts between which it acts may well be conceived as separated by a vacuum,—this is *actio in distans*; but for my part I cannot conceive an action of nothing on nothing as itself a reality.

The remarkable parallelism should here be noticed between Matter and Consciousness, both being taken in their ultimate empirical portions, or portions which are the least and simplest compatible with being empirically presented to sense or represented in thought. The same conception is true of both, namely, that both require distinguishable but inseparable elements as their constituents. This fact, which we have just seen exemplified in the case of real Matter, has its parallel in the fact, that the least empirical state, or process-content of consciousness, has two distinguishable but inseparable elements, one of sense or feeling, the other of time-duration, or (in the cases of sight and touch) of time-duration and space-extension together. Now it is this fact, common to Matter and to Consciousness, which, wherever it is met with in the subjective analysis of experience, is the foundation of Metaphysic, and together with the subjective aspect which Metaphysic selects as its field, contradistinguishes Metaphysic from all sciences which take some class or classes of empirical facts as the ultimate foundation of their reasoning. Metaphysic is the opposite, not of Physics, but of Empiric. In no other sense than this can Metaphysic be called an enquiry into supra-sensible realities, or *a priori* ideas of the Reason.

Looking back for a moment upon the conception of real Matter which we have just obtained, we see, in the first place, that the idea of an unformed Matter, as the potential or undeveloped state of the forms of Matter which are positively known to us, is a fiction of the imagination. There is no primordial *Hyle*; there is no primordial *Chaos*. Whatever may have been the form or forms, whatever the epoch or epochs, in and at which real Matter came into existence, and whatever relations of development, integration, or disintegration, may have existed between those forms, it was not out of pre-existing formless Matter that they sprang. The conception which we have obtained of real Matter, Newton's conception of it, which we may formulate as the occupancy of portions of space by cohesion within, and action on other portions (similarly occupied) without, is perfectly general, but in no wise indefinite. It is applicable to, and will be found realised in, whatever particular forms Matter assumes, or may be discovered to have assumed, at any period of its existence as Matter. Atoms and vortex-rings would alike realise it, supposing either of these two forms to have a real existence.

Secondly, if such be our general but not indefinite conception of

real Matter, what becomes of the German fiction of it as a *Ding-an-sich*, which manifests itself as a phenomenon in Matter as a percept? Inasmuch as it is now positively conceived, the reality supposed to lie concealed behind the percept, veiling itself in its own manifestation, is now brought into distinct relation to our thought, and can no longer be treated as an *An sich*, a something as it is in itself, unknowable by us. Both its nature as above defined, and the fact of its existence as a reality independent of our existence, are now known to us. It can be thought of as independent of us because, as real, it is thought of as the object of a representation, not of a presentation; which enables its existence to be separated from our own in thought, without forfeiting its reality. The proof alone of its reality, not the direct perception of it, now depends on presentation; namely, on the verification of its existence by actual sense-perception of its anticipated effects. The *Ding-an-sich* will have to seek some still remoter ambush, if it wishes to prolong its miserable biography.

II.*

The conception of Matter as a reality, the meaning and validity of which I have just brought before you, lays open an entirely new scene in respect of its relations to consciousness; to render which more plainly intelligible we shall require imagery quite different from that which I employed to depict those of its relations to consciousness which we have hitherto considered. We began by picturing consciousness and its objects as standing at opposite poles of the same globe of philosophical knowledge. The percept-Matter was depicted as a perceived Object of consciousness. Secondly, that percept-Matter was shown to be a reality independent of the existence of a perceiving consciousness, and irrespective of the fact of its being perceived by consciousness or not. It is thought on valid grounds, that is to say, it is *known*, to be an independent reality, but only in the form or shape in which it is so thought, that is to say, as what I may call *adverse and active occupancy of space*. Adverse in virtue of its *vis inertiae*, active in virtue of its *vis impressa*. The particular attributes which it possesses as actually presented to the sense-perceptions of sight and touch (with their included perceptions) are abstracted from, that is, are excluded from its reality as so conceived, and are thought of only as possibilities; or in other words, as attributes which *we should* perceive in it, *if* our sensibilities

* The whole of Section II. was omitted in delivery.

were sufficiently delicate or acute, and *if* a suitable medium, or other requisite conditions, were supplied.

Still, this second view of Matter as a reality (as distinguished from the percept-Matter) does not alter its position as Object to consciousness. The reality as well as the percept can still be figured as at the opposite pole to consciousness; whether thought of as independent of us, or as a percept of ours, it is alike thought of as an Object of our consciousness. Nor is it possible to think of it at all, except by also thinking of it in this way; I mean that it is impossible to think of it in any way which does not involve, imply, or rest upon this. We may go on to further and quite different modes of thinking of it; but one and all of them must pre-suppose this, which I may call the simple Objectivity of Matter. Objective as percept, or as independent reality, it is in both cases objective; and its objectivity as reality is the source of further modes of regarding it, all of which imply and pre-suppose its simple objectivity to consciousness. This point is indisputable, and indeed is one of the most fundamental facts in philosophy.

Now the reality of Matter requires us to depict its relation to consciousness in a very different way from that of placing them at the opposite poles of a globe. We have now to bring them into close proximity. Instead of their being at opposite poles, let us now imagine that consciousness and real Matter are removed to the centre of the globe, and there stand in close contact with each other, all mere percepts, and percept-Matter among them, being removed to the surrounding surface. Of course this imagery is to be taken as a mere aid to comprehension, just as in the former case. The reason why we make the change is, that the conception of Matter as a reality brings with it the conception, that it is the reality upon which consciousness depends for its existence, or, in other words, that it is the Real Condition of consciousness. The very word *depends* expresses or includes an image drawn from spatial and physical relations. As consciousness in perceiving and thinking is the *causa cognoscendi* of Matter and its real existence, so Matter in its real existence is the *causa existendi* of consciousness. To realise in thought the former relation we depict the two *relata* as opposite aspects, to realise the latter we depict one of them as in immediate dependence on the other, Matter as condition, consciousness as conditionate.

Nothing depends on the imagery which we may use to depict this relation, but everything on the reality of the relation itself. What, then, is the evidence for this reality? We have seen that the reality of Matter includes force as an inseparable element in its adverse and active occupancy of space, and that of this force the

various so-called physical forces of Nature are modes. The whole of physical Nature, that is, the whole world of real Matter, consists of parts which are interdependent. Every portion of Matter is at once a real condition and a real conditionate of other portions. They move or rest, in strict reciprocal dependence one on another. And Matter is the only object, positively known to us, of which this can be said. In other words, Matter is not unconditioned, but, so far as our positive knowledge goes, its states, whether of rest or motion, are conditioned only on their own reciprocal inter-action. Matter includes the only real conditions which are positively known to us. Those out of, or by virtue of, which Matter itself originates are unknown.

If, therefore, consciousness is conditioned at all, or so far as it is conditioned, it must be conditioned upon Matter. And in some sense it certainly is so conditioned. Undeniable facts show, that for its *genesis*, or as an existent, it depends upon the existence of living material organisms. We have no experience of unembodied or disembodied consciousness. So far as we have experience, consciousness and the organism which is its embodiment are in immediate proximity, and the organism is the immediate real condition of the consciousness which it embodies, and of the collocations and sequences of the states or process-contents of that consciousness. It is to bring this relation before you that I make use of the proximity of consciousness and Matter, at the centre of our globe of knowledge. The genesis of consciousness takes place in a succession of present moments of experience, in dependence upon some action or other, in the nerve-system of the organism, which is going on at each of those moments. The content of those successive present moments of consciousness may be depicted as being thrown off or radiated to various points within or upon the periphery of the globe, at the centre of which they are generated, and as forming, when thrown off, a more or less systematic panorama of knowledge, in which all objects whatever find a place. The successive moments of genesis themselves are what is figured by the permanent contact between consciousness and real nerve-Matter, at the centre of the globe of knowledge.

But it is not enough merely to set forth diagrammatic figures, under which we may range the facts to be comprehended, in order to facilitate their comprehension. It is necessary to show also, that the diagrams which we set forth can be used consistently with each other, by pointing out on what occasion each in turn becomes properly applicable, as well as used consistently with the facts of experience, common to both, to which they are applied. Now the second figure, that of a globe having consciousness and real nerve-matter together

at the centre, is suggested by, and applicable to, our common-sense perception of the external world of material objects, of which a conscious being always finds himself the central object. He himself is that juxtaposition of Matter and consciousness, which we place at the centre of our diagram; or more accurately, his neuro-cerebral activities from moment to moment are the physical actions which immediately give rise to the successive present moments of consciousness, the contents of which, taken together, are his perception and knowledge both of themselves and of all other objects. Not that the stream of consciousness so generated is perceived in arising as already divided into distinct present moments, but that we learn to perceive and speak of it in this way from observation of differences in its varied but continuous content.

Consequently, when we ask *what* anything is known as, we treat it as an immediate *object* of consciousness, and then our first diagram, which has consciousness and its objects at opposite poles, becomes applicable; when we ask *how we come to have* consciousness of objects, we treat consciousness as the conditionate of some real condition, and then have recourse to our second diagram. From the point of view supplied by our first question *What*, and in applying our first diagram of consciousness and its objects, we do not travel beyond consciousness as a perception of its own states or process-contents. All its objects, including the percept-Matter, are states or process-contents of consciousness objectified. It is, as I may perhaps repeat, a self-objectifying process. And when we go on to real Matter existing independently, and as the real condition, of consciousness, and in doing so apply our second diagram, we go on to something, the nature and real existence of which have been inferred and proved solely out of data supplied by the objective contents of consciousness figured in our first diagram.

So much in justification of the two diagrams which I have used in illustration of the double relation which real Matter bears to consciousness, that is, to experience, first as its object, secondly as its real condition. Now to return to real Matter itself. I have shown above, that real Matter is adverse and active occupancy of space, irrespective of whether it is or is not an object of immediate sense-perception. Real Matter is not less real, does not lose reality, because it can be actually seen and felt, nor even because it can be actually heard, or smelt, or tasted. This consideration leads us at once to the well known, but not always equally well deduced, distinction between the primary and secondary qualities or attributes of Matter.

Supposing that we think of any portion of real Matter as perceivable substance, then those properties of it may properly be called its primary attributes, which are necessary to fulfil or satisfy the

definition of it as adverse and active occupancy of space; that is to say, those which *are* the substance as conceived, only in perceptual form. Our idea of these properties in any portion of Matter taken singly need not include more than impenetrability or hardness, figure, and mobility, all of which may be derived from perceptions of touch alone, or of touch combined with (so-called) muscular sense, or feeling of effort. These, therefore, may be set down as the primary properties or attributes of Matter, while those attributes may be classed as secondary, the ideas of which are derived from perceptions of the other senses.

The properties which are perceived as qualities or attributes by touch and its adjuncts thus coincide with the properties which are expressed in conceptual form by the definition of real Matter. It must not, however, be supposed from this coincidence, that the qualities or attributes perceived by touch and its adjuncts suffice to prove the existence of real Matter, as distinguished from percept-Matter. They contribute, indeed, along with qualities perceived by the other senses, to verify the hypothesis that Matter is an independent and active Reality; and when that reality is assumed or taken as proved, they enforce the practical belief in it with irresistible effect. But the *fact* that Matter exists independently of our perception is not deducible from these perceptions alone. There is nothing in the quality or sense-content peculiar to them to give rise to the idea of a Reality independent of perception.

It is, then, from the conception of Matter as Real Condition, the truth of which conception is shown in the manner briefly sketched in the former part of my Address, that we must start in distinguishing the primary from the secondary properties of real Matter, as actually perceived or perceivable. Its primary properties are those which constitute it a Real Condition. These properties are immediately perceived when we touch or handle a piece of real Matter. They are therefore at once both the object and the real condition of our perception of them. They are the point of union or coincidence of Knowledge and Reality.

When, for instance, my open hand comes into contact with a stone, the contact of these two pieces of real Matter conditions the occurrence of a certain sense-perception in me, which is a contributory to my full perception and knowledge of my hand, the stone, and their coming into contact. That is to say, my hand, the stone, and their coming into contact, are the objects as well as the real conditions of the sense-perception. Object and real condition of sense-perception coincide in the case of touch with its adjuncts, muscular sense, and feeling of effort. It follows, that the sense-perception of touch with its adjuncts stands in a double relation

to the real Matter concerned; it is a partial knowledge of *what* that real Matter is, as its object, and it is a conditionate of it, as the real condition of its occurrence, or *genesis* into consciousness. These two relations, though coincident in the perception, are, as we see, by no means indistinguishable from one another. Still, owing to their strict coincidence in perception, in point of time-duration and space-position, the sense-perception in which they coincide gives us some knowledge of the nature of the real conditions in terms derived from the perception, of which they, with their *relata*, are at once the real conditions and the objects.

But object and real condition begin to fall apart when we come to other sense-perceptions. When I see a stone at a distance, the patch of colour which I see, and which is the object of my sight-perception, is not the real condition of that perception arising in my consciousness. It arises there in consequence of certain undulations of an ethereal medium being reflected from the stone and transmitted so as to impinge on my retina. The perception arises in me, that is, becomes part of my consciousness, and is conditioned proximately upon some action of my neuro-cerebral system, and remotely upon some action of the ethereal medium, the stone, and other ethereal undulations beating upon the stone from the sun. All these real conditions of the perception are physical operations, belonging to the primary properties of real Matter.

Now the sense of sight alone gives no indication at all of the distance of the patch of colour from my retina. It is a percept perfectly free to be located by other considerations. When I locate it, as I do in common-sense and pre-scientific experience, in the stone, which we are now supposing to be at some distance from me, I in fact (though not knowingly) throw it out, by associative processes which are wholly unknown to me at the time, from my nerve-system, which, unknown to me, is the real *locus* of its genesis, along what we may figuratively describe as a line of radiation from myself as the centre of my globe of knowledge, and place it as an attribute in the stone, that being the only tangible object from which it seems to come, and to which it seems to belong, being found coincident with the stone, when I approach it, so as to see and touch it simultaneously. In fact, my whole knowledge of the stone originates in this simultaneous seeing and handling, the notices of both senses being combined by association in the cerebrum. At first, then, and in pure common-sense experience, I believe it to inhere, just as I see it, in the stone; that is, I believe the stone to have the attribute of colour or visibility. When optical science begins to criticise the notions of common sense, a compromise is effected by calling it a *secondary* attribute of the stone as a material substance. This really means, that the

stone is the one tangible real condition of its occurrence as a percept.

Now it is from the combination of sensations of the two senses, sight and touch, by associative processes, that we originally obtain our perception of Matter, and of the world of material objects. Visual perceptions, therefore, seem to us originally to belong to the very essence of real Matter, inasmuch as they are necessary constituents of our percept-Matter, or Matter as an object of perception. It is only when we come to see that real Matter is distinct from percept-Matter, and that the difference between them lies in the fact that real Matter means Matter as Real Condition, and thus includes only what are called its primary attributes, that is to say, those which are perceived or perceivable by touch alone,—it is only then that we dissociate colour from the attributes of real Matter, and place it among its conditionates, as a sensation which forms part not of Matter but of consciousness.

But if this reasoning holds good of visual perceptions, which necessarily enter into the very constitution of percept-Matter, *a fortiori* it holds good of all other sense-perceptions, which do not necessarily contribute to form that percept. I need not therefore repeat the foregoing argument in application to sound, odour, and taste, which are the perceptions of the remaining external senses, or to the systemic or organic sensations which arise from states internal to the organism, or to the feelings of well-being and discomfort, or of pleasure and pain, which are bound up with them. A similar reasoning applies also to those states or process-contents of consciousness, which may be distributed under the heads of emotion, volition, and thought, and which depend proximately upon neural processes in the cerebrum. These are all alike conditionates of real Matter, and all enter, in their several ways, into the objective panorama which is our knowledge of Existence generally.

The sum of my whole argument hitherto is, that real Matter, as the total of Real Conditions, is the real condition of our having consciousness at all, and therefore of our having any knowledge of existence, while the knowledge which we thus obtain, being the sum total of our knowledge, includes a knowledge of real Matter, and of its being the real condition of its genesis and existence as knowledge. There is no reason to suppose, either that consciousness has in itself any power of generating or sustaining itself, or that it is generated or sustained by an immaterial agent which could be called *Mind*, even if we could frame any positive idea of the nature of such agency, or of such an agent.

But now it is necessary to scrutinise this conclusion more closely, with a view to see what precisely it involves, and what it does not

involve. It certainly does not involve representing real Matter as the *Cause* of consciousness. The idea of *Cause* is a common-sense notion, which has still to justify its philosophical validity, notwithstanding that Kant included the relation between Cause and Effect among the *a priori* Categories of the Pure Understanding (whatever that may mean). By a *Cause* is generally intended something real, which produces something else in its totality, and thus accounts for the *nature* as well as for the *genesis* of its Effect. Such is not the relation in which real Matter is represented as standing to consciousness, when represented as its real condition. As the real condition of consciousness it accounts for its *genesis* only, that is to say, its occurrence as an event or existent, and therefore only in the form of an individual consciousness and its parts. But since it accounts for the genesis of any such individual consciousness in all its parts, and during its whole duration, in the conscious life of the individual, it follows, that its accounting for the genesis includes accounting for the order, whether simultaneous or successive, in which its parts originally occur, and also for the order in which they may be arranged by processes both of spontaneous and volitional reintegration, seeing that these depend upon physically real nerve-processes.

What, then, is it, for which Matter as real condition does not account? It does not account for the ultimate *kinds* or *qualities* of those states or process-contents of consciousness which it generates; that is, for the *nature* or *whatness* of those feelings which are, as it were, the material out of which our panorama of objective knowledge is constructed; whether these ultimate feelings include the fundamental kinds of emotion, or whether (these being derivative) they are restricted to the so-called systemic and external sense-perceptions. This latter question is one which does not concern us here. The *nature* of sentience, awareness, or consciousness, including the *nature* of its ultimate kinds or qualities, whatever these may be, is not accounted for by attributing its genesis or theirs to the physical operations of Matter. There is nothing in those operations to explain, for instance, why there should be such a *kind* of feeling as the perception of *blue* or of *red*, but only why they should arise, or come into consciousness, *here* and *now*, supposing their kind, quality, or *whatness*, to be otherwise known. Matter can account for *which* of any given ultimate sensations shall arise in consciousness at a given time, but not for *what* any of them are in immediate perception.

If again we approach the relation of consciousness and its real condition from the side of consciousness, we find facts which completely harmonise with and corroborate these statements. Our whole knowledge of real Matter, knowledge both of its nature and of its existence as real condition, consists of certain ultimate

sense-perceptions, which are (so to speak) the material out of which our conception of it as an operative reality is constructed. Without those sense perceptions we should have no knowledge of it at all. They are among its essential conditions *cognoscendi*. Thus to answer the question, *What* real Matter is, we must have recourse to consciousness, and therein to certain modes of it, which in point of *nature* are not conditioned upon Matter. They are among the *ne plus ultra* constituents of knowledge, as real Matter is the *ne plus ultra* in positively known real conditions. Beyond the *fact* of its existence in this direction we cannot go. We cannot assign its *genesis*, because we can form no positive idea of any real conditions which are not physical.

The conclusion, then, at which we thus arrive is as follows. Real Matter accounts for the *genesis* of any individual consciousness, but not for its ultimate *nature* as consciousness. And consciousness in an individual accounts for the *nature* of real Matter, but not for its *genesis* as real Matter, that is, as real condition, since at that point all data for further knowledge fail us. Now all questions, whether as to nature, or reality, or genesis, must be answered in the terms in which they are put, that is, in terms of consciousness. Questions and answers alike are phenomena of consciousness. And we have just seen, that Matter does not condition the *nature* of consciousness. A great difference is thus disclosed between real Matter and consciousness, in respect of their being a *ne plus ultra* of enquiry. The difference is this. We can fairly and fully put the question with regard to the *nature* of real Matter, whether it is or is not conditioned upon some real condition which is positively unknown to us; but with regard to the *nature* of consciousness we cannot succeed in putting the same question, since all questioning is of the *nature* of consciousness, and assumes what is equally self-evident, namely, that the answer, if any, will be so too. The *nature* of consciousness, therefore, is not only an ultimate datum of all knowledge, but its character as ultimate is strictly and literally unquestionable. The *nature* of consciousness, like the *nature* of everything else, that is, of all its objects, real Matter included, must be given in terms of consciousness. This brings us back to the position from which we started, at the beginning of my Address, and which was illustrated by our first diagram of a globe with opposite poles.

III.

The question concerning the possibility or probability of real Matter having had its genesis from some real conditions different from itself, though all such conditions must be positively unknown

to us, the sense-data of our knowledge being what they are, involves, or rather presents by a different handle, the problems of the infinity and eternity of Matter. A word or two must be said in conclusion, and with all possible brevity, upon these problems.

Our idea of eternity, I take it, is derived from, and has reference to, our perception of time-duration, and that of infinity is derived from, and has reference to, our perception of three-dimensional space; though some confusion is caused by our having to use the term *infinity* in speaking of time and eternity, particularly in respect of what is called the infinite divisibility of time, which is really the inverse of its eternity, its eternity κατ' ἀφαιρέσιν. Infinity is thus a term which applies both to time and to space, and in each respect has two modes, one in the direction of decrease by divisibility, the other in that of increase by extensibility. In fact, most of the terms by which we picture anything to thought are derived from our spatial panorama of knowledge. We think of time itself under the figure of a line.

Now some reason was shown, in the former part of my Address, for holding that real Matter, or adverse and active space-occupancy, is not divisible so far as space itself, and therefore is not divisible *in infinitum*, but has a minimum of extension, in less than which extension it does not exist as Matter, an extension, therefore, which is necessary to its existence as real space-occupancy. Thus Matter is finite in the direction of divisibility with respect to space. This of course does not imply its corresponding finiteness in divisibility with respect to time-duration. Its occupancy of its minimum of space may come to pass instantaneously, and the occupation of every part of that minimum be simultaneous. If this be so, the duration of real Matter must be conceived as equally divisible with time-duration itself; that is to say, in point of its time-duration Matter is divisible *in infinitum*; go on dividing its duration as long as you may, you will never come to a duration so short as to be indivisible into parts still shorter. The genesis of the minimum of space-occupancy being instantaneous means, that there is no time-duration which that genesis must necessarily occupy. The divisibility of Matter in respect of time-duration, and its divisibility in respect of space-occupancy, do not stand on the same footing; its divisibility may be infinite in the former respect, while finite in the latter. And, so far as I am aware, there is nothing to show that it is not infinitely divisible in the former respect, like time itself, in which it exists.

But the fact that we discern a duality of parts in that space-occupancy which we call Matter, from which we are led to infer that it requires a finite minimum, or finite minima, in order to exist at all, leads us also to infer that it has some real conditions, which

would be seen to account, if we only knew them, for the putting together of those parts, so as to form the finite minimum or minima, which adversely and actively occupy space. In other words, we infer that there was a time, when no minima of real Matter existed, but only real conditions of it, conditions of which we have no positive knowledge; and this holds good, whether we think of those unknown real conditions as existing in time alone, or in time and space together.

These considerations carry us over from the question of the infinite divisibility of Matter, in respect of time and space, to that of its infinite extensibility in both respects, its infinity *κατὰ πρόσθεσιν*, that is to say, its infinity proper in respect of space, and its eternity in respect of time.

To begin with the latter. If, as we have seen reason to infer, there are real (though positively unknown) conditions of the genesis of real Matter, it is clear that it has a beginning or beginnings in time, and therefore falls short of eternity, the infinity *κατὰ πρόσθεσιν* of time, *a parte ante*, or looking backwards from any given moment of its existence to the epoch or epochs of its genesis. Time and space being infinite, and also entering as elements into the constitution of real Matter, we are compelled to conceive time, and it is most reasonable to conceive space also, as existing prior to the genesis of real Matter, and as occupied, prior to that event, only by real conditions of its genesis, positively unknown to us, and possibly by real conditions of these again, and so on, possibly *in infinitum*. The finiteness of Matter in respect of its origination at some epoch or epochs in a pre-existing eternity may thus be held to be fully established, and also, though with less certainty, its origination at some place or places of pre-existing and infinite space. The alternative to this latter view is, to regard infinite space itself as coming into existence simultaneously with Matter, at some single epoch of infinite time.

But this reasoning does not establish the finiteness of Matter *κατὰ πρόσθεσιν*, either in time or in space, *a parte post*, that is, looking onwards into the future from any given moment of its existence, or from the epoch or epochs of its genesis in time, whether that genesis is conceived as instantaneous, or as requiring some minimum of time-duration for its accomplishment. Taking first the question of its infinity or finiteness in space, in the sense assigned, it may, I think, be truly said, that the mere fact of a minimum of space being requisite for its genesis does not of itself involve the idea of that minimum, or the Matter which occupies it, being figured, that is, limited by an outline, and therefore finite; it is not thereby alone considered as a material atom; nothing whatever

is thereby implied as to its limitation *κατὰ πρόσθεσιν*. It may conceivably have sprung into existence throughout infinite space instantaneously.

But when we ask whether there are any other considerations which forbid us to conceive Matter as occupying infinite space, whether at present or in the future, I think we shall find that there are. In the first place, it is impossible to conceive Matter as a real existent, and at the same time infinite in expansion, since to conceive anything spatial as a real existent is to conceive it individualised by having some outline or figure, and therefore as limited. When we conceive it coming into existence as a reality, we must conceive it coming in some particular or individual form; otherwise it is not conceived as a concrete or empirical object, besides not having the characteristic of being a real condition, capable of acting and being acted on. It would not then correspond to its definition, as adverse and active space-occupancy. We should thus reduce it to an unformed *hyle*, a capacity for receiving form, and therefore a mere potentiality, which would be deserting Newton's conception of it, and falling back on Aristotle's, which we have seen reason above for abandoning.

In the second place, the conception of a limited outline to the whole world of Matter seems to be demanded by the established doctrine of physical science, that the quantity of Matter in the material world is a constant quantity, like the total amount of energy which it displays in its two alternating forms of potential and kinetic energy, the gain of one being a loss of the other, and *vice versâ*. It might perhaps be possible to reconcile these laws with the infinity of Matter in space, by restricting them to certain kinds of Matter only, excluding the ether, for instance, from the range of their proved and verified validity. But even could this be done, it would afford no positive ground for affirming the infinity of Matter in its widest range, and the reason first alleged in favour of its finiteness would continue valid. I accordingly conclude that Matter, besides having a beginning in time, and a minimum limit of extension in space, has also a maximum limit of extension in space; that is to say, is to be positively conceived as finite, though in respect of where its limits fall, or how they are fixed, its extension is indefinite, in the second sense of the term above noted.

Turning now to the question of the infinity of Matter in the direction of increase in future time, the case seems to me to be different. I am not aware of any reason which compels us to conceive its duration limited, so as to fall short of infinite time. The conceptions of its beginning and its ending seem to me to stand on different footings. That of its beginning rests on the fact, real or

supposed, of a limit to its divisibility in space ; but that of its ending seems unconnected with the real or supposed fact of its having a limit to its extensibility in space. Its being finite in space does not imply its being correspondingly finite in time.

It is true that the unknown real conditions, to which, as we must conceive, it owes its origination, or others equally unknown acting in conjunction with them, may operate so as to fix limits to its existence in time. But this fact is necessarily unknown to us, seeing that the real conditions on which it depends are unknown. The affirmative and the negative are equally possible, so far as our means of knowledge go. There are, as it seems to me, no speculative grounds which either compel us, or forbid us, to conceive the world of real Matter as infinite in duration, in the particular sense of the term which we are now considering, that is, as destined to exist, in some material shape or other, throughout a future eternity. The one thing which I think we may hold with certainty on speculative grounds is, that the world of real Matter is dependent upon some continually operative and eternal real condition or conditions, different from itself, which in their nature and mode of operation are positively unknown to us. Our speculative knowledge of real Matter thus leaves us at once with valid grounds for the conviction that there is some Reality which stands to Matter in the relation of real condition, and with grounds equally valid for the conviction that, with our present faculties, no positive knowledge of that Reality is attainable.

Here, then, I think it will be said,—here I think I see old Jack-in-the-Box, our long-lost *Ding-an-sich*, jump up with the cry, “That’s me! I am those positively unknown real conditions ; they are the Reality, of which real Matter is the Manifestation (*Erscheinung* is my very own word), in themselves unmanifested ; and you may suppose, if you like, your knowledge of those now unknown real conditions increased to any extent short of Omniscience, and still you will have real conditions, in themselves unmanifested, which escape your knowledge ; these will *always* be an unmanifested reality.”

This contention of Jack’s sounds plausible, but nevertheless there is a palpable fallacy in it, a false substitution of one thing for another. A thing, conceived as the unknown real condition of another thing which is known, is not identical with a thing conceived as out of relation to knowledge, that is, a thing *in itself*, or an *sich*. In fact they are contradictories. The former is conceived as possibly knowable, the latter as not possibly knowable. Now there is just one thing nameable which beyond all question is not possibly knowable, and that is the truth of a contradiction. One of its contradictories must be true and the other false. Which, then, of the present pair of

contradictories is true, and which false, the assertion of something positively unknown, or the assertion of a thing unknowable or *in itself*? Plainly the latter is false. And why? Because the thing which it asserts is a self-contradiction, a contradiction in terms. Knowledge is *always* knowledge of a content of knowledge. No content of knowledge can be out of relation to knowledge, or *in itself*. If the *An sich* is unknowable, it is so in no other sense than that the conception of it is a self-contradiction, and therefore its existence a fiction. I think Jack may be requested to step out of his Box, and make himself scarce.

But you may still ask me, How does this astonishing substitution arise, how comes the *An sich* to impose itself on thought as a genuine conception? The answer is easy, and yet perhaps not uninformative. The difference between appearance and reality is a genuine part of common-sense experience. In that character it is a true and valuable contrast. It is valuable also when used by way of illustration, as an aid or stimulus to thought, as Plato, for instance, used it in the well-known similitude of the shadows seen by prisoners in a cavern, in the *Republic*. But it is totally unfit to be used as an ultimate and valid philosophical conception, without being first sifted by analysis, that is, without analysis of what the term *Reality* means, and in what respects it can be distinguished from *Appearance*. Common sense never raises this question, but is content with the familiarity and practical usefulness of the distinction. It is a parallel case to that of *Cause*, noticed above. To adopt the common-sense distinction unanalysed as a philosophical one is virtually to assume *reality* to mean that which is *not* an appearance to us. In this assumption we have a source of confusion, ending probably in Agnosticism or in Scepticism. Analysis on the contrary shows that *Reality* means, either that which immediately appears, or that which may with certainty be inferred from immediate appearances. Reality and Appearance, instead of having a separate existence, as the *An sich* doctrine assumes, are inseparable, though distinguishable, aspects of each other. Common sense is blind to distinctions of this sort, because common sense is not philosophy and does not need them. Not the common-sense notion, but elevating it as it stands into a philosophical axiom, is thus the source of the blunder, and the reason for its condemnation.