

LECTURE IX. MEMORY

Memory, which we are to consider to-day, introduces us to knowledge in one of its forms. The analysis of knowledge will occupy us until the end of the thirteenth lecture, and is the most difficult part of our whole enterprise.

I do not myself believe that the analysis of knowledge can be effected entirely by means of purely external observation, such as behaviourists employ. I shall discuss this question in later lectures. In the present lecture I shall attempt the analysis of memory-knowledge, both as an introduction to the problem of knowledge in general, and because memory, in some form, is presupposed in almost all other knowledge. Sensation, we decided, is not a form of knowledge. It might, however, have been expected that we should begin our discussion of knowledge with PERCEPTION, i.e. with that integral experience of things in the environment, out of which sensation is extracted by psychological analysis. What is called perception differs from sensation by the fact that the sensational ingredients bring up habitual associates--images and expectations of their usual correlates--all of which are subjectively indistinguishable from the sensation. The FACT of past experience is essential in producing this filling-out of sensation, but not the RECOLLECTION of past experience. The non-sensational elements in perception can be wholly explained as the result of habit, produced by frequent correlations. Perception, according to our definition in Lecture VII, is no more a form of knowledge than sensation is, except

in so far as it involves expectations. The purely psychological problems which it raises are not very difficult, though they have sometimes been rendered artificially obscure by unwillingness to admit the fallibility of the non-sensational elements of perception. On the other hand, memory raises many difficult and very important problems, which it is necessary to consider at the first possible moment.

One reason for treating memory at this early stage is that it seems to be involved in the fact that images are recognized as "copies" of past sensible experience. In the preceding lecture I alluded to Hume's principle "that all our simple ideas in their first appearance are derived from simple impressions, which are correspondent to them, and which they exactly represent." Whether or not this principle is liable to exceptions, everyone would agree that it has a broad measure of truth, though the word "exactly" might seem an overstatement, and it might seem more correct to say that ideas APPROXIMATELY represent impressions. Such modifications of Hume's principle, however, do not affect the problem which I wish to present for your consideration, namely: Why do we believe that images are, sometimes or always, approximately or exactly, copies of sensations? What sort of evidence is there? And what sort of evidence is logically possible? The difficulty of this question arises through the fact that the sensation which an image is supposed to copy is in the past when the image exists, and can therefore only be known by memory, while, on the other hand, memory of past sensations seems only possible by means of present images. How, then, are we to find any way of comparing the present image and the past

sensation? The problem is just as acute if we say that images differ from their prototypes as if we say that they resemble them; it is the very possibility of comparison that is hard to understand.* We think we can know that they are alike or different, but we cannot bring them together in one experience and compare them. To deal with this problem, we must have a theory of memory. In this way the whole status of images as "copies" is bound up with the analysis of memory.

* How, for example, can we obtain such knowledge as the following: "If we look at, say, a red nose and perceive it, and after a little while ekphore, its memory-image, we note immediately how unlike, in its likeness, this memory-image is to the original perception" (A. Wohlgemuth, "On the Feelings and their Neural Correlate with an Examination of the Nature of Pain," "Journal of Psychology," vol. viii, part iv, June, 1917).

In investigating memory-beliefs, there are certain points which must be borne in mind. In the first place, everything constituting a memory-belief is happening now, not in that past time to which the belief is said to refer. It is not logically necessary to the existence of a memory-belief that the event remembered should have occurred, or even that the past should have existed at all. There is no logical impossibility in the hypothesis that the world sprang into being five minutes ago, exactly as it then was, with a population that "remembered" a wholly unreal past. There is no logically necessary connection between

events at different times; therefore nothing that is happening now or will happen in the future can disprove the hypothesis that the world began five minutes ago. Hence the occurrences which are CALLED knowledge of the past are logically independent of the past; they are wholly analysable into present contents, which might, theoretically, be just what they are even if no past had existed.

I am not suggesting that the non-existence of the past should be entertained as a serious hypothesis. Like all sceptical hypotheses, it is logically tenable, but uninteresting. All that I am doing is to use its logical tenability as a help in the analysis of what occurs when we remember.

In the second place, images without beliefs are insufficient to constitute memory; and habits are still more insufficient. The behaviourist, who attempts to make psychology a record of behaviour, has to trust his memory in making the record. "Habit" is a concept involving the occurrence of similar events at different times; if the behaviourist feels confident that there is such a phenomenon as habit, that can only be because he trusts his memory, when it assures him that there have been other times. And the same applies to images. If we are to know as it is supposed we do--that images are "copies," accurate or inaccurate, of past events, something more than the mere occurrence of images must go to constitute this knowledge. For their mere occurrence, by itself, would not suggest any connection with anything that had happened before.

Can we constitute memory out of images together with suitable beliefs?

We may take it that memory-images, when they occur in true memory, are (a) known to be copies, (b) sometimes known to be imperfect copies (cf. footnote on previous page). How is it possible to know that a memory-image is an imperfect copy, without having a more accurate copy by which to replace it? This would SEEM to suggest that we have a way of knowing the past which is independent of images, by means of which we can criticize image-memories. But I do not think such an inference is warranted.

What results, formally, from our knowledge of the past through images of which we recognize the inaccuracy, is that such images must have two characteristics by which we can arrange them in two series, of which one corresponds to the more or less remote period in the past to which they refer, and the other to our greater or less confidence in their accuracy. We will take the second of these points first.

Our confidence or lack of confidence in the accuracy of a memory-image must, in fundamental cases, be based upon a characteristic of the image itself, since we cannot evoke the past bodily and compare it with the present image. It might be suggested that vagueness is the required characteristic, but I do not think this is the case. We sometimes have images that are by no means peculiarly vague, which yet we do not trust--for example, under the influence of fatigue we may see a friend's face vividly and clearly, but horribly distorted. In such a case we distrust our image in spite of its being unusually clear. I think

the characteristic by which we distinguish the images we trust is the feeling of FAMILIARITY that accompanies them. Some images, like some sensations, feel very familiar, while others feel strange. Familiarity is a feeling capable of degrees. In an image of a well-known face, for example, some parts may feel more familiar than others; when this happens, we have more belief in the accuracy of the familiar parts than in that of the unfamiliar parts. I think it is by this means that we become critical of images, not by some imageless memory with which we compare them. I shall return to the consideration of familiarity shortly.

I come now to the other characteristic which memory-images must have in order to account for our knowledge of the past. They must have some characteristic which makes us regard them as referring to more or less remote portions of the past. That is to say if we suppose that A is the event remembered, B the remembering, and t the interval of time between A and B, there must be some characteristic of B which is capable of degrees, and which, in accurately dated memories, varies as t varies. It may increase as t increases, or diminish as t increases. The question which of these occurs is not of any importance for the theoretic serviceability of the characteristic in question.

In actual fact, there are doubtless various factors that concur in giving us the feeling of greater or less remoteness in some remembered event. There may be a specific feeling which could be called the feeling of "pastness," especially where immediate memory is concerned. But apart

from this, there are other marks. One of these is context. A recent memory has, usually, more context than a more distant one. When a remembered event has a remembered context, this may occur in two ways, either (a) by successive images in the same order as their prototypes, or (b) by remembering a whole process simultaneously, in the same way in which a present process may be apprehended, through akoluthic sensations which, by fading, acquire the mark of just-pastness in an increasing degree as they fade, and are thus placed in a series while all sensibly present. It will be context in this second sense, more specially, that will give us a sense of the nearness or remoteness of a remembered event.

There is, of course, a difference between knowing the temporal relation of a remembered event to the present, and knowing the time-order of two remembered events. Very often our knowledge of the temporal relation of a remembered event to the present is inferred from its temporal relations to other remembered events. It would seem that only rather recent events can be placed at all accurately by means of feelings giving their temporal relation to the present, but it is clear that such feelings must play an essential part in the process of dating remembered events.

We may say, then, that images are regarded by us as more or less accurate copies of past occurrences because they come to us with two sorts of feelings: (1) Those that may be called feelings of familiarity; (2) those that may be collected together as feelings giving a sense of

pastness. The first lead us to trust our memories, the second to assign places to them in the time-order.

We have now to analyse the memory-belief, as opposed to the characteristics of images which lead us to base memory-beliefs upon them.

If we had retained the "subject" or "act" in knowledge, the whole problem of memory would have been comparatively simple. We could then have said that remembering is a direct relation between the present act or subject and the past occurrence remembered: the act of remembering is present, though its object is past. But the rejection of the subject renders some more complicated theory necessary. Remembering has to be a present occurrence in some way resembling, or related to, what is remembered. And it is difficult to find any ground, except a pragmatic one, for supposing that memory is not sheer delusion, if, as seems to be the case, there is not, apart from memory, any way of ascertaining that there really was a past occurrence having the required relation to our present remembering. What, if we followed Meinong's terminology, we should call the "object" in memory, i.e. the past event which we are said to be remembering, is unpleasantly remote from the "content," i.e. the present mental occurrence in remembering. There is an awkward gulf between the two, which raises difficulties for the theory of knowledge. But we must not falsify observation to avoid theoretical difficulties. For the present, therefore, let us forget these problems, and try to discover what actually occurs in memory.

Some points may be taken as fixed, and such as any theory of memory must arrive at. In this case, as in most others, what may be taken as certain in advance is rather vague. The study of any topic is like the continued observation of an object which is approaching us along a road: what is certain to begin with is the quite vague knowledge that there is SOME object on the road. If you attempt to be less vague, and to assert that the object is an elephant, or a man, or a mad dog, you run a risk of error; but the purpose of continued observation is to enable you to arrive at such more precise knowledge. In like manner, in the study of memory, the certainties with which you begin are very vague, and the more precise propositions at which you try to arrive are less certain than the hazy data from which you set out. Nevertheless, in spite of the risk of error, precision is the goal at which we must aim.

The first of our vague but indubitable data is that there is knowledge of the past. We do not yet know with any precision what we mean by "knowledge," and we must admit that in any given instance our memory may be at fault. Nevertheless, whatever a sceptic might urge in theory, we cannot practically doubt that we got up this morning, that we did various things yesterday, that a great war has been taking place, and so on. How far our knowledge of the past is due to memory, and how far to other sources, is of course a matter to be investigated, but there can be no doubt that memory forms an indispensable part of our knowledge of the past.

The second datum is that we certainly have more capacity for knowing the past than for knowing the future. We know some things about the future, for example what eclipses there will be; but this knowledge is a matter of elaborate calculation and inference, whereas some of our knowledge of the past comes to us without effort, in the same sort of immediate way in which we acquire knowledge of occurrences in our present environment. We might provisionally, though perhaps not quite correctly, define "memory" as that way of knowing about the past which has no analogue in our knowledge of the future; such a definition would at least serve to mark the problem with which we are concerned, though some expectations may deserve to rank with memory as regards immediacy.

A third point, perhaps not quite so certain as our previous two, is that the truth of memory cannot be wholly practical, as pragmatists wish all truth to be. It seems clear that some of the things I remember are trivial and without any visible importance for the future, but that my memory is true (or false) in virtue of a past event, not in virtue of any future consequences of my belief. The definition of truth as the correspondence between beliefs and facts seems peculiarly evident in the case of memory, as against not only the pragmatist definition but also the idealist definition by means of coherence. These considerations, however, are taking us away from psychology, to which we must now return.

It is important not to confuse the two forms of memory which Bergson distinguishes in the second chapter of his "Matter and Memory,"

namely the sort that consists of habit, and the sort that consists of independent recollection. He gives the instance of learning a lesson by heart: when I know it by heart I am said to "remember" it, but this merely means that I have acquired certain habits; on the other hand, my recollection of (say) the second time I read the lesson while I was learning it is the recollection of a unique event, which occurred only once. The recollection of a unique event cannot, so Bergson contends, be wholly constituted by habit, and is in fact something radically different from the memory which is habit. The recollection alone is true memory. This distinction is vital to the understanding of memory. But it is not so easy to carry out in practice as it is to draw in theory. Habit is a very intrusive feature of our mental life, and is often present where at first sight it seems not to be. There is, for example, a habit of remembering a unique event. When we have once described the event, the words we have used easily become habitual. We may even have used words to describe it to ourselves while it was happening; in that case, the habit of these words may fulfil the function of Bergson's true memory, while in reality it is nothing but habit-memory. A gramophone, by the help of suitable records, might relate to us the incidents of its past; and people are not so different from gramophones as they like to believe.

In spite, however, of a difficulty in distinguishing the two forms of memory in practice, there can be no doubt that both forms exist. I can set to work now to remember things I never remembered before, such as what I had to eat for breakfast this morning, and it can hardly be

wholly habit that enables me to do this. It is this sort of occurrence that constitutes the essence of memory. Until we have analysed what happens in such a case as this, we have not succeeded in understanding memory.

The sort of memory with which we are here concerned is the sort which is a form of knowledge. Whether knowledge itself is reducible to habit is a question to which I shall return in a later lecture; for the present I am only anxious to point out that, whatever the true analysis of knowledge may be, knowledge of past occurrences is not proved by behaviour which is due to past experience. The fact that a man can recite a poem does not show that he remembers any previous occasion on which he has recited or read it. Similarly, the performances of animals in getting out of cages or mazes to which they are accustomed do not prove that they remember having been in the same situation before. Arguments in favour of (for example) memory in plants are only arguments in favour of habit-memory, not of knowledge-memory. Samuel Butler's arguments in favour of the view that an animal remembers something of the lives of its ancestors* are, when examined, only arguments in favour of habit-memory. Semon's two books, mentioned in an earlier lecture, do not touch knowledge-memory at all closely. They give laws according to which images of past occurrences come into our minds, but do not discuss our belief that these images refer to past occurrences, which is what constitutes knowledge-memory. It is this that is of interest to theory of knowledge. I shall speak of it as "true" memory, to distinguish it from mere habit acquired through past experience. Before considering

true memory, it will be well to consider two things which are on the way towards memory, namely the feeling of familiarity and recognition.

* See his "Life and Habit and Unconscious Memory."

We often feel that something in our sensible environment is familiar, without having any definite recollection of previous occasions on which we have seen it. We have this feeling normally in places where we have often been before--at home, or in well-known streets. Most people and animals find it essential to their happiness to spend a good deal of their time in familiar surroundings, which are especially comforting when any danger threatens. The feeling of familiarity has all sorts of degrees, down to the stage where we dimly feel that we have seen a person before. It is by no means always reliable; almost everybody has at some time experienced the well-known illusion that all that is happening now happened before at some time. There are occasions when familiarity does not attach itself to any definite object, when there is merely a vague feeling that SOMETHING is familiar. This is illustrated by Turgenev's "Smoke," where the hero is long puzzled by a haunting sense that something in his present is recalling something in his past, and at last traces it to the smell of heliotrope. Whenever the sense of familiarity occurs without a definite object, it leads us to search the environment until we are satisfied that we have found the appropriate object, which leads us to the judgment: "THIS is familiar." I think we may regard familiarity as a definite feeling, capable of existing without an object, but normally standing in a specific relation to some

feature of the environment, the relation being that which we express in words by saying that the feature in question is familiar. The judgment that what is familiar has been experienced before is a product of reflection, and is no part of the feeling of familiarity, such as a horse may be supposed to have when he returns to his stable. Thus no knowledge as to the past is to be derived from the feeling of familiarity alone.

A further stage is RECOGNITION. This may be taken in two senses, the first when a thing not merely feels familiar, but we know it is such-and-such. We recognize our friend Jones, we know cats and dogs when we see them, and so on. Here we have a definite influence of past experience, but not necessarily any actual knowledge of the past. When we see a cat, we know it is a cat because of previous cats we have seen, but we do not, as a rule, recollect at the moment any particular occasion when we have seen a cat. Recognition in this sense does not necessarily involve more than a habit of association: the kind of object we are seeing at the moment is associated with the word "cat," or with an auditory image of purring, or whatever other characteristic we may happen to recognize in the cat of the moment. We are, of course, in fact able to judge, when we recognize an object, that we have seen it before, but this judgment is something over and above recognition in this first sense, and may very probably be impossible to animals that nevertheless have the experience of recognition in this first sense of the word.

There is, however, another sense of the word, in which we mean by recognition, not knowing the name of a thing or some other property of it, but knowing that we have seen it before. In this sense recognition does involve knowledge about the Past. This knowledge is memory in one sense, though in another it is not. It does not involve a definite memory of a definite past event, but only the knowledge that something happening now is similar to something that happened before. It differs from the sense of familiarity by being cognitive; it is a belief or judgment, which the sense of familiarity is not. I do not wish to undertake the analysis of belief at present, since it will be the subject of the twelfth lecture; for the present I merely wish to emphasize the fact that recognition, in our second sense, consists in a belief, which we may express approximately in the words: "This has existed before."

There are, however, several points in which such an account of recognition is inadequate. To begin with, it might seem at first sight more correct to define recognition as "I have seen this before" than as "this has existed before." We recognize a thing (it may be urged) as having been in our experience before, whatever that may mean; we do not recognize it as merely having been in the world before. I am not sure that there is anything substantial in this point. The definition of "my experience" is difficult; broadly speaking, it is everything that is connected with what I am experiencing now by certain links, of which the various forms of memory are among the most important. Thus, if I recognize a thing, the occasion of its previous existence in virtue

of which I recognize it forms part of "my experience" by DEFINITION: recognition will be one of the marks by which my experience is singled out from the rest of the world. Of course, the words "this has existed before" are a very inadequate translation of what actually happens when we form a judgment of recognition, but that is unavoidable: words are framed to express a level of thought which is by no means primitive, and are quite incapable of expressing such an elementary occurrence as recognition. I shall return to what is virtually the same question in connection with true memory, which raises exactly similar problems.

A second point is that, when we recognize something, it was not in fact the very same thing, but only something similar, that we experienced on a former occasion. Suppose the object in question is a friend's face. A person's face is always changing, and is not exactly the same on any two occasions. Common sense treats it as one face with varying expressions; but the varying expressions actually exist, each at its proper time, while the one face is merely a logical construction. We regard two objects as the same, for common-sense purposes, when the reaction they call for is practically the same. Two visual appearances, to both of which it is appropriate to say: "Hullo, Jones!" are treated as appearances of one identical object, namely Jones. The name "Jones" is applicable to both, and it is only reflection that shows us that many diverse particulars are collected together to form the meaning of the name "Jones." What we see on any one occasion is not the whole series of particulars that make up Jones, but only one of them (or a few in quick succession). On another occasion we see another member of the series,

but it is sufficiently similar to count as the same from the standpoint of common sense. Accordingly, when we judge "I have seen THIS before," we judge falsely if "this" is taken as applying to the actual constituent of the world that we are seeing at the moment. The word "this" must be interpreted vaguely so as to include anything sufficiently like what we are seeing at the moment. Here, again, we shall find a similar point as regards true memory; and in connection with true memory we will consider the point again. It is sometimes suggested, by those who favour behaviourist views, that recognition consists in behaving in the same way when a stimulus is repeated as we behaved on the first occasion when it occurred. This seems to be the exact opposite of the truth. The essence of recognition is in the DIFFERENCE between a repeated stimulus and a new one. On the first occasion there is no recognition; on the second occasion there is. In fact, recognition is another instance of the peculiarity of causal laws in psychology, namely, that the causal unit is not a single event, but two or more events. Habit is the great instance of this, but recognition is another. A stimulus occurring once has a certain effect; occurring twice, it has the further effect of recognition. Thus the phenomenon of recognition has as its cause the two occasions when the stimulus has occurred; either alone is insufficient. This complexity of causes in psychology might be connected with Bergson's arguments against repetition in the mental world. It does not prove that there are no causal laws in psychology, as Bergson suggests; but it does prove that the causal laws of psychology are *Prima facie* very different from those of physics. On the possibility of explaining away the difference as due

to the peculiarities of nervous tissue I have spoken before, but this possibility must not be forgotten if we are tempted to draw unwarranted metaphysical deductions.

True memory, which we must now endeavour to understand, consists of knowledge of past events, but not of all such knowledge. Some knowledge of past events, for example what we learn through reading history, is on a par with the knowledge we can acquire concerning the future: it is obtained by inference, not (so to speak) spontaneously. There is a similar distinction in our knowledge of the present: some of it is obtained through the senses, some in more indirect ways. I know that there are at this moment a number of people in the streets of New York, but I do not know this in the immediate way in which I know of the people whom I see by looking out of my window. It is not easy to state precisely wherein the difference between these two sorts of knowledge consists, but it is easy to feel the difference. For the moment, I shall not stop to analyse it, but shall content myself with saying that, in this respect, memory resembles the knowledge derived from the senses. It is immediate, not inferred, not abstract; it differs from perception mainly by being referred to the past.

In regard to memory, as throughout the analysis of knowledge, there are two very distinct problems, namely (1) as to the nature of the present occurrence in knowing; (2) as to the relation of this occurrence to what is known. When we remember, the knowing is now, while what is known is in the past. Our two questions are, in the case of memory:

(1) What is the present occurrence when we remember?

(2) What is the relation of this present occurrence to the past event which is remembered?

Of these two questions, only the first concerns the psychologist; the second belongs to theory of knowledge. At the same time, if we accept the vague datum with which we began, to the effect that, in some sense, there is knowledge of the past, we shall have to find, if we can, such an account of the present occurrence in remembering as will make it not impossible for remembering to give us knowledge of the past. For the present, however, we shall do well to forget the problems concerning theory of knowledge, and concentrate upon the purely psychological problem of memory.

Between memory-image and sensation there is an intermediate experience concerning the immediate past. For example, a sound that we have just heard is present to us in a way which differs both from the sensation while we are hearing the sound and from the memory-image of something heard days or weeks ago. James states that it is this way of apprehending the immediate past that is "the ORIGINAL of our experience of pastness, from whence we get the meaning of the term" ("Psychology," i, p. 604). Everyone knows the experience of noticing (say) that the clock HAS BEEN striking, when we did not notice it while it was striking. And when we hear a remark spoken, we are conscious of the

earlier words while the later ones are being uttered, and this retention feels different from recollection of something definitely past. A sensation fades gradually, passing by continuous gradations to the status of an image. This retention of the immediate past in a condition intermediate between sensation and image may be called "immediate memory." Everything belonging to it is included with sensation in what is called the "specious present." The specious present includes elements at all stages on the journey from sensation to image. It is this fact that enables us to apprehend such things as movements, or the order of the words in a spoken sentence. Succession can occur within the specious present, of which we can distinguish some parts as earlier and others as later. It is to be supposed that the earliest parts are those that have faded most from their original force, while the latest parts are those that retain their full sensational character. At the beginning of a stimulus we have a sensation; then a gradual transition; and at the end an image. Sensations while they are fading are called "akoluthic" sensations.* When the process of fading is completed (which happens very quickly), we arrive at the image, which is capable of being revived on subsequent occasions with very little change. True memory, as opposed to "immediate memory," applies only to events sufficiently distant to have come to an end of the period of fading. Such events, if they are represented by anything present, can only be represented by images, not by those intermediate stages, between sensations and images, which occur during the period of fading.

* See Semon, "Die mnemischen Empfindungen," chap. vi.

Immediate memory is important both because it provides experience of succession, and because it bridges the gulf between sensations and the images which are their copies. But it is now time to resume the consideration of true memory.

Suppose you ask me what I ate for breakfast this morning. Suppose, further, that I have not thought about my breakfast in the meantime, and that I did not, while I was eating it, put into words what it consisted of. In this case my recollection will be true memory, not habit-memory. The process of remembering will consist of calling up images of my breakfast, which will come to me with a feeling of belief such as distinguishes memory-images from mere imagination-images. Or sometimes words may come without the intermediary of images; but in this case equally the feeling of belief is essential.

Let us omit from our consideration, for the present, the memories in which words replace images. These are always, I think, really habit-memories, the memories that use images being the typical true memories.

Memory-images and imagination-images do not differ in their intrinsic qualities, so far as we can discover. They differ by the fact that the images that constitute memories, unlike those that constitute imagination, are accompanied by a feeling of belief which may be expressed in the words "this happened." The mere occurrence of images,

without this feeling of belief, constitutes imagination; it is the element of belief that is the distinctive thing in memory.*

* For belief of a specific kind, cf. Dorothy Wrinch "On the Nature of Memory," "Mind," January, 1920.

There are, if I am not mistaken, at least three different kinds of belief-feeling, which we may call respectively memory, expectation and bare assent. In what I call bare assent, there is no time-element in the feeling of belief, though there may be in the content of what is believed. If I believe that Caesar landed in Britain in B.C. 55, the time-determination lies, not in the feeling of belief, but in what is believed. I do not remember the occurrence, but have the same feeling towards it as towards the announcement of an eclipse next year. But when I have seen a flash of lightning and am waiting for the thunder, I have a belief-feeling analogous to memory, except that it refers to the future: I have an image of thunder, combined with a feeling which may be expressed in the words: "this will happen." So, in memory, the pastness lies, not in the content of what is believed, but in the nature of the belief-feeling. I might have just the same images and expect their realization; I might entertain them without any belief, as in reading a novel; or I might entertain them together with a time-determination, and give bare assent, as in reading history. I shall return to this subject in a later lecture, when we come to the analysis of belief. For the present, I wish to make it clear that a certain special kind of belief is the distinctive characteristic of memory.

The problem as to whether memory can be explained as habit or association requires to be considered afresh in connection with the causes of our remembering something. Let us take again the case of my being asked what I had for breakfast this morning. In this case the question leads to my setting to work to recollect. It is a little strange that the question should instruct me as to what it is that I am to recall. This has to do with understanding words, which will be the topic of the next lecture; but something must be said about it now. Our understanding of the words "breakfast this morning" is a habit, in spite of the fact that on each fresh day they point to a different occasion. "This morning" does not, whenever it is used, mean the same thing, as "John" or "St. Paul's" does; it means a different period of time on each different day. It follows that the habit which constitutes our understanding of the words "this morning" is not the habit of associating the words with a fixed object, but the habit of associating them with something having a fixed time-relation to our present. This morning has, to-day, the same time-relation to my present that yesterday morning had yesterday. In order to understand the phrase "this morning" it is necessary that we should have a way of feeling time-intervals, and that this feeling should give what is constant in the meaning of the words "this morning." This appreciation of time-intervals is, however, obviously a product of memory, not a presupposition of it. It will be better, therefore, if we wish to analyse the causation of memory by something not presupposing memory, to take some other instance than that

of a question about "this morning."

Let us take the case of coming into a familiar room where something has been changed--say a new picture hung on the wall. We may at first have only a sense that SOMETHING is unfamiliar, but presently we shall remember, and say "that picture was not on the wall before." In order to make the case definite, we will suppose that we were only in the room on one former occasion. In this case it seems fairly clear what happens. The other objects in the room are associated, through the former occasion, with a blank space of wall where now there is a picture. They call up an image of a blank wall, which clashes with perception of the picture. The image is associated with the belief-feeling which we found to be distinctive of memory, since it can neither be abolished nor harmonized with perception. If the room had remained unchanged, we might have had only the feeling of familiarity without the definite remembering; it is the change that drives us from the present to memory of the past.

We may generalize this instance so as to cover the causes of many memories. Some present feature of the environment is associated, through past experiences, with something now absent; this absent something comes before us as an image, and is contrasted with present sensation. In cases of this sort, habit (or association) explains why the present feature of the environment brings up the memory-image, but it does not explain the memory-belief. Perhaps a more complete analysis could explain the memory-belief also on lines of association and habit, but

the causes of beliefs are obscure, and we cannot investigate them yet. For the present we must content ourselves with the fact that the memory-image can be explained by habit. As regards the memory-belief, we must, at least provisionally, accept Bergson's view that it cannot be brought under the head of habit, at any rate when it first occurs, i.e. when we remember something we never remembered before.

We must now consider somewhat more closely the content of a memory-belief. The memory-belief confers upon the memory-image something which we may call "meaning;" it makes us feel that the image points to an object which existed in the past. In order to deal with this topic we must consider the verbal expression of the memory-belief. We might be tempted to put the memory-belief into the words: "Something like this image occurred." But such words would be very far from an accurate translation of the simplest kind of memory-belief. "Something like this image" is a very complicated conception. In the simplest kind of memory we are not aware of the difference between an image and the sensation which it copies, which may be called its "prototype." When the image is before us, we judge rather "this occurred." The image is not distinguished from the object which existed in the past: the word "this" covers both, and enables us to have a memory-belief which does not introduce the complicated notion "something like this."

It might be objected that, if we judge "this occurred" when in fact "this" is a present image, we judge falsely, and the memory-belief, so interpreted, becomes deceptive. This, however, would be a mistake,

produced by attempting to give to words a precision which they do not possess when used by unsophisticated people. It is true that the image is not absolutely identical with its prototype, and if the word "this" meant the image to the exclusion of everything else, the judgment "this occurred" would be false. But identity is a precise conception, and no word, in ordinary speech, stands for anything precise. Ordinary speech does not distinguish between identity and close similarity. A word always applies, not only to one particular, but to a group of associated particulars, which are not recognized as multiple in common thought or speech. Thus primitive memory, when it judges that "this occurred," is vague, but not false.

Vague identity, which is really close similarity, has been a source of many of the confusions by which philosophy has lived. Of a vague subject, such as a "this," which is both an image and its prototype, contradictory predicates are true simultaneously: this existed and does not exist, since it is a thing remembered, but also this exists and did not exist, since it is a present image. Hence Bergson's interpenetration of the present by the past, Hegelian continuity and identity-in-diversity, and a host of other notions which are thought to be profound because they are obscure and confused. The contradictions resulting from confounding image and prototype in memory force us to precision. But when we become precise, our remembering becomes different from that of ordinary life, and if we forget this we shall go wrong in the analysis of ordinary memory.

Vagueness and accuracy are important notions, which it is very necessary to understand. Both are a matter of degree. All thinking is vague to some extent, and complete accuracy is a theoretical ideal not practically attainable. To understand what is meant by accuracy, it will be well to consider first instruments of measurement, such as a balance or a thermometer. These are said to be accurate when they give different results for very slightly different stimuli.* A clinical thermometer is accurate when it enables us to detect very slight differences in the temperature of the blood. We may say generally that an instrument is accurate in proportion as it reacts differently to very slightly different stimuli. When a small difference of stimulus produces a great difference of reaction, the instrument is accurate; in the contrary case it is not.

* This is a necessary but not a sufficient condition. The subject of accuracy and vagueness will be considered again in Lecture XIII.

Exactly the same thing applies in defining accuracy of thought or perception. A musician will respond differently to very minute differences in playing which would be quite imperceptible to the ordinary mortal. A negro can see the difference between one negro and another one is his friend, another his enemy. But to us such different responses are impossible: we can merely apply the word "negro" indiscriminately. Accuracy of response in regard to any particular kind of stimulus is improved by practice. Understanding a language is a

case in point. Few Frenchmen can hear any difference between the sounds "hall" and "hole," which produce quite different impressions upon us. The two statements "the hall is full of water" and "the hole is full of water" call for different responses, and a hearing which cannot distinguish between them is inaccurate or vague in this respect.

Precision and vagueness in thought, as in perception, depend upon the degree of difference between responses to more or less similar stimuli. In the case of thought, the response does not follow immediately upon the sensational stimulus, but that makes no difference as regards our present question. Thus to revert to memory: A memory is "vague" when it is appropriate to many different occurrences: for instance, "I met a man" is vague, since any man would verify it. A memory is "precise" when the occurrences that would verify it are narrowly circumscribed: for instance, "I met Jones" is precise as compared to "I met a man." A memory is "accurate" when it is both precise and true, i.e. in the above instance, if it was Jones I met. It is precise even if it is false, provided some very definite occurrence would have been required to make it true.

It follows from what has been said that a vague thought has more likelihood of being true than a precise one. To try and hit an object with a vague thought is like trying to hit the bull's eye with a lump of putty: when the putty reaches the target, it flattens out all over it, and probably covers the bull's eye along with the rest. To try and hit an object with a precise thought is like trying to hit the bull's

eye with a bullet. The advantage of the precise thought is that it distinguishes between the bull's eye and the rest of the target. For example, if the whole target is represented by the fungus family and the bull's eye by mushrooms, a vague thought which can only hit the target as a whole is not much use from a culinary point of view. And when I merely remember that I met a man, my memory may be very inadequate to my practical requirements, since it may make a great difference whether I met Brown or Jones. The memory "I met Jones" is relatively precise. It is accurate if I met Jones, inaccurate if I met Brown, but precise in either case as against the mere recollection that I met a man.

The distinction between accuracy and precision is however, not fundamental. We may omit precision from our thoughts and confine ourselves to the distinction between accuracy and vagueness. We may then set up the following definitions:

An instrument is "reliable" with respect to a given set of stimuli when to stimuli which are not relevantly different it gives always responses which are not relevantly different.

An instrument is a "measure" of a set of stimuli which are serially ordered when its responses, in all cases where they are relevantly different, are arranged in a series in the same order.

The "degree of accuracy" of an instrument which is a reliable measurer is the ratio of the difference of response to the difference of stimulus

in cases where the difference of stimulus is small.* That is to say, if a small difference of stimulus produces a great difference of response, the instrument is very accurate; in the contrary case, very inaccurate.

* Strictly speaking, the limit of this, i.e. the derivative of the response with respect to the stimulus.

A mental response is called "vague" in proportion to its lack of accuracy, or rather precision.

These definitions will be found useful, not only in the case of memory, but in almost all questions concerned with knowledge.

It should be observed that vague beliefs, so far from being necessarily false, have a better chance of truth than precise ones, though their truth is less valuable than that of precise beliefs, since they do not distinguish between occurrences which may differ in important ways.

The whole of the above discussion of vagueness and accuracy was occasioned by the attempt to interpret the word "this" when we judge in verbal memory that "this occurred." The word "this," in such a judgment, is a vague word, equally applicable to the present memory-image and to the past occurrence which is its prototype. A vague word is not to be identified with a general word, though in practice the distinction may often be blurred. A word is general when it is understood to be applicable to a number of different objects in virtue of some common

property. A word is vague when it is in fact applicable to a number of different objects because, in virtue of some common property, they have not appeared, to the person using the word, to be distinct. I emphatically do not mean that he has judged them to be identical, but merely that he has made the same response to them all and has not judged them to be different. We may compare a vague word to a jelly and a general word to a heap of shot. Vague words precede judgments of identity and difference; both general and particular words are subsequent to such judgments. The word "this" in the primitive memory-belief is a vague word, not a general word; it covers both the image and its prototype because the two are not distinguished.*

* On the vague and the general cf. Ribot: "Evolution of General Ideas," Open Court Co., 1899, p. 32: "The sole permissible formula is this: Intelligence progresses from the indefinite to the definite. If 'indefinite' is taken as synonymous with general, it may be said that the particular does not appear at the outset, but neither does the general in any exact sense: the vague would be more appropriate. In other words, no sooner has the intellect progressed beyond the moment of perception and of its immediate reproduction in memory, than the generic image makes its appearance, i.e. a state intermediate between the particular and the general, participating in the nature of the one and of the other--a confused simplification."

But we have not yet finished our analysis of the memory-belief. The tense in the belief that "this occurred" is provided by the nature of the belief-feeling involved in memory; the word "this," as we have seen, has a vagueness which we have tried to describe. But we must still ask what we mean by "occurred." The image is, in one sense, occurring now; and therefore we must find some other sense in which the past event occurred but the image does not occur.

There are two distinct questions to be asked: (1) What causes us to say that a thing occurs? (2) What are we feeling when we say this? As to the first question, in the crude use of the word, which is what concerns us, memory-images would not be said to occur; they would not be noticed in themselves, but merely used as signs of the past event. Images are "merely imaginary"; they have not, in crude thought, the sort of reality that belongs to outside bodies. Roughly speaking, "real" things would be those that can cause sensations, those that have correlations of the sort that constitute physical objects. A thing is said to be "real" or to "occur" when it fits into a context of such correlations. The prototype of our memory-image did fit into a physical context, while our memory-image does not. This causes us to feel that the prototype was "real," while the image is "imaginary."

But the answer to our second question, namely as to what we are feeling when we say a thing "occurs" or is "real," must be somewhat different. We do not, unless we are unusually reflective, think about the presence or absence of correlations: we merely have different feelings which,

intellectualized, may be represented as expectations of the presence or absence of correlations. A thing which "feels real" inspires us with hopes or fears, expectations or curiosities, which are wholly absent when a thing "feels imaginary." The feeling of reality is a feeling akin to respect: it belongs PRIMARILY to whatever can do things to us without our voluntary co-operation. This feeling of reality, related to the memory-image, and referred to the past by the specific kind of belief-feeling that is characteristic of memory, seems to be what constitutes the act of remembering in its pure form.

We may now summarize our analysis of pure memory.

Memory demands (a) an image, (b) a belief in past existence. The belief may be expressed in the words "this existed."

The belief, like every other, may be analysed into (1) the believing, (2) what is believed. The believing is a specific feeling or sensation or complex of sensations, different from expectation or bare assent in a way that makes the belief refer to the past; the reference to the past lies in the belief-feeling, not in the content believed. There is a relation between the belief-feeling and the content, making the belief-feeling refer to the content, and expressed by saying that the content is what is believed.

The content believed may or may not be expressed in words. Let us take first the case when it is not. In that case, if we are merely

remembering that something of which we now have an image occurred, the content consists of (a) the image, (b) the feeling, analogous to respect, which we translate by saying that something is "real" as opposed to "imaginary," (c) a relation between the image and the feeling of reality, of the sort expressed when we say that the feeling refers to the image. This content does not contain in itself any time-determination.

The time-determination lies in the nature of the belief feeling, which is that called "remembering" or (better) "recollecting." It is only subsequent reflection upon this reference to the past that makes us realize the distinction between the image and the event recollected. When we have made this distinction, we can say that the image "means" the past event.

The content expressed in words is best represented by the words "the existence of this," since these words do not involve tense, which belongs to the belief-feeling, not to the content. Here "this" is a vague term, covering the memory-image and anything very like it, including its prototype. "Existence" expresses the feeling of a "reality" aroused primarily by whatever can have effects upon us without our voluntary co-operation. The word "of" in the phrase "the existence of this" represents the relation which subsists between the feeling of reality and the "this."

This analysis of memory is probably extremely faulty, but I do not know

how to improve it.

NOTE.-When I speak of a FEELING of belief, I use the word "feeling" in a popular sense, to cover a sensation or an image or a complex of sensations or images or both; I use this word because I do not wish to commit myself to any special analysis of the belief-feeling.