

LECTURE III

ON OUR KNOWLEDGE OF THE EXTERNAL WORLD

Philosophy may be approached by many roads, but one of the oldest and most travelled is the road which leads through doubt as to the reality of the world of sense. In Indian mysticism, in Greek and modern monistic philosophy from Parmenides onward, in Berkeley, in modern physics, we find sensible appearance criticised and condemned for a bewildering variety of motives. The mystic condemns it on the ground of immediate knowledge of a more real and significant world behind the veil; Parmenides and Plato condemn it because its continual flux is thought inconsistent with the unchanging nature of the abstract entities revealed by logical analysis; Berkeley brings several weapons, but his chief is the subjectivity of sense-data, their dependence upon the organisation and point of view of the spectator; while modern physics, on the basis of sensible evidence itself, maintains a mad dance of electrons which has, superficially at least, very little resemblance to the immediate objects of sight or touch.

Every one of these lines of attack raises vital and interesting problems.

The mystic, so long as he merely reports a positive revelation, cannot be refuted; but when he denies reality to objects of sense, he may be

questioned as to what he means by "reality," and may be asked how their unreality follows from the supposed reality of his super-sensible world. In answering these questions, he is led to a logic which merges into that of Parmenides and Plato and the idealist tradition.

The logic of the idealist tradition has gradually grown very complex and very abstruse, as may be seen from the Bradleian sample considered in our first lecture. If we attempted to deal fully with this logic, we should not have time to reach any other aspect of our subject; we will therefore, while acknowledging that it deserves a long discussion, pass by its central doctrines with only such occasional criticism as may serve to exemplify other topics, and concentrate our attention on such matters as its objections to the continuity of motion and the infinity of space and time--objections which have been fully answered by modern mathematicians in a manner constituting an abiding triumph for the method of logical analysis in philosophy. These objections and the modern answers to them will occupy our fifth, sixth, and seventh lectures.

Berkeley's attack, as reinforced by the physiology of the sense-organs and nerves and brain, is very powerful. I think it must be admitted as probable that the immediate objects of sense depend for their existence upon physiological conditions in ourselves, and that, for example, the coloured surfaces which we see cease to exist when we shut our eyes. But it would be a mistake to infer that they are dependent upon mind, not real while we see them, or not the sole basis for our knowledge of the

external world. This line of argument will be developed in the present lecture.

The discrepancy between the world of physics and the world of sense, which we shall consider in our fourth lecture, will be found to be more apparent than real, and it will be shown that whatever there is reason to believe in physics can probably be interpreted in terms of sense.

The instrument of discovery throughout is modern logic, a very different science from the logic of the text-books and also from the logic of idealism. Our second lecture has given a short account of modern logic and of its points of divergence from the various traditional kinds of logic.

In our last lecture, after a discussion of causality and free will, we shall try to reach a general account of the logical-analytic method of scientific philosophy, and a tentative estimate of the hopes of philosophical progress which it allows us to entertain.

In this lecture, I wish to apply the logical-analytic method to one of the oldest problems of philosophy, namely, the problem of our knowledge of the external world. What I have to say on this problem does not amount to an answer of a definite and dogmatic kind; it amounts only to an analysis and statement of the questions involved, with an indication of the directions in which evidence may be sought. But although not yet a definite solution, what can be said at present seems to me to throw a

completely new light on the problem, and to be indispensable, not only in seeking the answer, but also in the preliminary question as to what parts of our problem may possibly have an ascertainable answer.

In every philosophical problem, our investigation starts from what may be called "data," by which I mean matters of common knowledge, vague, complex, inexact, as common knowledge always is, but yet somehow commanding our assent as on the whole and in some interpretation pretty certainly true. In the case of our present problem, the common knowledge involved is of various kinds. There is first our acquaintance with particular objects of daily life--furniture, houses, towns, other people, and so on. Then there is the extension of such particular knowledge to particular things outside our personal experience, through history and geography, newspapers, etc. And lastly, there is the systematisation of all this knowledge of particulars by means of physical science, which derives immense persuasive force from its astonishing power of foretelling the future. We are quite willing to admit that there may be errors of detail in this knowledge, but we believe them to be discoverable and corrigible by the methods which have given rise to our beliefs, and we do not, as practical men, entertain for a moment the hypothesis that the whole edifice may be built on insecure foundations. In the main, therefore, and without absolute dogmatism as to this or that special portion, we may accept this mass of common knowledge as affording data for our philosophical analysis.

It may be said--and this is an objection which must be met at the

outset--that it is the duty of the philosopher to call in question the admittedly fallible beliefs of daily life, and to replace them by something more solid and irrefragable. In a sense this is true, and in a sense it is effected in the course of analysis. But in another sense, and a very important one, it is quite impossible. While admitting that doubt is possible with regard to all our common knowledge, we must nevertheless accept that knowledge in the main if philosophy is to be possible at all. There is not any superfine brand of knowledge, obtainable by the philosopher, which can give us a standpoint from which to criticise the whole of the knowledge of daily life. The most that can be done is to examine and purify our common knowledge by an internal scrutiny, assuming the canons by which it has been obtained, and applying them with more care and with more precision. Philosophy cannot boast of having achieved such a degree of certainty that it can have authority to condemn the facts of experience and the laws of science. The philosophic scrutiny, therefore, though sceptical in regard to every detail, is not sceptical as regards the whole. That is to say, its criticism of details will only be based upon their relation to other details, not upon some external criterion which can be applied to all the details equally. The reason for this abstention from a universal criticism is not any dogmatic confidence, but its exact opposite; it is not that common knowledge must be true, but that we possess no radically different kind of knowledge derived from some other source. Universal scepticism, though logically irrefutable, is practically barren; it can only, therefore, give a certain flavour of hesitancy to our beliefs, and cannot be used to substitute other beliefs for them.

Although data can only be criticised by other data, not by an outside standard, yet we may distinguish different grades of certainty in the different kinds of common knowledge which we enumerated just now. What does not go beyond our own personal sensible acquaintance must be for us the most certain: the "evidence of the senses" is proverbially the least open to question. What depends on testimony, like the facts of history and geography which are learnt from books, has varying degrees of certainty according to the nature and extent of the testimony. Doubts as to the existence of Napoleon can only be maintained for a joke, whereas the historicity of Agamemnon is a legitimate subject of debate. In science, again, we find all grades of certainty short of the highest. The law of gravitation, at least as an approximate truth, has acquired by this time the same kind of certainty as the existence of Napoleon, whereas the latest speculations concerning the constitution of matter would be universally acknowledged to have as yet only a rather slight probability in their favour. These varying degrees of certainty attaching to different data may be regarded as themselves forming part of our data; they, along with the other data, lie within the vague, complex, inexact body of knowledge which it is the business of the philosopher to analyse.

The first thing that appears when we begin to analyse our common knowledge is that some of it is derivative, while some is primitive; that is to say, there is some that we only believe because of something else from which it has been inferred in some sense, though not

necessarily in a strict logical sense, while other parts are believed on their own account, without the support of any outside evidence. It is obvious that the senses give knowledge of the latter kind: the immediate facts perceived by sight or touch or hearing do not need to be proved by argument, but are completely self-evident. Psychologists, however, have made us aware that what is actually given in sense is much less than most people would naturally suppose, and that much of what at first sight seems to be given is really inferred. This applies especially in regard to our space-perceptions. For instance, we instinctively infer the "real" size and shape of a visible object from its apparent size and shape, according to its distance and our point of view. When we hear a person speaking, our actual sensations usually miss a great deal of what he says, and we supply its place by unconscious inference; in a foreign language, where this process is more difficult, we find ourselves apparently grown deaf, requiring, for example, to be much nearer the stage at a theatre than would be necessary in our own country. Thus the first step in the analysis of data, namely, the discovery of what is really given in sense, is full of difficulty. We will, however, not linger on this point; so long as its existence is realised, the exact outcome does not make any very great difference in our main problem.

The next step in our analysis must be the consideration of how the derivative parts of our common knowledge arise. Here we become involved in a somewhat puzzling entanglement of logic and psychology.

Psychologically, a belief may be called derivative whenever it is caused by one or more other beliefs, or by some fact of sense which is not

simply what the belief asserts. Derivative beliefs in this sense constantly arise without any process of logical inference, merely by association of ideas or some equally extra-logical process. From the expression of a man's face we judge as to what he is feeling: we say we see that he is angry, when in fact we only see a frown. We do not judge as to his state of mind by any logical process: the judgment grows up, often without our being able to say what physical mark of emotion we actually saw. In such a case, the knowledge is derivative psychologically; but logically it is in a sense primitive, since it is not the result of any logical deduction. There may or may not be a possible deduction leading to the same result, but whether there is or not, we certainly do not employ it. If we call a belief "logically primitive" when it is not actually arrived at by a logical inference, then innumerable beliefs are logically primitive which psychologically are derivative. The separation of these two kinds of primitiveness is vitally important to our present discussion.

When we reflect upon the beliefs which are logically but not psychologically primitive, we find that, unless they can on reflection be deduced by a logical process from beliefs which are also psychologically primitive, our confidence in their truth tends to diminish the more we think about them. We naturally believe, for example, that tables and chairs, trees and mountains, are still there when we turn our backs upon them. I do not wish for a moment to maintain that this is certainly not the case, but I do maintain that the question whether it is the case is not to be settled off-hand on any supposed

ground of obviousness. The belief that they persist is, in all men except a few philosophers, logically primitive, but it is not psychologically primitive; psychologically, it arises only through our having seen those tables and chairs, trees and mountains. As soon as the question is seriously raised whether, because we have seen them, we have a right to suppose that they are there still, we feel that some kind of argument must be produced, and that if none is forthcoming, our belief can be no more than a pious opinion. We do not feel this as regards the immediate objects of sense: there they are, and as far as their momentary existence is concerned, no further argument is required. There is accordingly more need of justifying our psychologically derivative beliefs than of justifying those that are primitive.

We are thus led to a somewhat vague distinction between what we may call "hard" data and "soft" data. This distinction is a matter of degree, and must not be pressed; but if not taken too seriously it may help to make the situation clear. I mean by "hard" data those which resist the solvent influence of critical reflection, and by "soft" data those which, under the operation of this process, become to our minds more or less doubtful. The hardest of hard data are of two sorts: the particular facts of sense, and the general truths of logic. The more we reflect upon these, the more we realise exactly what they are, and exactly what a doubt concerning them really means, the more luminously certain do they become. Verbal doubt concerning even these is possible, but verbal doubt may occur when what is nominally being doubted is not really in our thoughts, and only words are actually present to our

minds. Real doubt, in these two cases, would, I think, be pathological. At any rate, to me they seem quite certain, and I shall assume that you agree with me in this. Without this assumption, we are in danger of falling into that universal scepticism which, as we saw, is as barren as it is irrefutable. If we are to continue philosophising, we must make our bow to the sceptical hypothesis, and, while admitting the elegant terseness of its philosophy, proceed to the consideration of other hypotheses which, though perhaps not certain, have at least as good a right to our respect as the hypothesis of the sceptic.

Applying our distinction of "hard" and "soft" data to psychologically derivative but logically primitive beliefs, we shall find that most, if not all, are to be classed as soft data. They may be found, on reflection, to be capable of logical proof, and they then again become believed, but no longer as data. As data, though entitled to a certain limited respect, they cannot be placed on a level with the facts of sense or the laws of logic. The kind of respect which they deserve seems to me such as to warrant us in hoping, though not too confidently, that the hard data may prove them to be at least probable. Also, if the hard data are found to throw no light whatever upon their truth or falsehood, we are justified, I think, in giving rather more weight to the hypothesis of their truth than to the hypothesis of their falsehood. For the present, however, let us confine ourselves to the hard data, with a view to discovering what sort of world can be constructed by their means alone.

Our data now are primarily the facts of sense (i.e. of our own sense-data) and the laws of logic. But even the severest scrutiny will allow some additions to this slender stock. Some facts of memory--especially of recent memory--seem to have the highest degree of certainty. Some introspective facts are as certain as any facts of sense. And facts of sense themselves must, for our present purposes, be interpreted with a certain latitude. Spatial and temporal relations must sometimes be included, for example in the case of a swift motion falling wholly within the specious present. And some facts of comparison, such as the likeness or unlikeness of two shades of colour, are certainly to be included among hard data. Also we must remember that the distinction of hard and soft data is psychological and subjective, so that, if there are other minds than our own--which at our present stage must be held doubtful--the catalogue of hard data may be different for them from what it is for us.

Certain common beliefs are undoubtedly excluded from hard data. Such is the belief which led us to introduce the distinction, namely, that sensible objects in general persist when we are not perceiving them. Such also is the belief in other people's minds: this belief is obviously derivative from our perception of their bodies, and is felt to demand logical justification as soon as we become aware of its derivativeness. Belief in what is reported by the testimony of others, including all that we learn from books, is of course involved in the doubt as to whether other people have minds at all. Thus the world from

which our reconstruction is to begin is very fragmentary. The best we can say for it is that it is slightly more extensive than the world at which Descartes arrived by a similar process, since that world contained nothing except himself and his thoughts.

We are now in a position to understand and state the problem of our knowledge of the external world, and to remove various misunderstandings which have obscured the meaning of the problem. The problem really is: Can the existence of anything other than our own hard data be inferred from the existence of those data? But before considering this problem, let us briefly consider what the problem is not.

When we speak of the "external" world in this discussion, we must not mean "spatially external," unless "space" is interpreted in a peculiar and recondite manner. The immediate objects of sight, the coloured surfaces which make up the visible world, are spatially external in the natural meaning of this phrase. We feel them to be "there" as opposed to "here"; without making any assumption of an existence other than hard data, we can more or less estimate the distance of a coloured surface. It seems probable that distances, provided they are not too great, are actually given more or less roughly in sight; but whether this is the case or not, ordinary distances can certainly be estimated approximately by means of the data of sense alone. The immediately given world is spatial, and is further not wholly contained within our own bodies. Thus our knowledge of what is external in this sense is not open to doubt.

Another form in which the question is often put is: "Can we know of the existence of any reality which is independent of ourselves?" This form of the question suffers from the ambiguity of the two words "independent" and "self." To take the Self first: the question as to what is to be reckoned part of the Self and what is not, is a very difficult one. Among many other things which we may mean by the Self, two may be selected as specially important, namely, (1) the bare subject which thinks and is aware of objects, (2) the whole assemblage of things that would necessarily cease to exist if our lives came to an end. The bare subject, if it exists at all, is an inference, and is not part of the data; therefore this meaning of Self may be ignored in our present inquiry. The second meaning is difficult to make precise, since we hardly know what things depend upon our lives for their existence. And in this form, the definition of Self introduces the word "depend," which raises the same questions as are raised by the word "independent." Let us therefore take up the word "independent," and return to the Self later.

When we say that one thing is "independent" of another, we may mean either that it is logically possible for the one to exist without the other, or that there is no causal relation between the two such that the one only occurs as the effect of the other. The only way, so far as I know, in which one thing can be logically dependent upon another is when the other is part of the one. The existence of a book, for example, is logically dependent upon that of its pages: without the pages there would be no book. Thus in this sense the question, "Can we

know of the existence of any reality which is independent of ourselves?" reduces to the question, "Can we know of the existence of any reality of which our Self is not part?" In this form, the question brings us back to the problem of defining the Self; but I think, however the Self may be defined, even when it is taken as the bare subject, it cannot be supposed to be part of the immediate object of sense; thus in this form of the question we must admit that we can know of the existence of realities independent of ourselves.

The question of causal dependence is much more difficult. To know that one kind of thing is causally independent of another, we must know that it actually occurs without the other. Now it is fairly obvious that, whatever legitimate meaning we give to the Self, our thoughts and feelings are causally dependent upon ourselves, i.e. do not occur when there is no Self for them to belong to. But in the case of objects of sense this is not obvious; indeed, as we saw, the common-sense view is that such objects persist in the absence of any percipient. If this is the case, then they are causally independent of ourselves; if not, not. Thus in this form the question reduces to the question whether we can know that objects of sense, or any other objects not our own thoughts and feelings, exist at times when we are not perceiving them. This form, in which the difficult word "independent" no longer occurs, is the form in which we stated the problem a minute ago.

Our question in the above form raises two distinct problems, which it is important to keep separate. First, can we know that objects of sense, or

very similar objects, exist at times when we are not perceiving them? Secondly, if this cannot be known, can we know that other objects, inferable from objects of sense but not necessarily resembling them, exist either when we are perceiving the objects of sense or at any other time? This latter problem arises in philosophy as the problem of the "thing in itself," and in science as the problem of matter as assumed in physics. We will consider this latter problem first.

Owing to the fact that we feel passive in sensation, we naturally suppose that our sensations have outside causes. Now it is necessary here first of all to distinguish between (1) our sensation, which is a mental event consisting in our being aware of a sensible object, and (2) the sensible object of which we are aware in sensation. When I speak of the sensible object, it must be understood that I do not mean such a thing as a table, which is both visible and tangible, can be seen by many people at once, and is more or less permanent. What I mean is just that patch of colour which is momentarily seen when we look at the table, or just that particular hardness which is felt when we press it, or just that particular sound which is heard when we rap it. Each of these I call a sensible object, and our awareness of it I call a sensation. Now our sense of passivity, if it really afforded any argument, would only tend to show that the sensation has an outside cause; this cause we should naturally seek in the sensible object. Thus there is no good reason, so far, for supposing that sensible objects must have outside causes. But both the thing-in-itself of philosophy and the matter of physics present themselves as outside causes of the

sensible object as much as of the sensation. What are the grounds for this common opinion?

In each case, I think, the opinion has resulted from the combination of a belief that something which can persist independently of our consciousness makes itself known in sensation, with the fact that our sensations often change in ways which seem to depend upon us rather than upon anything which would be supposed to persist independently of us. At first, we believe unreflectingly that everything is as it seems to be, and that, if we shut our eyes, the objects we had been seeing remain as they were though we no longer see them. But there are arguments against this view, which have generally been thought conclusive. It is extraordinarily difficult to see just what the arguments prove; but if we are to make any progress with the problem of the external world, we must try to make up our minds as to these arguments.

A table viewed from one place presents a different appearance from that which it presents from another place. This is the language of common sense, but this language already assumes that there is a real table of which we see the appearances. Let us try to state what is known in terms of sensible objects alone, without any element of hypothesis. We find that as we walk round the table, we perceive a series of gradually changing visible objects. But in speaking of "walking round the table," we have still retained the hypothesis that there is a single table connected with all the appearances. What we ought to say is that, while we have those muscular and other sensations which make us say we are

walking, our visual sensations change in a continuous way, so that, for example, a striking patch of colour is not suddenly replaced by something wholly different, but is replaced by an insensible gradation of slightly different colours with slightly different shapes. This is what we really know by experience, when we have freed our minds from the assumption of permanent "things" with changing appearances. What is really known is a correlation of muscular and other bodily sensations with changes in visual sensations.

But walking round the table is not the only way of altering its appearance. We can shut one eye, or put on blue spectacles, or look through a microscope. All these operations, in various ways, alter the visual appearance which we call that of the table. More distant objects will also alter their appearance if (as we say) the state of the atmosphere changes--if there is fog or rain or sunshine. Physiological changes also alter the appearances of things. If we assume the world of common sense, all these changes, including those attributed to physiological causes, are changes in the intervening medium. It is not quite so easy as in the former case to reduce this set of facts to a form in which nothing is assumed beyond sensible objects. Anything intervening between ourselves and what we see must be invisible: our view in every direction is bounded by the nearest visible object. It might be objected that a dirty pane of glass, for example, is visible although we can see things through it. But in this case we really see a spotted patchwork: the dirtier specks in the glass are visible, while the cleaner parts are invisible and allow us to see what is beyond. Thus

the discovery that the intervening medium affects the appearances of things cannot be made by means of the sense of sight alone.

Let us take the case of the blue spectacles, which is the simplest, but may serve as a type for the others. The frame of the spectacles is of course visible, but the blue glass, if it is clean, is not visible. The blueness, which we say is in the glass, appears as being in the objects seen through the glass. The glass itself is known by means of the sense of touch. In order to know that it is between us and the objects seen through it, we must know how to correlate the space of touch with the space of sight. This correlation itself, when stated in terms of the data of sense alone, is by no means a simple matter. But it presents no difficulties of principle, and may therefore be supposed accomplished. When it has been accomplished, it becomes possible to attach a meaning to the statement that the blue glass, which we can touch, is between us and the object seen, as we say, "through" it.

But we have still not reduced our statement completely to what is actually given in sense. We have fallen into the assumption that the object of which we are conscious when we touch the blue spectacles still exists after we have ceased to touch them. So long as we are touching them, nothing except our finger can be seen through the part touched, which is the only part where we immediately know that there is something. If we are to account for the blue appearance of objects other than the spectacles, when seen through them, it might seem as if we must assume that the spectacles still exist when we are not touching them;

and if this assumption really is necessary, our main problem is answered: we have means of knowing of the present existence of objects not given in sense, though of the same kind as objects formerly given in sense.

It may be questioned, however, whether this assumption is actually unavoidable, though it is unquestionably the most natural one to make. We may say that the object of which we become aware when we touch the spectacles continues to have effects afterwards, though perhaps it no longer exists. In this view, the supposed continued existence of sensible objects after they have ceased to be sensible will be a fallacious inference from the fact that they still have effects. It is often supposed that nothing which has ceased to exist can continue to have effects, but this is a mere prejudice, due to a wrong conception of causality. We cannot, therefore, dismiss our present hypothesis on the ground of a priori impossibility, but must examine further whether it can really account for the facts.

It may be said that our hypothesis is useless in the case when the blue glass is never touched at all. How, in that case, are we to account for the blue appearance of objects? And more generally, what are we to make of the hypothetical sensations of touch which we associate with untouched visible objects, which we know would be verified if we chose, though in fact we do not verify them? Must not these be attributed to permanent possession, by the objects, of the properties which touch would reveal?

Let us consider the more general question first. Experience has taught us that where we see certain kinds of coloured surfaces we can, by touch, obtain certain expected sensations of hardness or softness, tactile shape, and so on. This leads us to believe that what is seen is usually tangible, and that it has, whether we touch it or not, the hardness or softness which we should expect to feel if we touched it. But the mere fact that we are able to infer what our tactile sensations would be shows that it is not logically necessary to assume tactile qualities before they are felt. All that is really known is that the visual appearance in question, together with touch, will lead to certain sensations, which can necessarily be determined in terms of the visual appearance, since otherwise they could not be inferred from it.

We can now give a statement of the experienced facts concerning the blue spectacles, which will supply an interpretation of common-sense beliefs without assuming anything beyond the existence of sensible objects at the times when they are sensible. By experience of the correlation of touch and sight sensations, we become able to associate a certain place in touch-space with a certain corresponding place in sight-space. Sometimes, namely in the case of transparent things, we find that there is a tangible object in a touch-place without there being any visible object in the corresponding sight-place. But in such a case as that of the blue spectacles, we find that whatever object is visible beyond the empty sight-place in the same line of sight has a different colour from what it has when there is no tangible object in the intervening

touch-place; and as we move the tangible object in touch-space, the blue patch moves in sight-space. If now we find a blue patch moving in this way in sight-space, when we have no sensible experience of an intervening tangible object, we nevertheless infer that, if we put our hand at a certain place in touch-space, we should experience a certain touch-sensation. If we are to avoid non-sensible objects, this must be taken as the whole of our meaning when we say that the blue spectacles are in a certain place, though we have not touched them, and have only seen other things rendered blue by their interposition.

I think it may be laid down quite generally that, in so far as physics or common sense is verifiable, it must be capable of interpretation in terms of actual sense-data alone. The reason for this is simple. Verification consists always in the occurrence of an expected sense-datum. Astronomers tell us there will be an eclipse of the moon: we look at the moon, and find the earth's shadow biting into it, that is to say, we see an appearance quite different from that of the usual full moon. Now if an expected sense-datum constitutes a verification, what was asserted must have been about sense-data; or, at any rate, if part of what was asserted was not about sense-data, then only the other part has been verified. There is in fact a certain regularity or conformity to law about the occurrence of sense-data, but the sense-data that occur at one time are often causally connected with those that occur at quite other times, and not, or at least not very closely, with those that occur at neighbouring times. If I look at the moon and immediately afterwards hear a train coming, there is no very close causal connection

between my two sense-data; but if I look at the moon on two nights a week apart, there is a very close causal connection between the two sense-data. The simplest, or at least the easiest, statement of the connection is obtained by imagining a "real" moon which goes on whether I look at it or not, providing a series of possible sense-data of which only those are actual which belong to moments when I choose to look at the moon.

But the degree of verification obtainable in this way is very small. It must be remembered that, at our present level of doubt, we are not at liberty to accept testimony. When we hear certain noises, which are those we should utter if we wished to express a certain thought, we assume that that thought, or one very like it, has been in another mind, and has given rise to the expression which we hear. If at the same time we see a body resembling our own, moving its lips as we move ours when we speak, we cannot resist the belief that it is alive, and that the feelings inside it continue when we are not looking at it. When we see our friend drop a weight upon his toe, and hear him say--what we should say in similar circumstances, the phenomena can no doubt be explained without assuming that he is anything but a series of shapes and noises seen and heard by us, but practically no man is so infected with philosophy as not to be quite certain that his friend has felt the same kind of pain as he himself would feel. We will consider the legitimacy of this belief presently; for the moment, I only wish to point out that it needs the same kind of justification as our belief that the moon exists when we do not see it, and that, without it, testimony heard or

read is reduced to noises and shapes, and cannot be regarded as evidence of the facts which it reports. The verification of physics which is possible at our present level is, therefore, only that degree of verification which is possible by one man's unaided observations, which will not carry us very far towards the establishment of a whole science.

Before proceeding further, let us summarise the argument so far as it has gone. The problem is: "Can the existence of anything other than our own hard data be inferred from these data?" It is a mistake to state the problem in the form: "Can we know of the existence of anything other than ourselves and our states?" or: "Can we know of the existence of anything independent of ourselves?" because of the extreme difficulty of defining "self" and "independent" precisely. The felt passivity of sensation is irrelevant, since, even if it proved anything, it could only prove that sensations are caused by sensible objects. The natural naïve belief is that things seen persist, when unseen, exactly or approximately as they appeared when seen; but this belief tends to be dispelled by the fact that what common sense regards as the appearance of one object changes with what common sense regards as changes in the point of view and in the intervening medium, including in the latter our own sense-organs and nerves and brain. This fact, as just stated, assumes, however, the common-sense world of stable objects which it professes to call in question; hence, before we can discover its precise bearing on our problem, we must find a way of stating it which does not involve any of the assumptions which it is designed to render doubtful. What we then find, as the bare outcome of experience, is that gradual

changes in certain sense-data are correlated with gradual changes in certain others, or (in the case of bodily motions) with the other sense-data themselves.

The assumption that sensible objects persist after they have ceased to be sensible--for example, that the hardness of a visible body, which has been discovered by touch, continues when the body is no longer touched--may be replaced by the statement that the effects of sensible objects persist, i.e. that what happens now can only be accounted for, in many cases, by taking account of what happened at an earlier time. Everything that one man, by his own personal experience, can verify in the account of the world given by common sense and physics, will be explicable by some such means, since verification consists merely in the occurrence of an expected sense-datum. But what depends upon testimony, whether heard or read, cannot be explained in this way, since testimony depends upon the existence of minds other than our own, and thus requires a knowledge of something not given in sense. But before examining the question of our knowledge of other minds, let us return to the question of the thing-in-itself, namely, to the theory that what exists at times when we are not perceiving a given sensible object is something quite unlike that object, something which, together with us and our sense-organs, causes our sensations, but is never itself given in sensation.

The thing-in-itself, when we start from common-sense assumptions, is a fairly natural outcome of the difficulties due to the changing

appearances of what is supposed to be one object. It is supposed that the table (for example) causes our sense-data of sight and touch, but must, since these are altered by the point of view and the intervening medium, be quite different from the sense-data to which it gives rise. There is, in this theory, a tendency to a confusion from which it derives some of its plausibility, namely, the confusion between a sensation as a psychical occurrence and its object. A patch of colour, even if it only exists when it is seen, is still something quite different from the seeing of it: the seeing of it is mental, but the patch of colour is not. This confusion, however, can be avoided without our necessarily abandoning the theory we are examining. The objection to it, I think, lies in its failure to realise the radical nature of the reconstruction demanded by the difficulties to which it points. We cannot speak legitimately of changes in the point of view and the intervening medium until we have already constructed some world more stable than that of momentary sensation. Our discussion of the blue spectacles and the walk round the table has, I hope, made this clear. But what remains far from clear is the nature of the reconstruction required.

Although we cannot rest content with the above theory, in the terms in which it is stated, we must nevertheless treat it with a certain respect, for it is in outline the theory upon which physical science and physiology are built, and it must, therefore, be susceptible of a true interpretation. Let us see how this is to be done.

The first thing to realise is that there are no such things as "illusions of sense." Objects of sense, even when they occur in dreams, are the most indubitably real objects known to us. What, then, makes us call them unreal in dreams? Merely the unusual nature of their connection with other objects of sense. I dream that I am in America, but I wake up and find myself in England without those intervening days on the Atlantic which, alas! are inseparably connected with a "real" visit to America. Objects of sense are called "real" when they have the kind of connection with other objects of sense which experience has led us to regard as normal; when they fail in this, they are called "illusions." But what is illusory is only the inferences to which they give rise; in themselves, they are every bit as real as the objects of waking life. And conversely, the sensible objects of waking life must not be expected to have any more intrinsic reality than those of dreams. Dreams and waking life, in our first efforts at construction, must be treated with equal respect; it is only by some reality not merely sensible that dreams can be condemned.

Accepting the indubitable momentary reality of objects of sense, the next thing to notice is the confusion underlying objections derived from their changeableness. As we walk round the table, its aspect changes; but it is thought impossible to maintain either that the table changes, or that its various aspects can all "really" exist in the same place. If we press one eyeball, we shall see two tables; but it is thought preposterous to maintain that there are "really" two tables. Such arguments, however, seem to involve the assumption that there can be

something more real than objects of sense. If we see two tables, then there are two visual tables. It is perfectly true that, at the same moment, we may discover by touch that there is only one tactile table. This makes us declare the two visual tables an illusion, because usually one visual object corresponds to one tactile object. But all that we are warranted in saying is that, in this case, the manner of correlation of touch and sight is unusual. Again, when the aspect of the table changes as we walk round it, and we are told there cannot be so many different aspects in the same place, the answer is simple: what does the critic of the table mean by "the same place"? The use of such a phrase presupposes that all our difficulties have been solved; as yet, we have no right to speak of a "place" except with reference to one given set of momentary sense-data. When all are changed by a bodily movement, no place remains the same as it was. Thus the difficulty, if it exists, has at least not been rightly stated.

We will now make a new start, adopting a different method. Instead of inquiring what is the minimum of assumption by which we can explain the world of sense, we will, in order to have a model hypothesis as a help for the imagination, construct one possible (not necessary) explanation of the facts. It may perhaps then be possible to pare away what is superfluous in our hypothesis, leaving a residue which may be regarded as the abstract answer to our problem.

Let us imagine that each mind looks out upon the world, as in Leibniz's monadology, from a point of view peculiar to itself; and for the sake of

simplicity let us confine ourselves to the sense of sight, ignoring minds which are devoid of this sense. Each mind sees at each moment an immensely complex three-dimensional world; but there is absolutely nothing which is seen by two minds simultaneously. When we say that two people see the same thing, we always find that, owing to difference of point of view, there are differences, however slight, between their immediate sensible objects. (I am here assuming the validity of testimony, but as we are only constructing a possible theory, that is a legitimate assumption.) The three-dimensional world seen by one mind therefore contains no place in common with that seen by another, for places can only be constituted by the things in or around them. Hence we may suppose, in spite of the differences between the different worlds, that each exists entire exactly as it is perceived, and might be exactly as it is even if it were not perceived. We may further suppose that there are an infinite number of such worlds which are in fact unperceived. If two men are sitting in a room, two somewhat similar worlds are perceived by them; if a third man enters and sits between them, a third world, intermediate between the two previous worlds, begins to be perceived. It is true that we cannot reasonably suppose just this world to have existed before, because it is conditioned by the sense-organs, nerves, and brain of the newly arrived man; but we can reasonably suppose that some aspect of the universe existed from that point of view, though no one was perceiving it. The system consisting of all views of the universe perceived and unperceived, I shall call the system of "perspectives"; I shall confine the expression "private worlds" to such views of the universe as are actually perceived. Thus a

"private world" is a perceived "perspective"; but there may be any number of unperceived perspectives.

Two men are sometimes found to perceive very similar perspectives, so similar that they can use the same words to describe them. They say they see the same table, because the differences between the two tables they see are slight and not practically important. Thus it is possible, sometimes, to establish a correlation by similarity between a great many of the things of one perspective, and a great many of the things of another. In case the similarity is very great, we say the points of view of the two perspectives are near together in space; but this space in which they are near together is totally different from the spaces inside the two perspectives. It is a relation between the perspectives, and is not in either of them; no one can perceive it, and if it is to be known it can be only by inference. Between two perceived perspectives which are similar, we can imagine a whole series of other perspectives, some at least unperceived, and such that between any two, however similar, there are others still more similar. In this way the space which consists of relations between perspectives can be rendered continuous, and (if we choose) three-dimensional.

We can now define the momentary common-sense "thing," as opposed to its momentary appearances. By the similarity of neighbouring perspectives, many objects in the one can be correlated with objects in the other, namely, with the similar objects. Given an object in one perspective, form the system of all the objects correlated with it in all the

perspectives; that system may be identified with the momentary common-sense "thing." Thus an aspect of a "thing" is a member of the system of aspects which is the "thing" at that moment. (The correlation of the times of different perspectives raises certain complications, of the kind considered in the theory of relativity; but we may ignore these at present.) All the aspects of a thing are real, whereas the thing is a mere logical construction. It has, however, the merit of being neutral as between different points of view, and of being visible to more than one person, in the only sense in which it can ever be visible, namely, in the sense that each sees one of its aspects.

It will be observed that, while each perspective contains its own space, there is only one space in which the perspectives themselves are the elements. There are as many private spaces as there are perspectives; there are therefore at least as many as there are percipients, and there may be any number of others which have a merely material existence and are not seen by anyone. But there is only one perspective-space, whose elements are single perspectives, each with its own private space. We have now to explain how the private space of a single perspective is correlated with part of the one all-embracing perspective space.

Perspective space is the system of "points of view" of private spaces (perspectives), or, since "points of view" have not been defined, we may say it is the system of the private spaces themselves. These private spaces will each count as one point, or at any rate as one element, in perspective space. They are ordered by means of their similarities.

Suppose, for example, that we start from one which contains the appearance of a circular disc, such as would be called a penny, and suppose this appearance, in the perspective in question, is circular, not elliptic. We can then form a whole series of perspectives containing a graduated series of circular aspects of varying sizes: for this purpose we only have to move (as we say) towards the penny or away from it. The perspectives in which the penny looks circular will be said to lie on a straight line in perspective space, and their order on this line will be that of the sizes of the circular aspects. Moreover--though this statement must be noticed and subsequently examined--the perspectives in which the penny looks big will be said to be nearer to the penny than those in which it looks small. It is to be remarked also that any other "thing" than our penny might have been chosen to define the relations of our perspectives in perspective space, and that experience shows that the same spatial order of perspectives would have resulted.

In order to explain the correlation of private spaces with perspective space, we have first to explain what is meant by "the place (in perspective space) where a thing is." For this purpose, let us again consider the penny which appears in many perspectives. We formed a straight line of perspectives in which the penny looked circular, and we agreed that those in which it looked larger were to be considered as nearer to the penny. We can form another straight line of perspectives in which the penny is seen end-on and looks like a straight line of a certain thickness. These two lines will meet in a certain place in

perspective space, i.e. in a certain perspective, which may be defined as "the place (in perspective space) where the penny is." It is true that, in order to prolong our lines until they reach this place, we shall have to make use of other things besides the penny, because, so far as experience goes, the penny ceases to present any appearance after we have come so near to it that it touches the eye. But this raises no real difficulty, because the spatial order of perspectives is found empirically to be independent of the particular "things" chosen for defining the order. We can, for example, remove our penny and prolong each of our two straight lines up to their intersection by placing other pennies further off in such a way that the aspects of the one are circular where those of our original penny were circular, and the aspects of the other are straight where those of our original penny were straight. There will then be just one perspective in which one of the new pennies looks circular and the other straight. This will be, by definition, the place where the original penny was in perspective space.

The above is, of course, only a first rough sketch of the way in which our definition is to be reached. It neglects the size of the penny, and it assumes that we can remove the penny without being disturbed by any simultaneous changes in the positions of other things. But it is plain that such niceties cannot affect the principle, and can only introduce complications in its application.

Having now defined the perspective which is the place where a given thing is, we can understand what is meant by saying that the

perspectives in which a thing looks large are nearer to the thing than those in which it looks small: they are, in fact, nearer to the perspective which is the place where the thing is.

We can now also explain the correlation between a private space and parts of perspective space. If there is an aspect of a given thing in a certain private space, then we correlate the place where this aspect is in the private space with the place where the thing is in perspective space.

We may define "here" as the place, in perspective space, which is occupied by our private world. Thus we can now understand what is meant by speaking of a thing as near to or far from "here." A thing is near to "here" if the place where it is is near to my private world. We can also understand what is meant by saying that our private world is inside our head; for our private world is a place in perspective space, and may be part of the place where our head is.

It will be observed that two places in perspective space are associated with every aspect of a thing: namely, the place where the thing is, and the place which is the perspective of which the aspect in question forms part. Every aspect of a thing is a member of two different classes of aspects, namely: (1) the various aspects of the thing, of which at most one appears in any given perspective; (2) the perspective of which the given aspect is a member, i.e. that in which the thing has the given aspect. The physicist naturally classifies

aspects in the first way, the psychologist in the second. The two places associated with a single aspect correspond to the two ways of classifying it. We may distinguish the two places as that at which, and that from which, the aspect appears. The "place at which" is the place of the thing to which the aspect belongs; the "place from which" is the place of the perspective to which the aspect belongs.

Let us now endeavour to state the fact that the aspect which a thing presents at a given place is affected by the intervening medium. The aspects of a thing in different perspectives are to be conceived as spreading outwards from the place where the thing is, and undergoing various changes as they get further away from this place. The laws according to which they change cannot be stated if we only take account of the aspects that are near the thing, but require that we should also take account of the things that are at the places from which these aspects appear. This empirical fact can, therefore, be interpreted in terms of our construction.

We have now constructed a largely hypothetical picture of the world, which contains and places the experienced facts, including those derived from testimony. The world we have constructed can, with a certain amount of trouble, be used to interpret the crude facts of sense, the facts of physics, and the facts of physiology. It is therefore a world which may be actual. It fits the facts, and there is no empirical evidence against it; it also is free from logical impossibilities. But have we any good reason to suppose that it is real? This brings us back to our

original problem, as to the grounds for believing in the existence of anything outside my private world. What we have derived from our hypothetical construction is that there are no grounds against the truth of this belief, but we have not derived any positive grounds in its favour. We will resume this inquiry by taking up again the question of testimony and the evidence for the existence of other minds.

It must be conceded to begin with that the argument in favour of the existence of other people's minds cannot be conclusive. A phantasm of our dreams will appear to have a mind--a mind to be annoying, as a rule. It will give unexpected answers, refuse to conform to our desires, and show all those other signs of intelligence to which we are accustomed in the acquaintances of our waking hours. And yet, when we are awake, we do not believe that the phantasm was, like the appearances of people in waking life, representative of a private world to which we have no direct access. If we are to believe this of the people we meet when we are awake, it must be on some ground short of demonstration, since it is obviously possible that what we call waking life may be only an unusually persistent and recurrent nightmare. It may be that our imagination brings forth all that other people seem to say to us, all that we read in books, all the daily, weekly, monthly, and quarterly journals that distract our thoughts, all the advertisements of soap and all the speeches of politicians. This may be true, since it cannot be shown to be false, yet no one can really believe it. Is there any logical ground for regarding this possibility as improbable? Or is there nothing beyond habit and prejudice?

The minds of other people are among our data, in the very wide sense in which we used the word at first. That is to say, when we first begin to reflect, we find ourselves already believing in them, not because of any argument, but because the belief is natural to us. It is, however, a psychologically derivative belief, since it results from observation of people's bodies; and along with other such beliefs, it does not belong to the hardest of hard data, but becomes, under the influence of philosophic reflection, just sufficiently questionable to make us desire some argument connecting it with the facts of sense.

The obvious argument is, of course, derived from analogy. Other people's bodies behave as ours do when we have certain thoughts and feelings; hence, by analogy, it is natural to suppose that such behaviour is connected with thoughts and feelings like our own. Someone says, "Look out!" and we find we are on the point of being killed by a motor-car; we therefore attribute the words we heard to the person in question having seen the motor-car first, in which case there are existing things of which we are not directly conscious. But this whole scene, with our inference, may occur in a dream, in which case the inference is generally considered to be mistaken. Is there anything to make the argument from analogy more cogent when we are (as we think) awake?

The analogy in waking life is only to be preferred to that in dreams on the ground of its greater extent and consistency. If a man were to dream every night about a set of people whom he never met by day, who had

consistent characters and grew older with the lapse of years, he might, like the man in Calderon's play, find it difficult to decide which was the dream-world and which was the so-called "real" world. It is only the failure of our dreams to form a consistent whole either with each other or with waking life that makes us condemn them. Certain uniformities are observed in waking life, while dreams seem quite erratic. The natural hypothesis would be that demons and the spirits of the dead visit us while we sleep; but the modern mind, as a rule, refuses to entertain this view, though it is hard to see what could be said against it. On the other hand, the mystic, in moments of illumination, seems to awaken from a sleep which has filled all his mundane life: the whole world of sense becomes phantasmal, and he sees, with the clarity and convincingness that belongs to our morning realisation after dreams, a world utterly different from that of our daily cares and troubles. Who shall condemn him? Who shall justify him? Or who shall justify the seeming solidity of the common objects among which we suppose ourselves to live?

The hypothesis that other people have minds must, I think, be allowed to be not susceptible of any very strong support from the analogical argument. At the same time, it is a hypothesis which systematises a vast body of facts and never leads to any consequences which there is reason to think false. There is therefore nothing to be said against its truth, and good reason to use it as a working hypothesis. When once it is admitted, it enables us to extend our knowledge of the sensible world by testimony, and thus leads to the system of private worlds which we

assumed in our hypothetical construction. In actual fact, whatever we may try to think as philosophers, we cannot help believing in the minds of other people, so that the question whether our belief is justified has a merely speculative interest. And if it is justified, then there is no further difficulty of principle in that vast extension of our knowledge, beyond our own private data, which we find in science and common sense.

This somewhat meagre conclusion must not be regarded as the whole outcome of our long discussion. The problem of the connection of sense with objective reality has commonly been dealt with from a standpoint which did not carry initial doubt so far as we have carried it; most writers, consciously or unconsciously, have assumed that the testimony of others is to be admitted, and therefore (at least by implication) that others have minds. Their difficulties have arisen after this admission, from the differences in the appearance which one physical object presents to two people at the same time, or to one person at two times between which it cannot be supposed to have changed. Such difficulties have made people doubtful how far objective reality could be known by sense at all, and have made them suppose that there were positive arguments against the view that it can be so known. Our hypothetical construction meets these arguments, and shows that the account of the world given by common sense and physical science can be interpreted in a way which is logically unobjectionable, and finds a place for all the data, both hard and soft. It is this hypothetical construction, with its reconciliation of psychology and physics, which

is the chief outcome of our discussion. Probably the construction is only in part necessary as an initial assumption, and can be obtained from more slender materials by the logical methods of which we shall have an example in the definitions of points, instants, and particles; but I do not yet know to what lengths this diminution in our initial assumptions can be carried.