

Matter and Memory

Henri Bergson

Authorized Translation by Nancy Margaret Paul

and W. Scott Palmer

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Translators' Note

This translation of Monsieur Bergson's *Matière et mémoire* has been made from the fifth edition of 1908, and has had the great advantage of being revised in proof by the author. Monsieur Bergson has also written a new Introduction for it, which supersedes that which accompanied the original work.

The translators offer their sincere thanks to the author for his invaluable help in these matters and for many suggestions made by him while the book was in manuscript.

N.M.P.

W.S.P.

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Introduction

This book affirms the reality of spirit and the reality of matter, and tries to determine the relation of the one to the other by the study of a definite example, that of memory. It is, then, frankly dualistic. But, on the other hand, it deals with body and mind in such a way as, we hope, to lessen greatly, if not to overcome, the theoretical difficulties which have always beset dualism, and which cause it; though suggested by the immediate verdict of consciousness and adopted by common sense, to be held in small honor among philosophers.

These difficulties are due, for the most part, to the conception, now realistic, now idealistic, which philosophers have of matter. The aim of our first chapter is to show that realism and idealism both go too far, that it is a mistake to reduce matter to the perception which we have of it, a mistake also to make of it a thing able to produce in us perceptions, but in itself of another nature than they. Matter, in our view, is an aggregate of "images." And by "image" we mean a certain existence which is more than that which the idealist calls a *representation*, but less than that which the realist calls a *thing* — an existence placed halfway between the "thing" and the "representation." This conception of matter

is simply that of common sense. It would greatly astonish a man unaware of the speculations of philosophy if we told him that the object before him, which he sees and touches, exists only in his mind and for his mind or even, more generally, exists only for mind, as Berkeley held. Such a man would always maintain that the object exists independently of the consciousness which perceives it. But, on the other hand, we should astonish him quite as much by telling him that the object is entirely different from that which is perceived in it, that it has neither the color ascribed to it by the eye nor the resistance found in it by the hand. The color, the resistance, are, for him, in the object: they are not states of our mind; they are part and parcel of an existence really independent of our own. For common sense, then, the object exists in itself, and, on the other hand, the object is, in itself, pictorial, as we perceive it: image it is, but a self-existing image.

This is just the sense in which we use the word image in our first chapter. We place ourselves at the point of view of a mind unaware of the disputes between philosophers. Such a mind would naturally believe that matter exists just as it is perceived; and, since it is perceived as an image, the mind would make of it, in itself, an image. In a word, we consider matter before the dissociation which idealism and realism have brought about between its existence and its appearance. No doubt it has become difficult to avoid this dissociation now that philosophers have made it. To forget it, however, is what we ask of the reader. If, in the course of this first chapter, objections arise in his mind against any of the views that we put forward, let him ask himself whether these objections do not imply his return to one or the other of the two points of view above which we urge him to rise.

Philosophy made a great step forward on the day when Berkeley proved, as against the "mechanical philosophers," that the secondary qualities of matter have at least as much reality as the pri-

mary qualities. His mistake lay in believing that, for this, it was necessary to place matter within the mind and make it into a pure idea. Descartes, no doubt, had put matter too far from us when he made it one with geometrical extensity. But, in order to bring it nearer to us, there was no need to go to the point of making it one with our own mind. Because he did go as far as this, Berkeley was unable to account for the success of physics, and, whereas Descartes had set up the mathematical relations between phenomena as their very essence, he was obliged to regard the mathematical order of the universe as a mere accident. So the Kantian criticism became necessary, to show the reason of this mathematical order and to give back to our physics a solid foundation — a task in which, however, it succeeded only by limiting the range and value of our senses and of our understanding. The criticism of Kant, on this point at least, would have been unnecessary; the human mind, in this direction at least, would not have been led to limit its own range; metaphysics would not have been sacrificed to physics, if philosophy had been content to leave matter half way between the place to which Descartes had driven it and that to which Berkeley drew it back — to leave it, in fact, where it is seen by common sense.

There we shall try to see it ourselves. Our first chapter defines this way of looking at matter; the last sets forth the consequences of such a view. But, as we said before, we treat of matter only in so far as it concerns the problem dealt with in our second and third chapters, that which is the subject of this essay: the problem of the relation between soul and body.

This relation, though it has been a favorite theme throughout the history of philosophy, has really been very little studied. If we leave on one side the theories which are content to state the "union of soul and body" as an irreducible and inexplicable fact, and those which speak vaguely of the body as an instrument of the soul,

there remains hardly any other conception of the psychophysiological relation than the hypothesis of "epiphenomenalism" or that of "parallelism," which in practice — I mean in the interpretation of particular facts — both end in the same conclusions. For whether, indeed, thought is regarded as a mere function of the brain and the state of consciousness as an epiphenomenon of the state of the brain, or whether mental states and brain states are held to be two versions, in two different languages, of one and the same original, in either case it is laid down that, could we penetrate into the inside of a brain at work and behold the dance of the atoms which make up the cortex, and if, on the other hand, we possessed the key to psychophysiology, we should know every detail of what is going on in the corresponding consciousness.

This, indeed, is what is most commonly maintained by philosophers as well as by men of science. Yet it would be well to ask whether the facts, when examined without any preconceived idea, really suggest an hypothesis of this kind. That there is a close connection between a state of consciousness and the brain we do not dispute. But there is also a close connection between a coat and the nail on which it hangs, for, if the nail is pulled out, the coat falls to the ground. Shall we say, then, that the shape of the nail gives us the shape of the coat, or in any way corresponds to it? No more are we entitled to conclude, because the physical fact is hung onto a cerebral state, that there is any parallelism between the two series psychical and physiological. When philosophy pleads that the theory of parallelism is borne out by the results of positive science, it enters upon an unmistakably vicious circle; for, if science interprets connection, which is a fact, as signifying parallelism, which is an hypothesis (and an hypothesis to which it is difficult to attach an intelligible meaning¹), it does so, consciously or unconsciously, for reasons of a philosophic order: it is because science has been accustomed by a certain type of philosophy to

believe that there is no hypothesis more probable, more in accordance with the interests of scientific inquiry.

Now, as soon as we do, indeed, apply to positive facts for such information as may help us to solve the problem, we find it is with memory that we have to deal. This was to be expected, because memory — we shall try to prove it in the course of this work — is just the intersection of mind and matter. But we may leave out the reason here: no one, at any rate, will deny that, among all the facts capable of throwing light on the psychophysiological relation, those which concern memory, whether in the normal or in the pathological state, hold a privileged position. Not only is the evidence here extremely abundant (consider the enormous mass of observations collected in regard to the various kinds of aphasia), but nowhere else have anatomy, physiology and psychology been able to lend each other such valuable aid. Anyone who approaches, without preconceived ideas and on the firm ground of facts, the classical problem of the relations of soul and body, will soon see this problem as centering upon the subject of memory, and, even more particularly, upon the memory of words: it is from this quarter, undoubtedly, that will come the light which will illumine the obscurer parts of the problem.

The reader will see how we try to solve it. Speaking generally, the physical state seems to us to be, in most cases, immensely wider than the cerebral state. I mean that the brain state indicates only a very small part of the mental state, that part which is capable of translating itself into movements of locomotion. Take a complex thought which unrolls itself in a chain of abstract reasoning. This thought is accompanied by images, that are at least nascent. And these images themselves are not pictured in consciousness without some foreshadowing, in the form of a sketch or a tendency, of the movements by which these images would be acted or played in space — would, that is to say, impress particular atti-

tudes upon the body, and set free all that they implicitly contain of spatial movement. Now, of all the thought which is unrolling, this, in our view, is what the cerebral state indicates at every moment. He who could penetrate into the interior of a brain and see what happens there, would probably obtain full details of these sketched-out, or prepared, movements; there is no proof that he would learn anything else. Were he endowed with a superhuman intellect, did he possess the key to psychophysiology, he would know no more of what is going on in the corresponding consciousness than we should know of a play from the comings and goings of the actors upon the stage.

That is to say, the relation of the mental to the cerebral is not a constant, any more than it is a simple, relation. According to the nature of the play that is being acted, the movements of the players tell us more or less about it: nearly everything, if it is a pantomime; next to nothing, if it is a delicate comedy. Thus our cerebral state contains more or less of our mental state in the measure that we reel off our psychic life into action or wind it up into pure knowledge.

There are then, in short, divers *tones* of mental life, or, in other words, our psychic life may be lived at different heights, now nearer to action, now further removed from it, according to the degree of our *attention to life*. Here we have one of the ruling ideas of this book — the idea, indeed, which served as the starting point of our inquiry. That which is usually held to be a greater complexity of the psychical state appears to us, from our point of view, to be a greater dilatation of the whole personality, which, normally narrowed down by action, expands with the unscrewing of the vice in which it has allowed itself to be squeezed, and, always whole and undivided, spreads itself over a wider and wider surface. That which is commonly held to be a disturbance of the psychic life itself, an inward disorder, a disease of the personality, appears to us, from our point of view, to be an unloosing or a breaking of the

tie which binds this psychic life to its motor accompaniment, a weakening or an impairing of our attention to outward life. This opinion, as also that which denies the localization of the memory-images of words and explains aphasia quite otherwise than by such localization, was considered paradoxical at the date of the first publication of the present work (1896). It will appear much less so now. The conception of aphasia then classical, universally admitted, believed to be unshakable, has been considerably shaken in the last few years, chiefly by reasons of an anatomical order, but partly also by reasons of the same kind as those which we then advanced.² And the profound and original study of neuroses made by Professor Pierre Janet has led him, of late years, to explain all *psychasthenic* forms of disease by these same considerations of psychic "tension" and of attention to reality which were then presumed to be metaphysical.³

In truth, it was not altogether a mistake to call them by that name. Without denying to psychology, any more than to metaphysics, the right to make itself into an independent science, we believe that each of these two sciences should set problems to the other and can, in a measure, help it to solve them. How should it be otherwise, if psychology has for its object the study of the human mind working for practical utility, and if metaphysics is but this same mind striving to transcend the conditions of useful action and to come back to itself as to a pure creative energy? Many problems, which appear foreign to each other as long as we are bound by the letter of the terms in which these two sciences state them, are seen to be very near akin, and to be able to solve each other when we thus penetrate into their inner meaning. We little thought, at the beginning of our inquiry, that there could be any connection between the analytical study of memory and the question, which is debated between realists and idealists or between mechanists and dynamists, with regard to the existence

or the essence of matter. Yet this connection is real, it is even intimate; and, if we take it into account, a cardinal metaphysical problem is carried into the open field of observation, where it may be solved progressively, instead of forever giving rise to fresh disputes of the schools within the closed lists of pure dialectic. The complexity of some parts of the present work is due to the inevitable dovetailing of problems which results from approaching philosophy in such a way. But through this complexity, which is due to the complexity of reality itself, we believe that the reader will find his way if he keeps a fast hold on the two principles which we have used as a clue throughout our own researches. The first is that in psychological analysis we must never forget the utilitarian character of our mental functions, which are essentially turned toward action. The second is that the habits formed in action find their way up to the sphere of speculation, where they create fictitious problems, and that metaphysics must begin by dispersing this artificial obscurity.

H. BERGSON

PARIS,
October 1910

CHAPTER I

Of The Selection of Images for
Conscious Presentation.

What Our Body Means and Does.

We will assume for the moment that we know nothing of theories of matter and theories of spirit, nothing of the discussions as to the reality or ideality of the external world. Here I am in the presence of images, in the vaguest sense of the word, images perceived when my senses are opened to them, unperceived when they are closed. All these images act and react upon one another in all their elementary parts according to constant laws which I call laws of nature, and, as a perfect knowledge of these laws would probably allow us to calculate and to foresee what will happen in each of these images, the future of the images must be contained in their present and will add to them nothing new.

Yet there is *one* of them which is distinct from all the others, in that I do not know it only from without by perceptions, but from within by affections: it is my body. I examine the conditions in which these affections are produced: I find that they always interpose themselves between the excitations that I receive from without and the movements which I am about to execute, as though they had some undefined influence on the final issue. I pass in review my different affections: it seems to me that each of them contains, after its kind, an invitation to act, with at the same time

leave to wait and even to do nothing. I look closer: I find movements begun, but not executed, the indication of a more or less useful decision, but not that constraint which precludes choice. I call up, I compare my recollections: I remember that everywhere, in the organic world, I have thought I saw this same sensibility appear at the very moment when nature, having conferred upon the living being the power of mobility in space, gives warning to the species, by means of sensation, of the general dangers which threaten it, leaving to the individual the precautions necessary for escaping from them. Lastly, I interrogate my consciousness as to the part which it plays in affection: consciousness replies that it is present indeed, in the form of feeling or of sensation, at all the steps in which I believe that I take the initiative, and that it fades and disappears as soon as my activity, by becoming automatic, shows that consciousness is no longer needed. Therefore, either all these appearances are deceptive, or the act in which the affective state issues is not one of those which might be rigorously deduced from antecedent phenomena, as a movement from a movement; and, hence, it really adds something new to the universe and to its history. Let us hold to the appearances; I will formulate purely and simply what I feel and what I see: *All seems to take place as if, in this aggregate of images which I call the universe, nothing really new could happen except through the medium of certain particular images, the type of which is furnished me by my body.*

I pass now to the study, in bodies similar to my own, of the structure of that particular image which I call my body. I perceive afferent nerves which transmit a disturbance to the nerve centers; then efferent nerves which start from the center, conduct the disturbance to the periphery, and set in motion parts of the body or the body as a whole. I question the physiologist and the psychologist as to the purpose of both kinds. They answer that, as the centrifugal movements of the nervous system can call forth a movement

of the body or of parts of the body, so the centripetal movements, or at least some of them, give birth to the representation¹ of the external world. What are we to think of this?

The afferent nerves are images, the brain is an image, the disturbance traveling through the sensory nerves and propagated in the brain is an image too. If the image which I term cerebral disturbance really begot external images, it would contain them in one way or another, and the representation of the whole material universe would be implied in that of this molecular movement. Now to state this proposition is enough to show its absurdity. The brain is part of the material world; the material world is not part of the brain. Eliminate the image which bears the name material world, and you destroy at the same time the brain and the cerebral disturbance which are parts of it. Suppose, on the contrary, that these two images, the brain and the cerebral disturbance, vanish: *ex hypothesi* you efface only these, that is to say very little, an insignificant detail from an immense picture. The picture in its totality, that is to say the whole universe, remains. To make of the brain the condition on which the whole image depends is, in truth, a contradiction in terms, since the brain is by hypothesis a part of this image. Neither nerves nor nerve centers can, then, condition the image of the universe.

Let us consider this last point. Here are external images, then my body, and, lastly, the changes brought about by my body in the surrounding images. I see plainly how external images influence the image that I call my body: they transmit movement to it. And I also see how this body influences external images: it gives back movement to them. My body is, then, in the aggregate of the material world, an image which acts like other images, receiving and giving back movement, with, perhaps, this difference only, that my body appears to choose, within certain limits, the manner in which it shall restore what it receives. But how could my body in

general, and my nervous system in particular, beget the whole or a part of my representation of the universe? You may say that my body is matter, or that it is an image: the word is of no importance. If it is matter, it is a part of the material world; and the material world, consequently, exists around it and without it. If it is an image, that image can give but what has been put into it, and since it is, by hypothesis, the image of my body only, it would be absurd to expect to get from it that of the whole universe. *My body, an object destined to move other objects, is, then, a center of action; it cannot give birth to a representation.*

But if my body is an object capable of exercising a genuine and therefore a *new* action upon the surrounding objects, it must occupy a privileged position in regard to them. As a rule, any image influences other images in a manner which is determined, and even calculable, through what are called the laws of nature. As it has not to choose, so neither has it any need to explore the region round about it, nor to try its hand at several merely *eventual* actions. The *necessary* action will take place automatically, when its hour strikes. But I have supposed that the office of the image which I call my body was to exercise on other images a real influence, and, consequently, to decide which step to take among several which are all materially possible. And since these steps are probably suggested to it by the greater or lesser advantage which it can derive from the surrounding images, these images must display in some way, upon the aspect which they present to my body, the profit which my body can gain from them. In fact, I note that the size, shape, even the color, of external objects is modified as my body approaches or recedes from them; that the strength of an odor, the intensity of a sound, increases or diminishes with distance; finally, that this very distance represents, above all, the mea-

sure in which surrounding bodies are insured, in some way, against the immediate action of my body. To the degree that my horizon widens, the images which surround me seem to be painted upon a more uniform background and become to me more indifferent. The more I narrow this horizon, the more the objects which it circumscribes space themselves out distinctly according to the greater or lesser ease with which my body can touch and move them. They send back, then, to my body, as would a mirror, its eventual influence; they take rank in an order corresponding to the growing or decreasing powers of my body. *The objects which surround my body reflect its possible action upon them.*

I will now, without touching the other images, modify slightly that image which I call my body. In this image I cut asunder, in thought, all the afferent nerves of the cerebro-spinal system. What will happen? A few cuts with the scalpel have severed a few bundles of fibres: the rest of the universe, and even the rest of my body, remain what they were before. The change effected is therefore insignificant. As a matter of fact, my perception has entirely vanished. Let us consider more closely what has just occurred. Here are the images which compose the universe in general, then those which are near to my body, and finally my body itself. In this last image the habitual office of the centripetal nerves is to transmit movements to the brain and to the cord; the centrifugal nerves send back this movement to the periphery. Sectioning of the centripetal nerves can, therefore, produce only one intelligible effect: that is, to interrupt the current which goes from the periphery to the periphery by way of the center, and, consequently, to make it impossible for my body to extract, from among all the things which surround it, the quantity and quality of movement necessary in order to act upon them. Here is something which

concerns action, and action alone. Yet it is my perception which has vanished. What does this mean, if not that my perception displays, in the midst of the image world, as would their outward reflection or shadow, the eventual or possible actions of my body? Now the system of images in which the scalpel has effected only an insignificant change is what is generally called the material world; and, on the other hand, that which has just vanished is "my perception" of matter. Whence, provisionally, these two definitions: *I call matter the aggregate of images, and perception of matter these same images referred to the eventual action of one particular image, my body.*

Let us go more deeply into this reference. I consider my body, with its centripetal and centrifugal nerves, with its nerve centers. I know that external objects make in the afferent nerves a disturbance which passes onward to the centers, that the centers are the theater of very varied molecular movements, and that these movements depend on the nature and position of the objects. Change the objects, or modify their relation to my body, and everything is changed in the interior movements of my perceptive centers. But everything is also changed in "my perception." My perception is, then, a function of these molecular movements; it depends upon them. But how does it depend upon them? It will perhaps be said that it translates them, and that, in the main, I represent to myself nothing but the molecular movements of cerebral substance. But how should this have any meaning, since the image of the nervous system and of its internal movements is only, by hypothesis, that of a certain material object, whereas I represent to myself the whole material universe? It is true that many philosophers attempt to evade the difficulty. They show us a brain, analogous in its essence to the rest of the material universe, an

image, consequently, if the universe is an image. Then, since they want the internal movements of this brain to create or determine the representation of the whole material world — an image infinitely greater than that of the cerebral vibrations — they maintain that these molecular movements, and movement in general, are not images like others, but something which is either more or less than an image — in any case is of another nature than an image — and from which representation will issue as by a miracle. Thus matter is made into something radically different from representation, something of which, consequently, we have no image; over against it they place a consciousness empty of images, of which we are unable to form any idea; lastly, to fill consciousness, they invent an incomprehensible action of this formless matter upon this matterless thought. But the truth is that the movements of matter are very clear, regarded as images, and that there is no need to look in movement for anything more than what we see in it. The sole difficulty would consist in bringing forth from these very particular images the infinite variety of representations; but why seek to do so, since we all agree that the cerebral vibrations *are contained in* the material world, and that these images, consequently, are only a part of the representation? What then are these movements, and what part do these particular images play in the representation of the whole? The answer is obvious: they are, within my body, the movements intended to prepare, while beginning it, the reaction of my body to the action of external objects. Images themselves cannot create images; but they indicate at each moment, like a compass that is being moved about, the position of a certain given image, my body, in relation to the surrounding images. In the totality of representation they are very little; but they are of capital importance for that part of representation which I call my body, since they foreshadow at each successive moment its virtual acts. There is, then, only a difference of degree — there can be no

difference in kind – between what is called the perceptive faculty of the brain and the reflex functions of the spinal cord. The cord transforms into movements the stimulation received; the brain prolongs them into reactions which are merely nascent; but, in the one case as in the other, the function of the nerve substance is to conduct, to coordinate, or to inhibit movements. How then does it come about that “my perception of the universe” appears to depend upon the internal movements of the cerebral substance, to change when they vary, and to vanish when they cease?

The difficulty of this problem is mainly due to the fact that the grey matter and its modifications are regarded as things which are sufficient to themselves and might be isolated from the rest of the universe. Materialists and dualists are fundamentally agreed on this point. They consider certain molecular movements of the cerebral matter apart: then, some see in our conscious perception a phosphorescence which follows these movements and illuminates their track; for others, our perceptions succeed each other like an unwinding scroll in a consciousness which expresses continuously, in its own way, the molecular vibrations of the cortical substance: in the one case, as in the other, our perception is supposed to *translate* or to *picture* the states of our nervous system. But is it possible to conceive the nervous system as living apart from the organism which nourishes it, from the atmosphere in which the organism breathes, from the earth which that atmosphere envelops, from the sun round which the earth revolves? More generally, does not the fiction of an isolated material object imply a kind of absurdity, since this object borrows its physical properties from the relations which it maintains with all others, and owes each of its determinations, and, consequently, its very existence, to the place which it occupies in the universe as a whole? Let us no longer say, then, that our perceptions depend simply upon the molecular movements of the cerebral mass. We must say rather

that they *vary with* them, but that these movements themselves remain inseparably bound up with the rest of the material world. The question, then, is not only how our perceptions are connected with the modifications of the grey matter. The problem widens, and can also be put in much clearer terms.

It might be stated as follows: Here is a system of images which I term my perception of the universe, and which may be entirely altered by a very slight change in a certain privileged image – *my body*. This image occupies the center; by it all the others are conditioned; at each of its movements everything changes, as though by a turn of a kaleidoscope. Here, on the other hand, are the same images, but referred each one to itself, influencing each other no doubt, but in such a manner that the effect is always in proportion to the cause: this is what I term *the universe*. The question is: how can these two systems coexist, and why are the same images relatively invariable in the universe and infinitely variable in perception? The problem at issue between realism and idealism, perhaps even between materialism and spiritualism, should be stated, then, it seems to us, in the following terms: *How is it that the same images can belong at the same time to two different systems: one in which each image varies for itself and in the well-defined measure that it is patient of the real action of surrounding images; and another in which all images change for a single image and in the varying measure that they reflect the eventual action of this privileged image?*

Every image is within certain images and without others; but of the aggregate of images we cannot say that it is within us or without us, since interiority and exteriority are only relations among images. To ask whether the universe exists only in our thought, or outside of our thought, is to put the problem in terms that are insoluble, even if we suppose them to be intelligible; it is to condemn ourselves to a barren discussion, in which the terms *thought*, *being*, *universe*, will always be taken on either hand in entirely dif-

ferent senses. To settle the matter, we must first find a common ground where combatants may meet; and since on both sides it is agreed that we can only grasp things in the form of images, we must state the problem in terms of images, and of images alone. Now no philosophical doctrine denies that the same images can enter at the same time into two distinct systems, one belonging to *science*, wherein each image, related only to itself, possesses an absolute value; and the other, the world of *consciousness*, wherein all the images depend on a central image, our body, the variations of which they follow. The question raised between realism and idealism then becomes quite clear: what are the relations which these two systems of images maintain with each other? And it is easy to see that subjective idealism consists in deriving the first system from the second, materialistic realism in deriving the second from the first.

The realist starts, in fact, from the universe, that is to say from an aggregate of images governed, as to their mutual relations, by fixed laws, in which effects are in strict proportion to their causes, and of which the character is an absence of center, all the images unfolding on one and the same plane indefinitely prolonged. But he is at once bound to recognize that, besides this system, there are *perceptions*, that is to say, systems in which these same images seem to depend on a single one among them, around which they range themselves on different planes, so as to be wholly transformed by the slightest modification of this central image. Now this perception is just what the idealist starts from: in the system of images which he adopts there is a privileged image, his body, by which the other images are conditioned. But as soon as he attempts to connect the present with the past and to foretell the future, he is obliged to abandon this central position, to replace all the images on the same plane, to suppose that they no longer vary for him, but for themselves; and to treat them as though they made part of

a system in which every change gives the exact measure of its cause. On this condition alone a science of the universe becomes possible; and, since this science exists, since it succeeds in foreseeing the future, its fundamental hypothesis cannot be arbitrary. The first system alone is *given* to present experience; but we *believe* in the second, if only because we affirm the continuity of the past, present and future. Thus in idealism, as in realism, we posit one of the two systems and seek to deduce the other from it.

But in this deduction neither realism nor idealism can succeed, because neither of the two systems of images is implied in the other, and each of them is sufficient to itself. If you posit the system of images which has no center, and in which each element possesses its absolute dimensions and value, I see no reason why to this system should accrue a second, in which each image has an undetermined value, subject to all the vicissitudes of a central image. You must, then, to engender perception, conjure up some *deus ex machina*, such as the materialistic hypothesis of the epiphenomenal consciousness, whereby you choose, among all the images that vary absolutely and that you posited to begin with, the one which we term our brain — conferring on the internal states of this image the singular and inexplicable privilege of adding to itself a reproduction, this time relative and variable, of all the others. It is true that you afterwards pretend to attach no importance to this representation, to see in it a mere phosphorescence which the cerebral vibrations leave behind them: as if the cerebral matter and cerebral vibrations, set in the images which compose this representation, could be of another nature than they are! All realism is thus bound to make perception an accident, and, consequently, a mystery. But, inversely, if you posit a system of unstable images disposed about a privileged center, and profoundly modified by trifling displacements of this center, you begin by excluding the order of nature, that order which is indifferent to

the point at which we take our stand and to the particular end from which we begin. You will have to bring back this order by conjuring up in your turn a *deus ex machina*; I mean that you will have to assume, by an arbitrary hypothesis, some sort of pre-established harmony between things and mind, or, at least (to use Kant's terms), between sense and understanding. It is science now that will become an accident, and its success a mystery. You cannot, then, deduce the first system of images from the second, nor the second from the first; and these two antagonistic doctrines, realism and idealism, as soon as they decide to enter the same lists, hurl themselves from opposite directions against the same obstacle.

If we now look closely at the two doctrines, we shall discover in them a common postulate, which we may formulate thus: *perception has a wholly speculative interest; it is pure knowledge*. The whole discussion turns upon the importance to be attributed to this knowledge as compared with *scientific* knowledge. The one doctrine starts from the order required by science, and sees in perception only a confused and provisional science. The other puts perception in the first place, erects it into an absolute, and then holds science to be a symbolic expression of the real. But, for both parties, to perceive means above all to know.

Now it is just this postulate that we dispute. Even the most superficial examination of the structure of the nervous system in the animal series gives it the lie. And it is not possible to accept it without profoundly obscuring the threefold problem of matter, consciousness and their relation.

For if we follow, step by step, the progress of external perception from the monera to the higher vertebrates, we find that living matter, even as a simple mass of protoplasm, is already irritable and contractile, that it is open to the influence of external stimulation, and answers to it by mechanical, physical and chemical reactions. As we rise in the organic series, we find a division of

physiological labor. Nerve cells appear, are diversified, tend to group themselves into a system; at the same time, the animal reacts by more varied movements to external stimulation. But even when the stimulation received is not at once prolonged into movement, it appears merely to await its occasion; and the same impression, which makes the organism aware of changes in the environment, determines it or prepares it to adapt itself to them. No doubt there is in the higher vertebrates a radical distinction between pure automatism, of which the seat is mainly in the spinal cord, and voluntary activity, which requires the intervention of the brain. It might be imagined that the impression received, instead of expanding into more movements, spiritualizes itself into consciousness. But as soon as we compare the structure of the spinal cord with that of the brain, we are bound to infer that there is merely a difference of complication, and not a difference in kind, between the functions of the brain and the reflex activity of the medullary system. For what takes place in reflex action? The centripetal movement communicated by the stimulus is reflected at once, by the intermediary of the nerve centers of the spinal cord, in a centrifugal movement determining a muscular contraction. In what, on the other hand, does the function of the cerebral system consist? The peripheral excitation, instead of proceeding directly to the motorcells of the spinal cord and impressing on the muscle a necessary contraction, mounts first to the brain, and then descends again to the very same motor cells of the spinal cord which intervened in the reflex action. Now what has it gained by this roundabout course, and what did it seek in the so-called sensory cells of the cerebral cortex? I do not understand, I shall never understand, that it draws thence a miraculous power of changing itself into a representation of things; and, moreover, I hold this hypothesis to be useless, as will shortly appear. But what I do see clearly is that the cells of the various regions of the cortex which are termed

sensory — cells interposed between the terminal branches of the centripetal fibers and the motor cells of the Rolandic area — allow the stimulation received to reach *at will* this or that motor mechanism of the spinal cord, and so to *choose* its effect. The more these intercalated cells are multiplied and the more they project amoeboid prolongations which are probably capable of approaching each other in various ways, the more numerous and more varied will be the paths capable of opening to one and the same disturbance from the periphery, and, consequently, the more systems of movements will there be among which one and the same stimulation will allow of choice. In our opinion, then, the brain is no more than a kind of central telephonic exchange: its office is to allow communication or to delay it. It adds nothing to what it receives; but, as all the organs of perception send it to their ultimate prolongations, and, as all the motor mechanisms of the spinal cord and of the medulla oblongata have in it their accredited representatives, it really constitutes a center, where the peripheral excitation gets into relation with this or that motor mechanism, chosen and no longer prescribed. Yet, as a great multitude of motor tracks can open simultaneously in this substance to one and the same excitation from the periphery, this disturbance may subdivide to any extent, and consequently dissipate itself in innumerable motor reactions which are merely nascent. Hence the office of the brain is sometimes to conduct the movement received to a *chosen* organ of reaction, and sometimes to open to this movement the *totality* of the motor tracts, so that it may manifest there all the potential reactions with which it is charged, and may divide and so disperse. In other words, the brain appears to us to be an instrument of analysis in regard to the movement received and an instrument of selection in regard to the movement executed. But, in the one case as in the other, its office is limited to the transmission and division of movement. And no more in the higher centers of the

cortex than in the spinal cord do the nervous elements work with a view to knowledge: they do but indicate a number of possible actions at once, or organize one of them.

That is to say that the nervous system is in no sense an apparatus which may serve to fabricate, or even to prepare, representations. Its function is to receive stimulation, to provide motor apparatus, and to present the largest possible number of these apparatuses to a given stimulus. The more it develops, the more numerous and the more distant are the points of space which it brings into relation with ever more complex motor mechanisms. In this way the scope which it allows to our action enlarges: its growing perfection consists in nothing else. But, if the nervous system is thus constructed, from one end of the animal series to the other, in view of an action which is less and less necessary, must we not think that perception, of which the progress is regulated by that of the nervous system, is also entirely directed toward action, and not toward pure knowledge? And, if this be so, is not the growing richness of this perception likely to symbolize the wider range of indetermination left to the choice of the living being in its conduct with regard to things? Let us start, then, from this indetermination as from the true principle, and try whether we cannot deduce from it the possibility, and even the necessity, of conscious perception. In other words, let us posit that system of closely-linked images which we call the material world, and imagine here and there, within the system, *centers of real action*, represented by living matter: what we mean to prove is that *there must be*, ranged round each one of these centers, images that are subordinated to its position and variable with it; that conscious perception is *bound* to occur, and that, moreover, it is possible to understand how it arises.

We note, in the first place, that a strict law connects the amount of conscious perception with the intensity of action at the disposal of the living being. If our hypothesis is well founded, this

perception appears at the precise moment when a stimulation received by matter is not prolonged into a necessary action. In the case of a rudimentary organism, it is true that immediate contact with the object which interests it is necessary to produce the stimulation and that reaction can then hardly be delayed. Thus, in the lower organisms, touch is active and passive at one and the same time, enabling them to recognize their prey and seize it, to feel a danger and make the effort to avoid it. The various prolongations of the protozoa, the ambulacra of the echinodermata, are organs of movement as well as of tactile perception; the stinging apparatus of the coelenterata is an instrument of perception as well as a means of defence. In a word, the more immediate the reaction is compelled to be, the more must perception resemble a mere contact; and the complete process of perception and of reaction can then hardly be distinguished from a mechanical impulsion followed by a necessary movement. But in the measure that the reaction becomes more uncertain, and allows more room for suspense, does the distance increase at which the animal is sensible of the action of that which interests it. By sight, by hearing, it enters into relation with an ever greater number of things, and is subject to more and more distant influences; and, whether these objects promise an advantage or threaten a danger, both promises and threats defer the date of their fulfillment. The degree of independence of which a living being is master, or, as we shall say, the zone of indetermination which surrounds its activity, allows, then, of an a priori estimate of the number and the distance of the things with which it is in relation. Whatever this relation may be, whatever be the inner nature of perception, we can affirm that its amplitude gives the exact measure of the indetermination of the act which is to follow. So that we can formulate this law: *perception is master of space in the exact measure in which action is master of time.*

But why does this relation of the organism to more or less dis-

tant objects take the particular form of conscious perception? We have examined what takes place in the organized body, we have seen movements transmitted or inhibited, metamorphosed into accomplished actions or broken up into nascent actions. These movements appear to us to concern action, and action alone; they remain absolutely foreign to the process of representation. We then considered action itself, and the indetermination which surrounds it and is implied in the structure of the nervous system — an indetermination to which this system seems to point much more than to representation. From this indetermination, accepted as a fact, we have been able to infer the necessity of a perception, that is to say, a *variable* relation between the living being and the more-or-less distant influence of the objects which interest it. How is it that this perception is consciousness, and why does everything happen *as if* this consciousness were born of the internal movements of the cerebral substance?

To answer this question, we will first simplify considerably the conditions under which conscious perception takes place. In fact, there is no perception which is not full of memories. With the immediate and present data of our senses, we mingle a thousand details out of our past experience. In most cases these memories supplant our actual perceptions, of which we then retain only a few hints, thus using them merely as "signs" that recall to us former images. The convenience and the rapidity of perception are bought at this price; but hence also springs every kind of illusion. Let us, for the purposes of study, substitute for this perception, impregnated with our past, a perception that a consciousness would have if it were supposed to be ripe and full-grown, yet confined to the present and absorbed, to the exclusion of all else, in the task of molding itself upon the external object. It may be urged that this is an arbitrary hypothesis, and that such an ideal perception, obtained by the elimination of individual accidents, has no corre-

spondence with reality. But we hope to show that the individual accidents are merely grafted on to this impersonal perception, which is at the very root of our knowledge of things; and that just because philosophers have overlooked it, because they have not distinguished it from that which memory adds to or subtracts from it, they have taken perception as a whole for a kind of *interior* and *subjective* vision, which would then differ from memory only by its greater intensity. This will be our first hypothesis. But it leads naturally to another. However brief we suppose any perception to be, it always occupies a certain duration, and involves, consequently, an effort of memory which prolongs, one into another, a plurality of moments. As we shall endeavor to show, even the "subjectivity" of sensible qualities consists above all else in a kind of contraction of the real, effected by our memory. In short, memory in these two forms, covering as it does with a cloak of recollections a core of immediate perception, and also contracting a number of external moments into a single internal moment, constitutes the principal share of individual consciousness in perception, the subjective side of the knowledge of things; and, since we must neglect this share in order to make our idea clearer, we shall go too far along the path we have chosen. But we shall only have to retrace our steps and to correct, especially by bringing memory back again, whatever may be excessive in our conclusions. What follows, therefore, must be regarded as only a schematic rendering, and we ask that perception should be provisionally understood to mean not my concrete and complex perception — that which is enlarged by memories and offers always a certain breadth of duration — but a *pure* perception. By this I mean a perception which exists in theory rather than in fact and would be possessed by a being placed where I am, living as I live, but absorbed in the present and capable, by giving up every form of memory, of obtaining a vision of matter both immediate and instantaneous. Adopting this hypoth-

esis, let us consider how conscious perception may be explained.

To deduce consciousness would be, indeed, a bold undertaking; but it is really not necessary here, because by positing the material world we assume an aggregate of images, and, moreover, because it is impossible to assume anything else. No theory of matter escapes this necessity. Reduce matter to atoms in motion: these atoms, though denuded of physical qualities, are determined only in relation to an eventual vision and an eventual contact, the one without light and the other without materiality. Condense atoms into centers of force, dissolve them into vortices revolving in a continuous fluid: this fluid, these movements, these centers, can themselves be determined only in relation to an impotent touch, an ineffectual impulsion, a colorless light; they are still images. It is true that an image may *be* without *being perceived* — it may be present without being represented — and the distance between these two terms, presence and representation, seems just to measure the interval between matter itself and our conscious perception of matter. But let us examine the point more closely and see in what this difference consists. If there were *more* in the second term than in the first, if, in order to pass from presence to representation, it were necessary to add something, the barrier would indeed be insuperable, and the passage from matter to perception would remain wrapped in impenetrable mystery. It would not be the same if it were possible to pass from the first term to the second by way of diminution, and if the representation of an image were *less* than its presence; for it would then suffice that the images present should be compelled to abandon something of themselves in order that their mere presence should convert them into representations. Now, here is the image which I call a material object; I have the representation of it. How then does it not appear to be in itself that which it is for me? It is because, being bound up with all other images, it is continued in those which follow it,

just as it prolonged those which preceded it. To transform its existence into representation, it would be enough to suppress what follows it, what precedes it, and also all that fills it, and to retain only its external crust, its superficial skin. That which distinguishes it as a *present* image, as an objective reality, from a *represented* image is the necessity which obliges it to act through every one of its points upon all the points of all other images, to transmit the whole of what it receives, to oppose to every action an equal and contrary reaction, to be, in short, merely a road by which pass, in every direction, the modifications propagated throughout the immensity of the universe. I should convert it into representation if I could isolate it, especially if I could isolate its shell. Representation is there, but always virtual — being neutralized, at the very moment when it might become actual, by the obligation to continue itself and to lose itself in something else. To obtain this conversion from the virtual to the actual, it would be necessary, not to throw more light on the object, but, on the contrary, to obscure some of its aspects, to diminish it by the greater part of itself, so that the remainder, instead of being encased in its surroundings as a *thing*, should detach itself from them as a *picture*. Now, if living beings are, within the universe, just “centers of indetermination,” and if the degree of this indetermination is measured by the number and rank of their functions, we can conceive that their mere presence is equivalent to the suppression of all those parts of objects in which their functions find no interest. They allow to pass through them, so to speak, those external influences which are indifferent to them; the others isolated, become “perceptions” by their very isolation. Everything thus happens for us as though we reflected back to surfaces the light which emanates from them, the light which, had it passed on unopposed, would never have been revealed. The images which surround us will appear to turn toward our body the side, emphasized by the light upon it, which interests our body.

They will detach from themselves that which we have arrested on its way, that which we are capable of influencing. Indifferent to each other because of the radical mechanism which binds them together, they present each to the others all their sides at once: which means that they act and react mutually by all their elements, and that none of them perceives or is perceived consciously. Suppose, on the contrary, that they encounter somewhere a certain spontaneity of reaction: their action is so far diminished, and this diminution of their action is just the representation which we have of them. Our representation of things would thus arise from the fact that they are thrown back and reflected by our freedom.

When a ray of light passes from one medium into another, it usually traverses it with a change of direction. But the respective densities of the two media may be such that, for a given angle of incidence, refraction is no longer possible. Then we have total reflection. The luminous point gives rise to a *virtual* image which symbolizes, so to speak, the fact that the luminous rays cannot pursue their way. Perception is just a phenomenon of the same kind. That which is given is the totality of the images of the material world, with the totality of their internal elements. But, if we suppose centers of real, that is to say of spontaneous, activity, the rays which reach it, and which interest that activity, instead of passing through those centers, will appear to be reflected and thus to indicate the outlines of the object which emits them. There is nothing positive here, nothing added to the image, nothing new. The objects merely abandon something of their real action in order to manifest their virtual influence of the living being upon them. Perception therefore resembles those phenomena of reflexion which result from an impeded refraction; it is like an effect of mirage.

This is as much as to say that there is for images merely a difference of degree, and not of kind, between *being* and *being consciously perceived*. The reality of matter consists in the totality of its ele-

ments and of their actions of every kind. Our representation of matter is the measure of our possible action upon bodies: it results from the discarding of what has no interest for our needs, or more generally, for our functions. In one sense we might say that the perception of any unconscious material point whatever, in its instantaneousness, is infinitely greater and more complete than ours, since this point gathers and transmits the influences of all the points of the material universe, whereas our consciousness only attains to certain parts and to certain aspects of those parts. Consciousness — in regard to external perception — lies in just this choice. But there is, in this necessary poverty of our conscious perception, something that is positive, that foretells spirit: it is, in the etymological sense of the word, discernment.

The whole difficulty of the problem that occupies us comes from the fact that we imagine perception to be a kind of photographic view of things, taken from a fixed point by that special apparatus which is called an organ of perception — a photograph which would then be developed in the brain-matter by some unknown chemical and psychical process of elaboration. But is it not obvious that the photograph, if photograph there be, is already taken, already developed in the very heart of things and at all the points of space? No metaphysics, no physics even, can escape this conclusion. Build up the universe with atoms: each of them is subject to the action, variable in quantity and quality according to the distance, exerted on it by all material atoms. Bring in Faraday's centers of force: the lines of force emitted in every direction from every center bring to bear upon each the influences of the whole material world. Call up the Leibnizian monads: each is the mirror of the universe. All philosophers, then, agree on this point. Only if, when we consider any other given place in the universe, we can regard the action of all matter as passing through it without resistance and without loss, and the photograph of the whole as

translucent: here there is wanting behind the plate the black screen on which the image could be shown. Our "zones of indetermination" play in some sort the part of the screen. They add nothing to what is there; they effect merely this: that the real action passes through, the virtual action remains.

This is no hypothesis. We content ourselves with formulating data with which no theory of perception can dispense. For no philosopher can begin the study of external perception without assuming the possibility at least of a material world, that is to say, in the main, the virtual perception of all things. From this merely possible material mass he will then isolate the particular object which I call my body, and, in this body, centers of perception: he will show me the disturbance coming from a certain point in space, propagating itself along the nerves, and reaching the centers. But here I am confronted by a transformation scene from fairyland. The material world, which surrounds the body; the body, which shelters the brain; the brain, in which we distinguish centers; he abruptly dismisses, and, as by a magician's wand, he conjures up, as a thing entirely new the representation of what he began by postulating. This representation he drives out of space, so that it may have nothing in common with the matter from which he started. As for matter itself, he would fain go without it, but cannot, because its phenomena present relatively to each other an order so strict and so indifferent as to the point of origin chosen, that this regularity and this indifference really constitute an independent existence. So he must resign himself to retaining at least the phantasm of matter. But then he manages to deprive it of all the qualities which give it life. In an amorphous space he carves out moving figures; or else (and it comes to nearly the same thing), he imagines relations of magnitude which adjust themselves one to another, mathematical functions which go on evolving and developing their own content: representation, laden with the spoils of

matter, thenceforth displays itself freely in an unextended consciousness. But it is not enough to cut out, it is necessary to sew the pieces together. You must now explain how those qualities which you have detached from their material support can be joined to it again. Each attribute which you take away from matter widens the interval between representation and its object. If you make matter unextended, how will it acquire extension? If you reduce it to homogeneous movements, whence arises quality? Above all, how are we to imagine a relation between a thing and its image, between matter and thought, since each of these terms possesses, by definition, only that which is lacking to the other? Thus difficulties spring up beneath our feet; and every effort that you make to dispose of one of them does but resolve it into many more. What then do we ask of you? Merely to give up your magician's wand, and to continue along the path on which you first set out. You showed us external images reaching the organs of sense, modifying the nerves, propagating their influence in the brain. Well, follow the process to the end. The movement will pass through the cerebral substance (although not without having tarried there), and will then expand into voluntary action. There you have the whole mechanism of perception. As for perception itself, in so far as it is an image, you are not called upon to retrace its genesis, since you posited it to begin with, and since, moreover, no other course was open to you. In assuming the brain, in assuming the smallest portion of matter, did you not assume the totality of images? *What you have to explain, then, is not how perception arises, but how it is limited, since it should be the image of the whole, and is in fact reduced to the image of that which interests you.* But if it differs from the mere image, precisely in that its parts range themselves with reference to a variable center, its limitation is easy to understand: unlimited de jure, it confines itself de facto to indicating the degree of indetermination allowed to the acts of the special

image which you call your body. And, inversely, it follows that the indetermination of the movements of your body, such as it results from the structure of the grey matter of the brain, gives the exact measure of the extent of your perception. It is no wonder, then, that everything happens *as though* your perception were a result of the internal motions of the brain and issued in some sort from the cortical centers. It could not actually come from them, since the brain is an image like others, enveloped in the mass of other images, and it would be absurd that the container should issue from the content. But since the structure of the brain is like the detailed plan of the movements among which you have the choice, and since that part of the external images which appears to return upon itself in order to constitute perception includes precisely all the points of the universe which these movements could affect, conscious perception and cerebral movement are in strict correspondence. The reciprocal dependence of these two terms is therefore simply due to the fact that both are functions of a third, which is the indetermination of the will.

Take, for example, a luminous point P, of which the rays impinge on the different parts *a, b, c*, of the retina. At this point P, science localizes vibrations of a certain amplitude and duration. At the same point P, consciousness perceives light. We propose to show, in the course of this study, that both are right; and that there is no essential difference between the light and the movements, provided we restore to movement the unity, indivisibility, and qualitative heterogeneity denied to it by abstract mechanics; provided also that we see in sensible qualities *contractions* effected by our memory. Science and consciousness would then coincide in the instantaneous. For the moment all we need say, without examining too closely the meaning of the words, is that the point P sends to the retina vibrations of light. What happens then? If the visual image of the point P were not already given, we should indeed

have to seek the manner in which it had been engendered, and should soon be confronted by an insoluble problem. But, whatever we do, we cannot avoid assuming it to begin with: the sole question is, then, to know how and why this image *is chosen* to form part of my perception, while an infinite number of other images remain excluded from it. Now I see that the vibrations transmitted from the point P to the various parts of the retina are conducted to the subcortical and cortical optic centers, often to other centers as well, and that these centers sometimes transmit them to motor mechanisms, sometimes provisionally arrest them. The nervous elements concerned are, therefore, what give efficacy to the disturbance received; they symbolize the indetermination of the will; on their soundness this indetermination depends; consequently, any injury to these elements, by diminishing our possible action, diminishes perception in the same degree. In other words, if there exist in the material world places where the vibrations received are not mechanically transmitted, if there are, as we said, zones of indetermination, these zones must occur along the path of what is termed the sensori-motor process; and hence all must happen as though the rays Pa, Pb, Pc were *perceived* along this path and afterwards *projected* into P. Further, while the indetermination is something which escapes experiment and calculation, this is not the case with the nervous elements by which the impression is received and transmitted. These elements are the special concern of the physiologist and the psychologist; on them all the details of external perception would seem to depend and by them they may be explained. So we may say, if we like, that the disturbance, after having travelled along these nervous elements, after having gained the center, there changes into a conscious image which is subsequently exteriorized at the point P. But, when we so express ourselves, we merely bow to the exigencies of the scientific method; we in no way describe the real process. There is

not, in fact, an unextended image which forms itself in consciousness and then projects itself into P. The truth is that the point P, the rays which it emits, the retina and the nervous elements affected, form a single whole; that the luminous point P is a part of this whole; and that it is really in P, and not elsewhere, that the image of P is formed and perceived.

When we represent things to ourselves in this manner, we do but return to the simple convictions of common sense. We all of us began by believing that we grasped the very object, that we perceived it in itself and not in us. When philosophers disdain an idea so simple and so close to reality, it is because the intracerebral process — that diminutive part of perception — appears to them the equivalent of the whole of perception. If we suppress the object perceived and keep the internal process, it seems to them that the image of the object remains. And their belief is easily explained: there are many conditions, such as hallucination and dreams, in which images arise that resemble external perception in all their details. Because as, in such cases, the object has disappeared while the brain persists, he holds that the cerebral phenomenon is sufficient for the production of the image. But it must not be forgotten that in all psychical states of this kind memory plays the chief part. We shall try to show later that, when perception, as we understand it, is once admitted, memory *must* arise, and that this memory has not, any more than perception itself, a cerebral state as its true and complete condition. But, without as yet entering upon the examination of these two points, we will content ourselves with a very simple observation which has indeed no novelty. In many people who are blind from birth, the visual centers are intact; yet they live and die without having formed a single visual image. Such an image, therefore, cannot appear unless the external object has, at least, once played its part: it must, once at any rate, have been part and parcel with representation. Now this is what we claim

and for the moment all that we require, for we are dealing here with *pure* perception, and not with perception complicated by memory. Reject then the share of memory, consider perception in its unmixed state, and you will be forced to recognize that there is no image without an object. But, from the moment that you thus posit the intracerebral processes in addition to the external object which causes them, we can clearly see how the image of that object is given with it and in it: how the image should arise from the cerebral movement we shall never understand.

When a lesion of the nerves or of the centers interrupts the passage of the nerve vibration, perception is to that extent diminished. Need we be surprised? The office of the nervous system is to utilize that vibration, to convert it into practical deeds, really or virtually accomplished. If, for one reason or another, the disturbance cannot pass along, it would be strange if the corresponding perception still took place, since this perception would then connect our body with points of space which no longer directly invite it to make a choice. Sever the optic nerve of an animal: the vibrations issuing from the luminous point can no longer be transmitted to the brain and thence to the motor nerves; the thread, of which the optic nerve is a part and which binds the external object to the motor mechanisms of the animal, is broken: visual perception has therefore become impotent, and this very impotence is unconsciousness. That matter should be perceived without the help of a nervous system and without organs of sense, is not theoretically inconceivable; but it is practically impossible because such perception would be of no use. It would suit a phantom, not a living, and, therefore, acting, being. We are too much inclined to regard the living body as a world within a world, the nervous system as a separate being, of which the function is, first, to elaborate perceptions, and, then, to create movements. The truth is that my nervous system, interposed between the objects which

affect my body and those which I can influence, is a mere conductor, transmitting, sending back or inhibiting movement. This conductor is composed of an enormous number of threads which stretch from the periphery to the center, and from the center to the periphery. As many threads as pass from the periphery to the center, so many points of space are there able to make an appeal to my will and to put, so to speak, an elementary question to my motor activity. Every such question is what is termed a perception. Thus perception is diminished by one of its elements each time one of the threads termed sensory is cut because some part of the external object then becomes unable to appeal to activity; and it is also diminished whenever a stable habit has been formed, because this time the ready-made response renders the question unnecessary. What disappears in either case is the apparent reflection of the stimulus upon itself, the return of the light on the image whence it comes; or rather that dissociation, that *discernment*, whereby the perception is disengaged from the image. We may therefore say that while the detail of perception is molded exactly upon that of the nerves termed sensory, perception as a whole has its true and final explanation in the tendency of the body to movement.

The cause of the general illusion on this point lies in the apparent indifference of our movements to the stimulation which excites them. It seems that the movement of my body in order to reach and to modify an object is the same, whether I have been told of its existence by the ear or whether it has been revealed to me by sight or touch. My motor activity thus appears as a separate entity, a sort of reservoir whence movements issue at will, always the same for the same action, whatever the kind of image which has called it into being. But the truth is that the character of movements which are externally identical is internally different, according as they respond to a visual, an auditory or a tactile impression. Suppose I perceive a multitude of objects in space; each of them,

inasmuch as it is a visual form, solicits my activity. Now I suddenly lose my sight. No doubt I still have at my disposal the same quantity and the same quality of movements in space; but these movements can no longer be coordinated to visual impressions; they must in future follow tactile impressions, for example, and a new arrangement will take place in the brain. The protoplasmic expansions of the motor nervous elements in the cortex will now be in relation with a much smaller number of the nervous elements termed sensory. My activity is then really diminished, in the sense that although I can produce the same movements, the occasion comes more rarely from the external objects. Consequently, the sudden interruption of optical continuity has brought with it, as its essential and profound effect, the suppression of a large part of the queries or demands addressed to my activity. Now such as query or demand is, as we have seen, a perception. Here we put our finger on the mistake of those who maintain that perception springs from what is properly called the sensory vibration, and not from a sort of question addressed to motor activity. They sever this motor activity from the perceptive process; and, as it appears to survive the loss of perception, they conclude that perception is localized in the nervous elements termed sensory. But the truth is that perception is no more in the sensory centers than in the motor centers; it measures the complexity of their relations, and is, in fact, where it appears to be.

Psychologists who have studied infancy are well aware that our representation is at first impersonal. Only little by little, and as a result of experience, does it adopt our body as a center and become *our* representation. The mechanism of this process is, moreover, easy to understand. As my body moves in space, all the other images vary, while that image, my body, remains invariable. I must, therefore, make it a center, to which I refer all the other images. My belief in an external world does not come, cannot come, from the

fact that I project outside myself sensations that are unextended: how could these sensations ever acquire extension, and whence should I get the notion of exteriority? But, if we allow that, as experience testifies, the aggregate of images is given to begin with, I can see clearly how my body comes to occupy, within this aggregate, a privileged position. And I understand also whence arises the notion of interiority and exteriority, which is, to begin with, merely the distinction between my body and other bodies. For, if you start from my body, as is usually done, you will never make me understand how impressions received on the surface of my body, impressions which concern that body alone, are able to become for me independent objects and form an external world. But if, on the contrary, all images are posited at the outset, my body will necessarily end by standing out in the midst of them as a distinct thing, since they change unceasingly, and it does not vary. The distinction between the inside and the outside will then be only a distinction between the part and the whole. There is, first of all, the aggregate of images; and, then, in this aggregate, there are "centers of action," from which the interesting images appear to be reflected: thus perceptions are born and actions made ready. *My body* is that which stands out as the center of these perceptions; *my personality* is the being to which these actions must be referred. The whole subject becomes clear if we travel thus from the periphery to the center, as the child does, and as we ourselves are invited to do by immediate experience and by common sense. On the contrary everything becomes obscure, and problems are multiplied on all sides, if we attempt, with the theorists, to travel from the center to the periphery. Whence arises, then, this idea of an external world constructed artificially, piece by piece, out of unextended sensations, though we can neither understand how they come to form an extended surface, nor how they are subsequently projected outside our body? Why insist, in spite of appear-

ances, that I should go from my conscious self to my body, then from my body to other bodies, whereas in fact I place myself at once in the material world in general, and then gradually cut out within it the center of action which I shall come to call my body and to distinguish from all others? There are so many illusions gathered round this belief in the originally unextended character of our external perception; there are, in the idea that we project outside ourselves states which are purely internal, so many misconceptions, so many lame answers to badly stated questions, that we cannot hope to throw light on the whole subject at once. We believe that light will increase, as we show more clearly, behind these illusions, the metaphysical error which confounds "pure perception" with memory. But these illusions are, nevertheless, connected with real facts, which we may here indicate in order to correct their interpretation.

The first of these facts is that our senses require education. Neither sight nor touch is able at the outset to localize impressions. A series of comparisons and inductions is necessary, whereby we gradually coordinate one impression with another. Hence philosophers may jump to the belief that sensations are in their essence inextensive and that they constitute extensity by their juxtaposition. But is it not clear that, upon the hypothesis just advanced, our senses are equally in need of education — not, of course, in order to accommodate themselves to each other? Here, in the midst of all the images, there is a certain image which I term my body and of which the virtual action reveals itself by an apparent reflection of the surrounding images upon themselves. Suppose there are so many kinds of possible action for my body: there must be an equal number of systems of reflection for other bodies; each of these systems will be just what is perceived by one of my senses. My body, then, acts like an image which reflects others, and which, in so doing, analyzes them along lines corresponding to the differ-

ent actions which it can exercise upon them. And, consequently, each of the qualities perceived in the same object by my different senses symbolizes a particular direction of my activity, a particular need. Now, will all these perceptions of a body by my different senses give me, when united, the complete image of that body? Certainly not, because they have been gathered from a larger whole. To perceive all the influences from all the points of all bodies would be to descend to the condition of a material object. Conscious perception signifies choice, and consciousness mainly consists in this practical discernment. The diverse perceptions of the same object, given by my different senses, will not, then, when put together, reconstruct the *complete* image of the object; they will remain separated from each other by intervals which measure, so to speak, the gaps in my needs. It is to fill these intervals that an education of the senses is necessary. The aim of this education is to harmonize my senses with each other, to restore between their data a continuity which has been broken by the discontinuity of the needs of my body, in short, to reconstruct, as nearly as may be, the whole of the material object. This, on our hypothesis, explains the need for an education of the senses. Now let us compare it with the preceding explanation. In the first, unextended sensations of sight combine with unextended sensations of touch and of the other senses to give, by their synthesis, the idea of a material object. But, to begin with, it is not easy to see how these sensations can acquire extension, nor how, above all, when extension in general has been acquired, we can explain in particular the preference of a given one of these sensations for a given point of space. And then we may ask: by what happy agreement, in virtue of what preestablished harmony, do these sensations of different kinds coordinate themselves to form a stable object, henceforth solidified, common to my experience and to that of all men, subject, in its relation to other objects, to those inflexible rules which

we call the laws of nature? In the second, "the data of our different senses" are, on the contrary, the very qualities of things, perceived first in the things rather than in us: is it surprising that they come together, since abstraction alone has separated them? On the first hypothesis, the material object is nothing of all that we perceive: you put, on one side, the conscious principle with the sensible qualities and, on the other, a matter of which you can predicate nothing, which you define by negations because you have begun by despoiling it of all that reveals it to us. On the second hypothesis, an ever-deepening knowledge of matter becomes possible. Far from depriving matter of anything perceived, we must on the contrary, bring together all sensible qualities, restore their relationship, and reestablish among them the continuity broken by our needs. Our perception of matter is, then, no longer either relative or subjective, at least in principle, and apart, as we shall see presently, from affection and especially from memory; it is merely dissevered by the multiplicity of our needs. On the first hypothesis, spirit is as unknowable as matter, for (we) attribute to it the undefinable power of evoking sensations we know not whence, and of projecting them, we know not why, into a space where they will form bodies. On the second, the part played by consciousness is clearly defined: consciousness means virtual action, and the forms acquired by mind, those which hide the essence of spirit from us, should, with the help of this second principle, be removed as so many concealing veils. Thus, on our hypothesis, we begin to see the possibility of a clearer distinction between spirit and matter, and of a reconciliation between them. But we will leave this first point and come to the second.

The second fact brought forward consists of what was long termed the "specific energy of the nerves." We know that stimulation of the optic nerve by an external shock or by an electric current will produce a visual sensation and that this same electric

current applied to the acoustic or to the glosso-pharyngeal nerve will cause a sound to be heard or a taste to be perceived. From these very particular facts have been deduced two very general laws: that different causes acting on the same nerve excite the same sensation and that the same cause, acting on different nerves, provokes different sensations. And from these laws it has been inferred that our sensations are merely signals and that the office of each sense is to translate into its own language homogeneous and mechanical movements occurring in space. Hence, as a conclusion, the idea of cutting our perception into two distinct parts, thenceforth incapable of uniting: on the one hand, homogeneous movements in space and, on the other hand, unextended sensations in consciousness. Now it is not our part to enter into an examination of the physiological problems raised by the interpretation of the two laws: in whatever way these laws are understood, whether the specific energy is attributed to the nerves or whether it is referred to the centers, insurmountable difficulties arise. But the very existence of the laws themselves appears more and more problematical. Lotze himself already suspected a fallacy in them. He awaited, before putting faith in them, "sound waves which should give to the eye the sensation of light, or luminous vibrations which should give to the ear a sound."² The truth is that all the facts alleged can be brought back to a single type: the one stimulus capable of producing different sensations, the multiple stimuli capable of inducing the same sensation, are either an electric current or a mechanical cause capable of determining in the organ a modification of electrical equilibrium. Now we may well ask whether the electrical stimulus does not include different *components*, answering objectively to sensations of different kinds, and whether the office of each sense is not merely to extract from the whole the component that concerns it. We should then have, indeed, the same stimuli giving the same sensations and different

stimuli provoking different sensations. To speak more precisely, it is difficult to admit, for instance, that applying an electrical stimulus to the tongue would not occasion chemical changes, and these changes are what, in all cases, we term tastes. Yet, while the physicist has been able to identify light with an electromagnetic disturbance, we may say, inversely, that what he calls here an electromagnetic disturbance *is* light, so that it is really light that the optic nerve perceives objectively when subject to electrical stimulus. The doctrine of specific energy appears to be nowhere more firmly based than in the case of the ear: nowhere also has the real existence of the thing perceived become more probable. We will not insist on these facts because they will be found stated and exhaustively discussed in a recent work.³ We will only remark that the sensations here spoken of are not images perceived by us outside our body, but rather affections localized within the body. Now it results from the nature and use of our body, as we shall see, that each of its so-called sensory elements has its own *real* action, which must be of the same kind as its *virtual* action on the external objects which it usually perceives; and thus we can understand how it is that each of the sensory nerves appears to vibrate according to a fixed manner of sensation. But to elucidate this point we must consider the nature of affection. Thus we are led to the third and last argument which we have to examine.

This third argument is drawn from the fact that we pass by insensible degrees from the representative state, which occupies space, to the affective state which appears to be unextended.

Hence it is inferred that all sensation is naturally and necessarily unextended, so that extensity is superimposed upon sensation, and the process of perception consists in an exteriorization of internal states. The psychologist starts, in fact, from his body, and, as the impressions received at the periphery of this body seem to him sufficient for the reconstitution of the entire material uni-

verse, to his body he at first reduces the universe. But this first position is not tenable; his body has not, and cannot have, any more or any less reality than all other bodies. So he must go farther, follow to the end the consequences of his principle, and, after having narrowed the universe to the surface of the living body, contract this body itself into a center which he will end by supposing unextended. Then, from this center will start unextended sensations, which will swell, so to speak, will grow into extensity, and will end by giving extension first to his body and afterwards to all other material objects. But this strange supposition would be impossible if there were not, in point of fact, between images and ideas — the former extended and the latter unextended — a series of intermediate states, more or less vaguely localized, which are the *affective* states. Our understanding, yielding to its customary illusion, poses the dilemma that a thing either is or is not extended, and as the affective state participates vaguely in extension, is in fact imperfectly localized, we conclude that this state is absolutely unextended. But then the successive degrees of extension, and extensity itself, will have to be explained by I know not what acquired property of unextended states; the history of perception will become that of internal unextended states which acquire extension and project themselves without. Shall we put the argument in another form? There is hardly any perception which may not, by the increase of the action of its object upon our body, become an affection, and, more particularly, pain. Thus we pass insensibly from the contact with a pin to its prick. Inversely the decreasing pain coincides with the lessening perception of its cause, and exteriorizes itself, so to speak, into a representation. So it does seem, then, as if there were a difference of degree and not of nature between affection and perception. Now the first is intimately bound up with my personal existence: what, indeed, would be a pain detached from the subject that feels it? It seems, there-

fore, that it must be so with the second and that external perception is formed by projecting into space an affection which has become harmless. Realists and idealists are agreed in this method of reasoning. The latter see in the material universe nothing but a synthesis of subjective and unextended states; the former add that, behind this synthesis, there is an independent reality corresponding to it, but both conclude, from the gradual passage of affection to representation, that our representation of the material universe is relative and subjective and that it has, so to speak, emerged from us, rather than that we have emerged from it.

Before criticizing this questionable interpretation of an unquestionable fact, we may show that it does not succeed in explaining, or even in throwing light upon, the nature either of pain or of perception. That affective states, essentially bound up with my personality, and vanishing if I disappear, should acquire extensity by losing intensity, should adopt a definite position in space, and build up a firm, solid experience, always in accord with itself and with the experience of other men — is very difficult to realize. Whatever we do, we shall be forced to give back to sensations, in one form or another, first the extension and then the independence which we have tried to do without. But, what is more, affection, on this hypothesis, is hardly clearer than representation. For if it is not easy to see how affections, by diminishing in intensity, become representations, neither can we understand how the same phenomenon, which was given at first as perception, becomes affection by an increase of intensity. There is in pain something positive and active, which is ill explained by saying, as do some philosophers, that it consists in a *confused* representation. But still this is not the principal difficulty. That the gradual augmentation of the stimulus ends by transforming perception into pain, no one will deny; it is none the less true that this change arises at a definite moment: why at this moment rather than at another? And

what special reason causes a phenomenon of which I was at first only an indifferent spectator to suddenly acquire for me a vital interest? Therefore, on this hypothesis I fail to see either why, at a given moment, a diminution of intensity in the phenomenon confers on it a right to extension and to an apparent independence, or why an increase of intensity should create, at one moment rather than at another, this new property, the source of positive action, which is called pain.

Let us return now to our hypothesis and show that affection *must*, at a given moment, arise out of the image. We shall thus understand how it is that we pass from a perception, which has extensity, to an affection which is believed to be unextended. But some preliminary remarks on the real significance of pain are indispensable.

When a foreign body touches one of the prolongations of the amoeba, that prolongation is retracted; every part of the protoplasmic mass is equally able to receive a stimulation and to react against it; perception and movement being here blended in a single property — contractility. But, as the organism grows more complex, there is a division of labor; functions become differentiated, and the anatomical elements thus determined forego their independence. In such an organism as our own, the nerve fibres termed sensory are exclusively empowered to transmit stimulation to a central region whence the vibration will be passed on to motor elements. It would seem then that they have abandoned individual action to take their share, as outposts, in the maneuvers of the whole body. But nonetheless they remain exposed, singly, to the same causes of destruction which threaten the organism as a whole, and while this organism is able to move — and thereby to escape a danger or to repair a loss — the sensitive element retains the relative immobility to which the division of labor condemns it. Thence arises pain, which, in our view, is nothing but the effort of the damaged element to set things right — a kind of motor tendency

in a sensory nerve. Every pain, then, must consist in an effort — an effort which is doomed to be unavailing. Every pain is a *local* effort, and in its very isolation lies the cause of its impotence, because the organism, by reason of the solidarity of its parts, is able to move only as a whole. It is also because the effort is local that pain is entirely disproportioned to the danger incurred by the living being. The danger may be mortal and the pain slight; the pain may be unbearable (as in a toothache) and the danger insignificant. There is then, there must be, a precise moment when pain intervenes: it is when the interested part of the organism, instead of accepting the stimulation, repels it. And it is not merely a difference of degree that separates perception from affection but a difference in kind.

Now we have considered the living body as a kind of center whence is reflected on the surrounding objects the action which these objects exercise upon it: in that reflection external perception consists. But this center is not a mathematical point; it is a body, exposed, like all natural bodies, to the action of external causes which threaten to disintegrate it. We have just seen that it resists the influence of these causes. It does not merely reflect action received from without; it struggles, and thus absorbs some part of this action. Here is the source of affection. We might therefore say, metaphorically, that while perception measures the reflecting power of the body, affection measures its power to absorb.

But this is only a metaphor. We must consider the matter more carefully in order to understand clearly that the necessity of affection follows from the very existence of perception. Perception, understood as we understand it, measures our possible action upon things, and thereby, inversely, the possible action of things upon us. The greater the body's power of action (symbolized by a higher degree of complexity in the nervous system), the wider is the field that perception embraces. The distance which separates our body

from an object perceived really measures, therefore, the greater or less imminence of a danger, the nearer or more remote fulfillment of a promise. And, consequently, our perception of an object distinct from our body, separated from our body by an interval, never expresses anything but a *virtual* action. But the more distance decreases between this object and our body (the more, in other words, the danger becomes urgent or the promise immediate), the more does virtual action tend to pass into *real* action. Suppose the distance reduced to zero, that is to say that the object to be perceived coincides with our body, that is to say again, that our body is the object to be perceived. Then it is no longer virtual action, but real action, that this specialized perception will express, and this is exactly what affection is. Our sensations are, then, to our perceptions that which the real action of our body is to its possible, or virtual, action. Its virtual action concerns other objects and is manifested within those objects; its real action concerns itself, and is manifested within its own substance. Everything then will happen as if, by a true return of real and virtual actions to their points of application or of origin, the external images were reflected by our body into surrounding space and the real actions arrested by it within itself. And that is why its surface, the common limit of the external and the internal, is the only portion of space which is both perceived and felt.

That is to say once more, that my perception is outside my body and my affection within it. Just as external objects are perceived by me where they are, in themselves and not in me, so my affective states are experienced where they occur, that is, at a given point in my body. Consider the system of images which is called the material world. My body is one of them. Around this image is grouped the representation, i.e., its eventual influence on the others. Within it occurs affection, i.e., its actual effort upon itself. Such is indeed the fundamental difference which every one of us

naturally makes between an image and a sensation. When we say that the image exists outside us, we signify by this that it is external to our body. When we speak of sensation as an internal state, we mean that it arises within in our body. And this is why we affirm that the totality of perceived images subsists, even if our body disappears, whereas we know that we cannot annihilate our body without destroying our sensations.

Hence we begin to see that we must correct, at least in this particular, our theory of pure perception. We have argued as though our perception were a part of the images, detached, as such, from their entirety, as though, expressing the virtual action of the object upon our body, or of our body upon the object, perception merely isolated from the total object that aspect of it which interests us. But we have to take into account the fact that our body is not a mathematical point in space, that its virtual actions are complicated by, and impregnated with, real actions, or, in other words, that there is no perception without affection. Affection is, then, that part or aspect of the inside of our body which we mix with the image of external bodies; it is what we must first of all subtract from perception to get the image in its purity. But the psychologist who shuts his eyes to the difference of function and nature between perception and sensation — the latter involving a real action, and the former a merely possible action — can only find between them a difference of degree. Because sensation (on account of the *confused* effort which it involves) is only vaguely localized, he declares it unextended, and thence makes sensation in general the simple element from which we obtain by composition all external images. The truth is that affection is not the primary matter of which perception is made; it is rather the impurity with which perception is alloyed.

Here we grasp, at its origin, the error which leads the psychologist to consider sensation as unextended and perception as

an aggregate of sensations. This error is reinforced, as we shall see, by illusions derived from a false conception of the role of space and of the nature of extensity. But it has also the support of misinterpreted facts, which we must now examine.

It appears, in the first place, as if the localization of an affective sensation in one part of the body were a matter of gradual training. A certain time elapses before the child can touch with the finger the precise point where it has been pricked. The fact is indisputable, but all that can be concluded from it is that some tentative essays are required to coordinate the painful impressions on the skin, which has received the prick, with the impressions of the muscular sense, which guides the movement, of arm and hand. Our internal affections, like our external perceptions, are of different kinds. These kinds of affections, like those of perception, are discontinuous, separated by intervals which are filled up in the course of education. But it does not at all follow that there is not, for each affection, an immediate localization of a certain kind, a local color which is proper to it. We may go further: if the affection has not this local color at once, it will never have it. For all that education can do is to associate with the actual affective sensation the idea of a certain potential perception of sight and touch, so that a definite affection may evoke the image of a visual or tactile impression, equally definite. There must be, therefore, in this affection itself, something which distinguishes it from other affections of the same kind and permits of its reference to this or that potential datum of sight or touch rather than to any other. But is not this equivalent to saying that affection possesses, from the outset, a certain determination of extensity?

Again, it is alleged that there are erroneous localizations, for example, the illusion of those who have lost a limb (an illusion which requires, however, further examination). But what can we conclude from this beyond the fact that education, once acquired,

persists and that such data of memory as are more useful in practical life supplant those of immediate consciousness? It is indispensable, in view of action, that we should translate our affective experience into eventual data of sight, touch and muscular sense. When this translation is made, the original pales, but it never could have been made if the original had not been there to begin with, and if sensation had not been, from the beginning, localized by its own power and in its own way.

But the psychologist has much difficulty in accepting this idea from common sense. Just as perception, in his view, could be in the things perceived only if they had perception, so a sensation cannot be in the nerve unless the nerve feels. Now it is evident that the nerve does not feel. So he takes sensation away from the point where common sense localizes it, carries it toward the brain, on which, more than on the nerve, it appears to depend, and logically should end by placing it *in* the brain. But it soon becomes clear that if it is not at the point where it appears to arise, neither can it be anywhere else: if it is not in the nerve, neither is it in the brain; for to explain its projection from the center to the periphery a certain force is necessary, which must be attributed to a consciousness that is to some extent active. Therefore, he must go further, and, after having made sensations converge toward the cerebral center, must push them out of the brain and thereby out of space. So he has to imagine, on the one hand, sensations that are absolutely unextended, and, on the other hand, an empty space indifferent to the sensations which are projected into it: henceforth he will exhaust himself in efforts of every kind to make us understand how unextended sensations acquire extensity and why they choose for their abode this or that point of space rather than any other. But this doctrine is not only incapable of showing us clearly how the unextended takes on extension; it renders affection, extension and representation equally inexplicable. It must

assume affective states as so many absolutes, of which it is impossible to say why they appear in or disappear from consciousness at definite moments. The passage from affection to representation remains wrapped in an equally impenetrable mystery because, once again, you will never find in internal states, which are supposed to be simple and unextended, any reason why they should prefer this or that particular order in space. And, finally, representation itself must be posited as an absolute: we cannot guess either its origin or its goal.

Everything becomes clearer, on the other hand, if we start from representation itself, that is to say, from the totality of perceived images. My perception, in its pure state, isolated from memory, does not go on from my body to other bodies; it is, to begin with, in the aggregate of bodies, then gradually limits itself and adopts my body as a center. And it is led to do so precisely by experience of the double faculty, which this body possesses, of performing actions and feeling affections; in a word, it is led to do so by experience of the sensori-motor power of a certain image, privileged among other images. For, on the one hand, this image always occupies the center of representation, so that the other images range themselves round it in the very order in which they might be subject to its action; on the other hand, I know it from within, by sensations which I term affective, instead of knowing only, as in the case of the other images, its outer skin. There is, then, in the aggregate of images, a privileged image, perceived in its depths and no longer only on the surface — the seat of affection and, at the same time, the source of action: it is this particular image which I adopt as the center of my universe and as the physical basis of my personality.

But before we go on to establish the precise relation between the personality and the images in which it dwells, let us briefly sum up, contrasting it with the analyses of current psychology,

the theory of pure perception which we have just sketched out.

We will return, for the sake of simplicity, to the sense of sight, which we chose as our example. Psychology has accustomed us to assume the elementary sensations corresponding to the impressions received by the rods and cones of the retina. With these sensations it goes on to reconstitute visual perception. But, in the first place, there is not one retina, there are two; so that we have to explain how two sensations, held to be distinct, combine to form a single perception corresponding to what we call a point in space.

Suppose this problem is solved. The sensations in question are unextended; how will they acquire extension? Whether we see in extensity a framework ready to receive sensations, or an effect of the mere simultaneity of sensations coexisting in consciousness without coalescing, in either case something new is introduced with extensity, something unaccounted for: the process by which sensation arrives at extension, and the choice by each elementary sensation of a definite point in space, remain alike unexplained.

We will leave this difficulty, and suppose visual extension constituted. How does it in its turn reunite with tactile extension? All that my vision perceives in space is verified by my touch. Shall we say that objects are constituted by just the cooperation of sight and touch and that the agreement of the two senses in perception may be explained by the fact that the object perceived is their common product? But how could there be anything common, in the matter of quality, between an elementary visual sensation and a tactile sensation, since they belong to two different genera? The correspondence between visual and tactile extension can only be explained, therefore, by the parallelism of the *order* of the visual sensations with the order of the tactile sensations. So we are now obliged to suppose, over and above visual sensations, over and above tactile sensations, a certain order which is common to both and which, consequently, must be independent of either. We may go

further: this order is independent of our individual perception, since it is the same for all men and constitutes a material world in which effects are linked with causes, in which phenomena obey laws. We are thus led at last to the hypothesis of an *objective* order, independent of ourselves, that is to say, of a material world distinct from sensation.

We have had, as we advanced, to multiply our irreducible data and to complicate more and more the simple hypothesis from which we started. But have we gained anything by it? Though the matter which we have been led to posit is indispensable in order to account for the marvellous accord of sensations among themselves, we still know nothing of it, since we must refuse to it all the qualities perceived, all the sensations of which it has only to explain the correspondence. It is not, then, it cannot be, anything of what we know, anything of what we imagine. It remains a mysterious entity.

But our own nature, the office and the function of our personality, remain enveloped in equal mystery. For these elementary unextended sensations which develop themselves in space, whence do they come, how are they born, what purpose do they serve? We must posit them as so many absolutes, of which we see neither the origin nor the end. And even supposing that we must distinguish, in each of us, between the spirit and the body, we can know nothing either of body or of spirit or of the relation between them.

Now in what does this hypothesis of ours consist, and at what precise point does it part company with the other? Instead of starting from *affection*, of which we can say nothing, since there is no reason why it should be what it is rather than anything else, we start from *action*, that is to say from our faculty of effecting changes in things, a faculty attested to by consciousness and toward which all the powers of the organized body are seen to converge. So we place ourselves at once in the midst of extended images, and in

this material universe we perceive centers of indetermination, characteristic of life. In order that actions may radiate from these centers, the movements or influences of the other images must be, on the one hand, received and, on the other hand, utilized. Living matter, in its simplest form and in a homogeneous state, accomplishes this function simultaneously with those of nourishment and repair. The progress of such matter consists in sharing this double labor between two categories of organs, the purpose of the first, called organs of nutrition, being to maintain the second: the second, in their turn, are made for *action*; they have as their simple type a chain of nervous elements, connecting two extremities, of which the one receives external impressions and the other executes movements. Thus, to return to the example of visual perception, the office of the rods and cones is merely to receive excitations which will be subsequently elaborated into movements, either accomplished or nascent. No perception can result from this, and nowhere in the nervous system are there conscious centers, but perception arises from the same cause which has brought into being the chain of nervous elements, with the organs which sustain them and with life in general. It expresses and measures the power of action in the living being, the indetermination of the movement or of the action which will follow the receipt of the stimulus. This indetermination, as we have shown, will express itself in a reflection upon themselves or, better, in a division, of the images which surround our body, and, as the chain of nervous elements which receives, arrests and transmits movements is the seat of this indetermination and gives its measure, our perception will follow all the detail and will appear to express all the variations of the nervous elements themselves. Perception, in its pure state, is, then, in very truth, a part of things. And, as for affective sensation, it does not spring spontaneously from the depths of consciousness to extend itself, as it grows weaker, in space; it is

one with the necessary modifications to which, in the midst of the surrounding images that influence it, the particular image that each one of us terms his body is subject.

Such is our simplified, schematic theory of external perception. It is the theory of *pure* perception. If we went no further, the part of consciousness in perception would thus be confined to threading on the continuous string of memory an uninterrupted series of instantaneous visions, which would be a part of things rather than of ourselves. That this *is* the chief office of consciousness in external perception is indeed what we may deduce *a priori* from the very definition of living bodies. For though the function of these bodies is to receive stimulations in order to elaborate them into unforeseen reactions, still the choice of the reaction cannot be the work of chance. This choice is likely to be inspired by past experience, and the reaction does not take place without an appeal to the memories which analogous situations may have left behind them. The indetermination of acts to be accomplished requires, then, if it is not to be confounded with pure caprice, the preservation of the images perceived. It may be said that we have no grasp of the future without an equal and corresponding outlook over the past, that the onrush of our activity makes a void behind it into which memories flow, and that memory is thus the reverberation, in the sphere of consciousness, of the indetermination of our will. But the action of memory goes further and deeper than this superficial glance would suggest. The moment has come to reinstate memory in perception, to correct in this way the element of exaggeration in our conclusions, and so to determine with more precision the point of contact between consciousness and things, between the body and the spirit.

We assert, at the outset, that if there be memory, that is, the

survival of past images, these images must constantly mingle with our perception of the present and may even take its place. For if they have survived it is with a view to utility; at every moment they complete our present experience, enriching it with experience already acquired, and, as the latter is ever increasing, it must end by covering up and submerging the former. It is indisputable that the basis of real, and so to speak instantaneous, intuition, on which our perception of the external world is developed, is a small matter compared with all that memory adds to it. Just because the recollection of earlier analogous intuitions is more useful than the intuition itself, being bound up in memory with the whole series of subsequent events and capable thereby of throwing a better light on our decision, it supplants the real intuition of which the office is then merely — we shall prove it later — to call up the recollection, to give it a body, to render it active and thereby actual. We had every right, then, to say that the coincidence of perception with the object perceived exists in theory rather than in fact. We must take into account that perception ends by being merely an occasion for remembering, that we measure in practice the degree of reality by the degree of utility, and, finally, that it is our interest to regard as mere signs of the real those immediate intuitions which are, in fact, part and parcel of reality. But here we discover the mistake of those who say that to perceive is to project externally unextended sensations, which have been drawn from our own depths, and then to develop them in space. They have no difficulty in showing that our *complete* perception is filled with images which belong to us personally, with exteriorized (that is to say, recollected) images, but they forget that an impersonal basis remains in which perception coincides with the object perceived and which is, in fact, externality itself.

The capital error, the error which, passing over from psychology into metaphysic, shuts us out in the end from the knowledge both

of body and spirit, is that which sees only a difference of intensity instead of a difference of nature, between pure perception and memory. Our perceptions are undoubtedly interlaced with memories, and, inversely, a memory, as we shall show later, only becomes actual by borrowing the body of some perception into which it slips. These two acts, perception and recollection, always interpenetrate each other, are always exchanging something of their substance as by a process of endosmosis. The proper office of psychologists would be to dissociate them, to give back to each its natural purity; in this way many difficulties raised by psychology, and perhaps also by metaphysics, might be lessened. But they will have it that these mixed states, compounded, in unequal proportions, of pure perception and pure memory, are simple. And so we are condemned to an ignorance both of pure memory and of pure perception; to knowing only a single kind of phenomenon which will be called now memory and now perception, according to the predominance in it of one or other of the two aspects; and, consequently, to finding between perception and memory only a difference in degree, and not in kind. The first effect of this error, as we shall see in detail, is to vitiate profoundly the theory of memory; for, if we make recollection merely a weakened perception, we misunderstand the essential difference between the past and the present, we abandon all hope of understanding the phenomena of recognition, and, more generally, the mechanism of the unconscious. But, inversely, if recollection is regarded as a weakened perception, perception must be regarded as a stronger recollection. We are driven to argue as though it was given to us after the manner of a memory, as an internal state, a mere modification of our personality; and our eyes are closed to the primordial and fundamental act of perception — the act, constituting pure perception, whereby we place ourselves in the very heart of things. And thus the same error, which manifests itself in psychology by a

radical incapacity to explain the mechanism of memory, will in metaphysics profoundly influence the idealistic and realistic conceptions of matter.

For realism, in fact, the invariable order of the phenomena of nature lies in a cause distinct from our perceptions, whether this cause must remain unknowable, or whether we can reach it by an effort (always more or less arbitrary) of metaphysical construction. For the idealist, on the contrary, these perceptions are the whole of reality, and the invariable order of the phenomena of nature is but the symbol whereby we express, alongside of real perceptions, perceptions that are possible. But, for realism as for idealism, perceptions are "veridical hallucinations," states of the subject, projected outside himself, and the two doctrines differ merely in this: that, in the one, these states constitute reality; in the other, they are sent forth to unite with it.

But behind this illusion lurks yet another that extends to the theory of knowledge in general. We have said that the material world is made up of objects, or, if you prefer it, of images, of which all the parts act and react upon each other by movements. And that which constitutes our pure perception, is our dawning action, in so far as it is prefigured in those images. The *actuality* of our perception thus lies in its *activity*, in the movements which prolong it, and not in its greater intensity: the past is only idea, the present is ideo-motor. But this is what our opponents are determined not to see because they regard perception as a kind of contemplation, attribute to it always a purely speculative end, and maintain that it seeks some strange disinterested knowledge, as though, by isolating it from action, and thus severing its links with the real, they were not rendering it both inexplicable and useless. But thenceforward all difference between perception and recollection is abolished, since the past is essentially *that which acts no longer*, and since, by misunderstanding this characteristic of the

past, they become incapable of making a real distinction between it and the present, i.e., *that which is acting*. No difference but that of mere degree will remain between perception and memory and neither in the one nor in the other will the subject be acknowledged to pass beyond himself. Restore, on the contrary, the true character of perception; recognize in pure perception a system of nascent acts which plunges roots deep into the real; and at once perception is seen to be radically distinct from recollection; the reality of things is no more constructed or reconstructed, but touched, penetrated, lived, and the problem at issue between realism and idealism, instead of giving rise to interminable metaphysical discussions, is solved, or rather, dissolved, by intuition.

In this way also we shall plainly see what position we ought to take up between idealism and realism, which are both condemned to see in a matter only a construction or a reconstruction executed by the mind. For if we follow to the end the principle according to which the subjectivity of our perception consists, above all, in the share taken by memory, we shall say that even the sensible qualities of matter would be known *in themselves*, from within and not from without, could we but disengage them from that particular rhythm of duration which characterizes our consciousness. Pure perception, in fact, however rapid we suppose it to be, occupies a certain depth of duration, so that our successive perceptions are never the real moments of things, as we have hitherto supposed, but are moments of our consciousness. Theoretically, we said, the part played by consciousness in external perception would be to join together, by the continuous thread of memory, instantaneous visions of the real. But, in fact, there is for us nothing that is instantaneous. In all that goes by that name there is already some work of our memory, and consequently, of our consciousness, which prolongs into each other, so as to grasp them in one relatively simple intuition, an endless number of moments of

an endlessly divisible time. Now what is, in truth, the difference between matter as the strictest realism might conceive it and the perception which we have of it? Our perception presents us with a series of pictorial, but discontinuous, views of the universe; from our present perceptions we could not deduce subsequent perceptions because there is nothing in an aggregate of sensible qualities which foretells the new qualities into which they will change. On the contrary, matter, as realism usually posits it, evolves in such a manner that we can pass from one moment to the next by a mathematical deduction. It is true that, between this matter and this perception, scientific realism can find no point of contact because it develops matter into homogeneous changes in space, while it contracts perception into unextended sensations within consciousness. But, if our hypothesis is correct, we can easily see how perception and matter are distinguished and how they coincide. The qualitative heterogeneity of our successive perceptions of the universe results from the fact that each, in itself, extends over a certain depth of duration and that memory condenses in each an enormous multiplicity of vibrations which appear to us all at once, although they are successive. If we were only to divide, ideally, this undivided depth of time, to distinguish in it the necessary multiplicity of moments, in a word, to eliminate all memory, we should pass thereby from perception to matter, from the subject to the object. Then matter, becoming more and more homogeneous as our extended sensations spread themselves over a greater number of moments, would tend more and more toward that system of homogeneous vibrations of which realism tells us, although it would never coincide entirely with them. There would be no need to assume, on the one hand, space with unperceived movements, and, on the other, consciousness with unextended sensations. Subject and object would unite in an extended perception, the subjective side of perception being the contraction

effected by memory, and the objective reality of matter fusing with the multitudinous and successive vibrations into which this perception can be internally broken up. Such at least is the conclusion which, we hope, will issue clearly from the last part of this essay. *Questions relating to subject and object, to their distinction and their union, should be put in terms of time rather than of space.*

But our distinction between "pure perception" and "pure memory" has yet another aim. Just as pure perception, by giving us hints as to the nature of matter, allows us to take an intermediate position between realism and idealism, so pure memory, on the other hand, by opening to us a view of what is called spirit should enable us to decide between those other two doctrines, materialism and spiritualism.⁴ Indeed, it is this aspect of the subject which will first occupy our attention in the two following chapters because it is in this aspect that our hypothesis allows some degree of experimental verification.

For it is possible to sum up our conclusions as to pure perception by saying that *there is in matter something more than, but not something different from, that which is actually given*. Undoubtedly, conscious perception does not compass the whole of matter, since it consists, in as far as it is conscious, in the separation, or the "discernment," of that which, in matter, interests our various needs. But between this perception of matter and matter itself there is but a difference of degree and not of kind, pure perception standing toward matter in the relation of the part to the whole. This amounts to saying that matter cannot exercise powers of any kind other than those which we perceive. It has no mysterious virtue; it can conceal none. To take a definite example, one, moreover, which interests us most nearly, we may say that the nervous system, a material mass presenting certain qualities of color, resistance, cohe-

sion, etc., may well possess unperceived physical properties, but physical properties only. And hence it can have no other office than to receive, inhibit or transmit movement.

Now the essence of every form of materialism is to maintain the contrary, since it holds that consciousness, with all its functions, is born of the mere interplay of material elements. Hence it is led to consider even the perceived qualities of matter – sensible, and consequently felt, qualities – as so many phosphorescences which follow the track of the cerebral phenomena in the act of perception. Matter, thus supposed capable of creating elementary facts of consciousness, might therefore just as well engender intellectual facts of the highest order. It is, then, the essence of materialism to assert the perfect relativity of sensible qualities, and it is not without good reason that this thesis, which Democritus has formulated in precise terms, is as old as materialism.

But spiritualism has always followed materialism along this path. As if everything lost to matter *must* be gained by spirit, spiritualism has never hesitated to despoil matter of the qualities with which it is invested in our perception, and which, on this view, are subjective appearances. Matter has thus too often been reduced to a mysterious entity which, just because all we know of it is an empty show, might as well engender thought as well as any other phenomenon.

The truth is that there is one, and only one, method of refuting materialism: it is to show that matter is precisely that which it appears to be. Thereby we eliminate all virtuality, all hidden power, from matter and establish the phenomena of spirit as an independent reality. But to do this we must leave to matter those qualities which materialists and spiritualists alike strip from it: the latter that they may make of them representations of the spirit, the former that they may regard them only as the accidental garb of space.

This, indeed, is the attitude of common sense with regard to

matter, and for this reason common sense believes in spirit. It seems to us that philosophy should here adopt the attitude of common sense, although correcting it in one respect. Memory, inseparable in practice from perception, imports the past into the present, contracts into a single intuition many moments of duration, and thus by a twofold operation compels us, *de facto*, to perceive matter in ourselves, whereas we, *de jure*, perceive matter within matter.

Hence the capital importance of the problem of memory. If it is memory above all that lends to perception its subjective character, the philosophy of matter must aim, in the first instance, we said, at eliminating the contributions of memory. We must now add that, as pure perception gives us the whole or at least the essential part of matter (since the rest comes from memory and is super-added to matter), it follows that memory must be, in principle, a power absolutely independent of matter. If, then, spirit is a reality, it is here, in the phenomenon of memory, that we may come into touch with it experimentally. And hence any attempt to derive pure memory from an operation of the brain should reveal on analysis a radical illusion.

Let us put the same statement in clearer language. We maintain that matter has no occult or unknowable power and that it coincides, in essentials, with pure perception. Therefore we conclude that the living body in general, and the nervous system in particular, are only channels for the transmission of movements, which, received in the form of stimulation, are transmitted in the form of action, reflex or voluntary. That is to say, it is vain to attribute to the cerebral substance the property of engendering representations. Now the phenomena of memory, in which we believe that we can grasp spirit in its most tangible form, are precisely those of which a superficial psychology is most ready to find the origin in cerebral activity alone; just because they are at the point of contact between consciousness and matter, and because even

the adversaries of materialism have no objection to treating the brain as a storehouse of memories. But if it could be positively established that the cerebral process answers only to a very small part of memory, that it is rather the effect than the cause, that matter is here as elsewhere the vehicle of an *action* and not the substratum of a *knowledge*, then the thesis which we are maintaining would be demonstrated by the very example which is commonly supposed to be most unfavorable to it, and the necessity might arise of erecting spirit into an independent reality. In this way also, perhaps some light would be thrown on the nature of what is called spirit and on the possibility of the interaction of spirit and matter. For a demonstration of this kind could not be purely negative. Having shown what memory is not, we should have to try to discover what it is. Having attributed to the body the sole function of preparing actions, we are bound to enquire why memory appears to be one with this body, how bodily lesions influence it, and in what sense it may be said to mold itself upon the state of the brain matter. It is, moreover, impossible that this enquiry should fail to give us some information as to the psychological mechanism of memory and the various mental operations connected therewith. And, inversely, if the problems of pure psychology seem to acquire some light from our hypothesis, this hypothesis itself will thereby gain in certainty and weight.

But we must present this same idea in yet a third form, so as to make it quite clear why the problem of memory is in our eyes a privileged problem. From our analysis of pure perception issue two conclusions, which are in some sort divergent, one of them going beyond psychology in the direction of psycho-physiology and the other in that of metaphysics, but neither allowing of immediate verification. The first concerns the office of the brain in perception: we maintain that the brain is an instrument of action, and not of representation. We cannot demand from facts the direct

confirmation of this thesis because pure perception bears, by definition, upon *present* objects, acting on our organs and our nerve centers; and because everything always happens, in consequence, *as though* our perceptions emanated from our cerebral state and were subsequently projected upon an object which differs absolutely from them. In other words, with regard to external perception, the thesis which we dispute and that which we substitute for it lead to precisely the same consequence, so that it is possible to invoke in favor of either the one or the other its greater intelligibility, but not the authority of experience. On the contrary, the empirical study of memory may and must decide between them. For pure recollection is, by hypothesis, the representation of an *absent* object. If the necessary and sufficient cause of perception lies in a certain activity of the brain, this same cerebral activity, repeating itself more or less completely in the absence of the object, will suffice to reproduce perception: memory will be entirely explicable by the brain. But if we find that the cerebral mechanism does indeed in some sort condition memories, but is in no way sufficient to ensure their survival; if it concerns, in remembered perception, our action rather than our representation; we shall be able to infer that it plays an analogous part in perception itself and that its office is merely to ensure our effective action on the object present. Our first conclusion may thus find its verification. There would still remain this second conclusion, which is of a more metaphysical order — viz.: that in pure perception we are actually placed outside ourselves; we touch the reality of the object in an immediate intuition. Here also an experimental verification is impossible, since the practical results are absolutely the same whether the reality of the object is intuitively perceived or whether it is rationally constructed. But here again a study of memory may decide between the two hypotheses. For, in the second, there is only a difference of intensity, or more generally, of

degree, between perception and recollection, since they are both self-sufficient phenomena of representation. But if, on the contrary, we find that the difference between perception and recollection is not merely in degree, but is a radical difference in kind, the presumption will be in favor of the hypothesis which finds in perception something which is entirely absent from memory, a reality intuitively grasped. Thus the problem of memory is in very truth a privileged problem, in that it must lead to the psychological verification of two theses which appear to be unsusceptible to proof, and of which the second, being of a metaphysical order, appears to go far beyond the borders of psychology.

The road which we have to follow, then, lies clear before us. We shall first review evidence of various kinds borrowed from normal and from pathological psychology, by which philosophers might hold themselves justified in maintaining a physical explanation of memory. This examination must needs be minute or it would be useless. Keeping as close as possible to facts, we must seek to discover where, in the operations of memory, the office of the body begins and where it ends. And should we, in the course of this inquiry, find confirmation of our own hypothesis, we shall not hesitate to go further and, considering in itself the elementary work of the mind, complete the theory thereby sketched out, of the relation of spirit with matter.

Of The Recognition of Images.

Memory and The Brain

We pass now to the consideration of the consequences for the theory of memory, which might ensue from the acceptance of the principles we have laid down. We have said that the body, placed between the objects which act upon it and those which it influences, is only a conductor, the office of which is to receive movements and to transmit them (when it does not arrest them) to certain motor mechanisms, determined if the action is reflex, chosen if the action is voluntary. Everything, then, must happen as if an independent memory gathered images as they successively occur along the course of time; and as if our body, together with its surroundings, was never more than one among these images, the last is that which we obtain at any moment by making an instantaneous section in the general stream of becoming. In this section our body occupies the center. The things which surround it act upon it, and it reacts upon them. Its reactions are more or less complex, more or less varied, according to the number and nature of the apparatus which experience has set up within it. Therefore, in the form of motor contrivances, and of motor contrivances only, it can store up the action of the past. Whence it results that past images, properly so called, must be otherwise preserved; and we may formulate this first hypothesis:

I. *The past survives under two distinct forms: first, in motor mechanisms; secondly, in independent recollections.*

But then the practical, and, consequently, the usual function of memory, the utilizing of past experience for present action — recognition, in short — must take place in two different ways. Sometimes it lies in the action itself and in the automatic setting in motion of a mechanism adapted to the circumstances; at other times it implies an effort of the mind which seeks in the past, in order to apply them to the present, those representations which are best able to enter into the present situation. Whence our second proposition:

II. *The recognition of a present object is effected by movements when it proceeds from the object, by representations when it issues from the subject.*

It is true that there remains yet another question: how these representations are preserved, and what are their relations with the motor mechanisms. We shall go into this subject thoroughly in our next chapter, after we have considered the unconscious and shown where the fundamental distinction lies between the past and the present. But already we may speak of the body as an ever advancing boundary between the future and the past, as a pointed end, which our past is continually driving forward into our future. Whereas my body, taken at a single moment, is but a conductor interposed between the objects which influence it and those on which it acts, it is, nevertheless, when replaced in the flux of time, always situated at the very point where my past expires in a deed. And, consequently, those particular images, which I call cerebral mechanisms, terminate at each successive moment the series of my past representations, being the extreme prolongation of those representations into the present, their link with

the real, that is, with action. Sever that link — and you do not necessarily destroy the past image, but you deprive it of all means of acting upon the real and, consequently, as we shall show, of being realized. It is in this sense, and in this sense only, that an injury to the brain can abolish any part of memory. Hence our third, and last, proposition:

III. *We pass, by imperceptible stages, from recollections strung out along the course of time to the movements which indicate their nascent or possible action in space. Lesions of the brain may affect these movements, but not these recollections.*

We have now to see whether experience verifies these three propositions.

I. *The two forms of memory.* I study a lesson, and in order to learn it by heart I read it a first time, accentuating every line; I then repeat it a certain number of times. At each repetition there is progress; the words are more and more linked together and at last make a continuous whole. When that moment comes, it is said that I know my lesson by heart, that it is imprinted on my memory.

I consider now how the lesson has been learned, and picture to myself the successive phases of the process. Each successive reading then recurs to me with its own individuality; I can see it again with the circumstances which attended it then and still form its setting. It is distinguished from those which preceded or followed it by the place which it occupied in time; in short, each reading stands out in my mind as a definite event in my history. Again it will be said that these images are recollections, that they are imprinted on my memory. The same words, then, are used in both cases. Do they mean the same thing?

The memory of the lesson, which is remembered in the sense

of learned by heart, has *all* the marks of a habit. Like a habit, it is acquired by the repetition of the same effort. Like a habit, it demands first a decomposition and then a recomposition of the whole action. Lastly, like every habitual bodily exercise, it is stored up in a mechanism which is set in motion as a whole by an initial impulse, in a closed system of automatic movements which succeed each other in the same order and, together, take the same length of time.

The memory of each successive reading, on the contrary, the second or the third for instance, has *none* of the marks of a habit. Its image was necessarily imprinted at once on the memory, since the other readings form, by their very definition, other recollections. It is like an event in my life; its essence is to bear a date, and, consequently, to be unable to occur again. All that later readings can add to it will only alter its original nature; though my effort to recall this image becomes more and more easy as I repeat it, the image, regarded in itself, was necessarily at the outset what it always will be.

It may be urged that these two recollections, that of the reading and that of the lesson, differ only as the less from the more, and that the images successively developed by each repetition overlap each other, so that the lesson once learned is but the composite image in which all readings are blended. And I quite agree that each of the successive readings differs from the preceding mainly in the fact that the lesson is better known. But it is no less certain that each of them, considered as a new reading and not as a lesson better known, is entirely sufficient to itself, subsists exactly as it occurred, and constitutes with all its concomitant perceptions an original moment of my history. We may even go further and aver that consciousness reveals to us a profound difference, a difference in kind, between the two sorts of recollection. The memory of a given reading is a representation, and only a representation; it

is embraced in an intuition of the mind which I may lengthen or shorten at will; I assign to it any duration I please; there is nothing to prevent my grasping the whole of it instantaneously, as in one picture. On the contrary, the memory of the lesson I have learned, even if I repeat this lesson only mentally, requires a definite time, the time necessary to develop one by one, were it only in imagination, all the articulatory movements that are necessary: it is no longer a representation; it is an action. And, in fact, the lesson once learned bears upon it no mark which betrays its origin and classes it in the past; it is part of my present, exactly like my habit of walking or of writing; it is lived and acted, rather than represented: I might believe it innate, if I did not choose to recall at the same time, as so many representations, the successive readings by means of which I learned it. Therefore, these representations are independent of it, and, just as they preceded the lesson as I now possess and know it, so that lesson once learned can do without them.

Following to the end this fundamental distinction, we are confronted by two different memories theoretically independent. The first records, in the form of memory-images, all the events of our daily life as they occur in time; it neglects no detail; it leaves to each fact, to each gesture, its place and date. Regardless of utility or of practical application, it stores up the past by the mere necessity of its own nature. By this memory is made possible the intelligent, or rather intellectual, recognition of perception already experienced; in it we take refuge every time that, in the search for a particular image, we remount the slope of our past. But every perception is prolonged into a nascent action; and while the images are taking their place and order in this memory, the movements which continue them modify the organism and create in the body new dispositions toward action. Thus is gradually formed an experience of an entirely different order, which accumulates within

the body, a series of mechanisms would up and ready, with reactions to external stimuli ever more numerous and more varied and answers ready prepared to an ever growing number of possible solicitations. We become conscious of these mechanisms as they come into play; this consciousness of a whole past of efforts stored up in the present is indeed also a memory, but a memory profoundly different from the first, always bent upon action, seated in the present and looking only to the future. It has retained from the past only the intelligently coordinated movements which represent the accumulated efforts of the past; it recovers those past efforts, not in the memory-images which recall them, but in the definite order and systematic character with which the actual movements take place. In truth it no longer *represents* our past to us, it *acts* it; and if it still deserves the name of memory, it is not because it conserves bygone images, but because it prolongs their useful effect into the present moment.

Of these two memories, of which the one *imagines* and the other *repeats*, the second may supply the place of the first and even sometimes be mistaken for it. When a dog welcomes his master, barking and wagging his tail, he certainly recognizes him; but does this recognition imply the evocation of a past image and the comparison of that image with the present perception? Does it not rather consist in the animal's consciousness of a certain special attitude adopted by his body, an attitude which has been gradually built up by his familiar relations with his master, and which the mere perception of his master now calls forth in him mechanically? We must not go too far; even in the animal it is possible that vague images of the past overflow into the present perception; we can even conceive that its entire past is virtually indicated in its consciousness; but this past does not interest the animal enough to detach it from the fascinating present, and its recognition must be rather lived than thought. To call up the past in the form of an

image, we must be able to withdraw ourselves from the action of the moment, we must have the power to value the useless, we must have the will to dream. Man alone is capable of such an effort. But even in him the past to which he returns is fugitive, ever on the point of escaping him, as though his backward turning memory were thwarted by the other, more natural, memory, of which the forward movement bears him on to action and to life.

When psychologists talk of recollection as of a fold in a material, as of an impress graven deeper by repetition, they forget that the immense majority of our memories bear upon events and details of our life of which the essence is to have a date, and, consequently, to be incapable of being repeated. The memories which we acquire voluntarily by repetition are rare and exceptional. On the contrary, the recording, by memory, of facts and images unique in their kind takes place at every moment of duration. But inasmuch as *learned* memories are more useful, they are more remarked. And as the acquisition of these memories by a repetition of the same effort resembles the well-known process of habit, we prefer to set this kind of memory in the foreground, to erect it into the model memory, and to see in spontaneous recollection only the same phenomenon in a nascent state, the beginning of a lesson learned by heart. But how can we overlook the radical difference between that which must be built up by repetition and that which is essentially incapable of being repeated? Spontaneous recollection is perfect from the outset; time can add nothing to its image without disfiguring it; it retains in memory its place and date. On the contrary, a learned recollection passes out of time in the measure that the lesson is better known; it becomes more and more impersonal, more and more foreign to our past life. Repetition, therefore, in no sense effects the conversion of the first into the last; its office is merely to utilize more and more the movements by which the first was continued, in order to organize them together

and, by setting up a mechanism, to create a bodily habit. Indeed, this habit could not be called a remembrance were it not that I remember that I have acquired it, and I remember its acquisition only because I appeal to that memory which is spontaneous, which dates events and records them but once. Of the two memories, then, which we have just distinguished, the first appears to be memory par excellence. The second, that generally studied by psychologists, is *habit interpreted by memory* rather than memory itself.

It is true that the example of a lesson learned by heart is to some extent artificial. Yet our whole life is passed among a limited number of objects, which pass more or less often before our eyes: each of them, as it is perceived, provokes on our part movements, at least nascent, whereby we adapt ourselves to it. These movements, as they recur, contrive a mechanism for themselves, grow into a habit, and determine in us attitudes which automatically follow our perception of things. This, as we have said, is the main office of our nervous system. The afferent nerves bring to the brain a disturbance, which, after having intelligently chosen its path, transmits itself to motor mechanisms created by repetition. Thus is ensured the appropriate reaction, the correspondence to environment — adaptation, in a word — which is the general aim of life. And a living being which did nothing but live would need no more than this. But, simultaneously with this process of perception and adaptation which ends in the record of the past in the form of motor habits, consciousness, as we have seen, retains the image of the situations through which it has successively traveled, and lays them side by side in the order in which they took place. Of what use are these memory-images? Preserved in memory, reproduced in consciousness, do they not distort the practical character of life, mingling dream with reality? They would, no doubt, if our actual consciousness, a consciousness which reflects the exact adaptation of our nervous system to the present situation,

did not set aside all those among the past images which cannot be coordinated with the present perception and are unable to form with it a *useful* combination. At most, certain confused recollections, unrelated to the present circumstances, may overflow the usefully associated images, making around these a less illuminated fringe which fades away into an immense zone of obscurity. But suppose an accident which upsets the equilibrium maintained by the brain between the external stimulation and the motor reaction, relax for a moment the tension of the threads which go from the periphery to the periphery by way of the center, and immediately these darkened images come forward into the full light: it is probably the latter condition which is realized in any sleep wherein we dream. Of these two memories that we have distinguished, the second, which is active, or motor, will, then, constantly inhibit the first, or at least only accept from it that which can throw light upon and complete in a useful way the present situation: thus, as we shall see later, could the laws of the association of ideas be explained. But, besides the services which they can render by associating with the present perception, the images stored up in the spontaneous memory have yet another use. No doubt they are dream-images; no doubt they usually appear and disappear independently of our will; this is why, when we really wish to *know* a thing, we are obliged to learn it by heart, that is to say, to substitute for the spontaneous image a motor mechanism which can serve in its stead. But there is a certain effort *sui generis* which permits us to retain the image itself, for a limited time, within the field of our consciousness; thanks to this faculty, we have no need to await at the hands of chance the accidental repetition of the same situations in order to organize into a habit concomitant movements; we make use of the fugitive image to construct a stable mechanism which takes its place. Either, then, our distinction of the two independent memories is unsound, or, if it corresponds to

facts, we shall find an exaltation of spontaneous memory in most cases where the sensori-motor equilibrium of the nervous system is disturbed; an inhibition, on the contrary, in the normal state, of all spontaneous recollections which do not serve to consolidate the present equilibrium; and lastly, in the operation by means of which we acquire the habit-memory, a latent intervention of the image-memory. Let us see whether the facts confirm this hypothesis.

For the moment we will insist on neither point; we hope to throw ample light upon both when we study the disturbances of memory and the laws of the association of ideas. We shall be content for the present to show, in regard to things which are learned, how the two memories run side by side and lend to each other a mutual support. It is a matter of everyday experience that lessons committed to the motor memory can be automatically repeated, but observation of pathological cases proves that automatism extends much further in this direction than we think. In cases of dementia, we sometimes find that intelligent answers are given to a succession of questions which are not understood: language here works after the manner of a reflex.¹ Aphasics, incapable of uttering a word spontaneously, can recollect without a mistake the words of an air which they sing.² Or again, they will fluently repeat a prayer, a series of numbers, the days of the week or the months of the year.³ Thus extremely complex mechanisms, subtle enough to imitate intelligence, can work by themselves when once they have been built up, and, in consequence, usually obey a mere initial impulse of the will. But what takes place while they are being built up? When we strive to learn a lesson, for instance, is not the visual or auditory image which we endeavor to reconstitute by movements already in our mind, invisible though present? Even in the very first recitation, we recognize, by a vague feeling of uneasiness, any error we have made, as though from the obscure depths of consciousness we received a sort of warning.⁴ Concen-

trate your mind on that sensation, and you will feel that the complete image is there, but evanescent, a phantasm that disappears just at the moment when motor activity tries to fix its outline. During some recent experiments (which, however, were undertaken with quite a different purpose),⁵ the subjects averred that they felt just such an impression. A series of letters, which they were asked to remember, was held before their eyes for a few seconds. But, to prevent any accentuating of the letters so perceived by appropriate movements of articulation, they were asked to repeat continuously a given syllable while their eyes were fixed on the image. From this resulted a special psychical state; the subjects felt themselves to be in complete possession of the visual image, although unable to produce any part of it on demand: to their great surprise the line disappeared. "According to one observer, the basis was a *Gesamtvorstellung*, a sort of all-embracing complex idea in which the parts have an indefinitely felt unity."⁶

This spontaneous recollection, which is masked by the acquired recollection, may flash out at intervals, but it disappears at the least movement of the voluntary memory. If the subject sees the series of letters, of which he thought he retained the image, vanish from before his eyes, this happens mainly when he begins to repeat it: the effort seems to drive the rest of the image out of his consciousness.⁷ Now, analyze many of the imaginative methods of mnemonics and you will find that the object of this science is to bring into the foreground the spontaneous memory which was hidden, and to place it, as an active memory, at our service; to this end every attempt at motor memory is, to begin with, suppressed. The faculty of mental photography, says one author,⁸ belongs rather to subconsciousness than to consciousness; it answers with difficulty to the summons of the will. In order to exercise it, we should accustom ourselves to retaining, for instance, several arrangements of points at once, without even thinking of counting them⁹: we

must imitate in some sort the instantaneity of this memory in order to attain to its mastery. Even so it remains capricious in its manifestations; as the recollections which it brings us are akin to dreams, its more regular intrusion into the life of the mind may seriously disturb intellectual equilibrium.

What this memory is, whence it is derived and how it works will be shown in the next chapter. For the moment, the schematic conception will be enough. So we shall merely sum up the preceding paragraphs and say that the past appears indeed to be stored up, as we had surmised, under two extreme forms: on the one hand, motor mechanisms which make use of it; on the other, personal memory-images which picture all past events with their outline, their color and their place in time. Of these two memories the first follows the direction of nature; the second, left to itself, would rather go the contrary way. The first, conquered by effort, remains dependent upon our will; the second, entirely spontaneous, is as capricious in reproducing as it is faithful in preserving. The only regular and certain service which the second memory can render to the first is to bring before it images of what preceded or followed situations similar to the present situation, so as to guide its choice: in this consists the association of ideas. There is no other case in which the memory which recalls is sure to obey the memory which repeats. Everywhere else, we prefer to construct a mechanism which allows us to sketch the image again, at need, because we are well aware that we cannot count upon its reappearance. These are the two extreme forms of memory in their *pure state*.

Now we may say at once that it is because philosophers have concerned themselves only with the intermediate and, so to speak, impure forms that they have misunderstood the true nature of memory. Instead of dissociating the two elements, memory-image and movement, in order to discover subsequently by what series

of operations they come, having each abandoned some part of its original purity to fuse one with the other, they are apt to consider only the mixed phenomenon which results from their coalescence. This phenomenon, being mixed, presents on the one side the aspect of a motor habit, and, on the other side, that of an image more or less consciously localized. But they will have it that the phenomenon is a simple one. So they must assume that the cerebral mechanism, whether of the brain or of the medulla oblongata or of the cord, which serves as the basis of the motor habit, is at the same time the substratum of the conscious image. Hence the strange hypothesis of recollections stored in the brain, which are supposed to become conscious as though by a miracle and bring us back to the past by a process that is left unexplained. True, some observers do not make so light of the conscious aspect of the operation and see in it something more than an epiphenomenon. But, as they have not begun by isolating the memory which retains and sets out the successive repetitions side by side in the form of memory images, since they confound it with the habit which is perfected by use, they are led to believe that the effect of repetition is brought to bear upon one and the same single and indivisible phenomenon which merely grows stronger by recurrence: and, as this phenomenon clearly ends by being merely a motor habit corresponding to a mechanism, cerebral or other, they are led, whether they will it or not, to suppose that some mechanism of this kind was from the beginning behind the image and that the brain is an organ of representation. We are now about to consider these intermediate states and distinguish in each of them the part which belongs to nascent action, that is to say of the brain, and the part of independent memory, that is to say of memory-images. What are these states? Being partly motor they must, on our hypothesis, prolong a present perception; but, on the other hand, inasmuch as they are images, they reproduce past percep-

tions. Now the concrete process by which we grasp the past in the present is *recognition*. Recognition, therefore, is what we have to study, to begin with.

II. *Of recognition in general: memory-images and movements.* There are two ways in which it is customary to explain the feeling of "having seen a thing before." On one theory, the recognition of a present perception consists in inserting it mentally in its former surroundings. I encounter a man for the first time: I simply perceive him. If I meet him again, I recognize him, in the sense that the concomitant circumstances of the original perception, returning to my mind, surround the actual image with a setting which is not a setting actually perceived. To recognize, then, according to this theory, is to associate with a present perception the images which were formerly given in connection with it.¹⁰ But, as it has been justly observed, a renewed perception cannot suggest the concomitant circumstances of the original perception unless the latter is evoked, to begin with, by the present state which resembles it.¹¹ Let A be the first perception; the accompanying circumstances B, C, D, remain associated with it by contiguity. If I call the same perception renewed A', as it is not with A', but with A that the terms B, C, D are bound up, it is necessary, in order to evoke the terms B, C, D, that A' should be first called up by some association of resemblance. And it is of no use to assert that A' is identical with A. For the two terms, though similar, are numerically distinct, and differ at least by this simple fact that A' is a perception, whereas A is but a memory. Of the two interpretations of which we have spoken, the first, then, melts into the second, which we will now examine.

It is alleged that the present perception dives into the depths of memory in search of the remembrance of the previous perception which resembles it: the sense of recognition would thus come

from a bringing together, or a blending, or perception and memory. No doubt, as an acute thinker¹² has already pointed out, resemblance is a relation established by the mind between terms which it compares and consequently already possesses; so the perception of a resemblance is rather an effect of association than its cause. But, along with this definite and perceived resemblance which consists in the common element seized and disengaged by the mind, there is a vague and in some way objective resemblance, spread over the surface of the images themselves, which might act perhaps like a physical cause of reciprocal attraction.¹³ And should we ask how it is, then, that when we often recognize an object without being able to identify it with a former image, refuge is sought in the convenient hypothesis of cerebral tracks which coincide with each other, of cerebral movements made easier by practice,¹⁴ or of perceptive cells communicating with cells where memories are stored.¹⁵ In truth, all such theories of recognition are bound to melt away, in the end, into physiological hypotheses of this kind. What they were aiming at, first, was to make all recognition issue from a bringing together of perception and memory; but experience stands over against them, testifying that in most cases recollection emerges only after the perception is recognized. So they are sooner or later forced to relegate to the brain, in the form of a combination between movements or of a connection between cells, that which they had first declared to be an association of ideas; and to explain the fact of recognition — very clear on our view — by the hypothesis, which seems to us very obscure, of a brain which stores up ideas.

But the fact is that the association of a perception with a memory is not enough to account for the process of recognition. For, if recognition took place in this way, it would always be obliterated when the memory images had disappeared and always happen when these images are retained. Psychic blindness, or the inability to

recognize perceived objects, would, then, never occur without an inhibition of visual memory, and, above all, the inhibition of visual memory would invariably produce psychic blindness. But neither consequence is borne out by facts. In a case studied by Wilbrand,¹⁶ the patient could describe with her eyes shut the town she lived in and, in imagination, walk through its streets; yet, once in the street, she felt like a complete stranger: she recognized nothing and could not find her way. Facts of the same kind have been observed by Fr. Müller¹⁷ and Lissauer:¹⁸ the patients can summon up the mental picture of an object named to them; they describe it very well; but they cannot recognize it when it is shown to them. The retention, even the conscious retention, of a visual memory is, therefore, not enough for the recognition of a similar perception. Inversely, in Charcot's case, which has become the classic example of a complete eclipse of visual images,¹⁹ not all recognition of perceptions was obliterated. A careful study of the report of the case is conclusive on this point. No doubt the patient failed to recognize the streets and houses of his native town, to the extent of being unable to name them or to find his way about them; yet he knew that they were streets and houses. He no longer recognized his wife and children; yet, when he saw them, he could say that this was a woman, that those were children. None of this would have been possible had there been psychic blindness in the absolute sense of the word. A certain kind of recognition, then, which we shall need to analyze, was obliterated, not the general faculty of recognition. So we must conclude that not every recognition implies the intervention of a memory image, and, conversely, that we may still be able to call up such images when we have lost the power of identifying perceptions with them. What, then, is recognition, and how shall we define it?

There is, in the first place, if we carry the process to the extreme, an *instantaneous* recognition, of which the body is capable by itself,

without the help of any explicit memory-image. It consists in action and not in representation. For instance, I take a walk in a town seen for the first time. At every street corner I hesitate, uncertain where I am going. I am in doubt, I mean by this that alternatives are offered to my body, that my movement as a whole is discontinuous, that there is nothing in one attitude which foretells and prepares future attitudes. Later, after prolonged sojourn in the town, I shall go about it mechanically, without having any distinct perception of the objects which I am passing. Now, between these two extremes, the one in which perception has not yet organized the definite movements which accompany it and the other in which these accompanying movements are organized to a degree which renders perception useless, there is an intermediate state in which the object is perceived, yet provokes movements which are connected, continuous and called up by one another. I began by a state in which I distinguished only by my perception; I shall end in a state in which I am hardly conscious of anything but automatism: in the interval there is a mixed state, a perception followed step by step by automatism just impending. Now, if the later perceptions differ from the first perception in the fact that they guide the body toward the appropriate mechanical reaction, and if, on the other hand, those renewed perceptions appear to the mind under that special aspect which characterizes familiar or recognized perceptions, must we not assume that the consciousness of a well-regulated motor accompaniment, of an organized motor reaction, is here the foundation of the sense of familiarity? At the basis of recognition there would thus be a phenomenon of a motor order.

To recognize a common object is mainly to know how to use it. This is so true that early observers gave the name *apraxia* to that failure of recognition which we call psychic blindness.²⁰ But to know how to use a thing is to sketch out the movements which

adapt themselves to it; it is to take a certain attitude or at least to have a tendency to do so through what the Germans call motor impulses (*Bewegungsantriebe*). The habit of using the object has, then, resulted in organizing together movements and perceptions; the consciousness of these nascent movements, which follow perception after the manner of a reflex, must be here also at the bottom of recognition.

There is no perception which is not prolonged into movement. Ribot²¹ and Maudsley²² have long since drawn attention to this point. The training of the senses consists in just the sum of the connections established between the sensory impression and the movement which makes use of it. As the impression is repeated, the connection is consolidated. Nor is there anything mysterious in the mechanism of the operation. Our nervous system is evidently arranged with a view to the building up of motor apparatus linked, through the intermediary of centers, with sense stimuli; the discontinuity of the nervous elements, the multiplicity of their terminal branches, which are probably capable of joining in various ways, make possible an unlimited number of connections between impressions and the corresponding movements. But the mechanism in course of construction cannot appear to consciousness in the same form as the mechanism already constructed. There is something which profoundly distinguishes and clearly manifests those systems of movements which are consolidated in the organism; that is, we believe, the difficulty we have in modifying their order. It is, again, the performance of the movements which follow in the movements which precede, a performance whereby the part virtually contains the whole, as when each note of a tune learned by heart seems to lean over the next to watch its execution.²³ If, then, every perception has its organized motor accompaniment, the ordinary feeling of recognition has its root in the consciousness of this organization.

In fact, we commonly act our recognition before we think it. Our daily life is spent among objects whose very presence invites us to play a part: in this the familiarity of their aspect consists. Motor tendencies would, then, be enough by themselves to give us the feeling of recognition. But we hasten to add that in most cases there is something else besides.

For, while motor apparatus are built up under the influence of perceptions that are analyzed with increasing precision by the body, our past psychical life is there: it survives — as we shall try to prove — with all the detail of its events localized in time. Always inhibited by the practical and useful consciousness of the present moment, that is to say, by the sensori-motor equilibrium of a nervous system connecting perception with action, this memory merely awaits the occurrence of a rift between the actual impression and its corresponding movement to slip in its images. As a rule, when we desire to go back along the course of the past and discover the known, localized, personal memory-image which is related to the present, an effort is necessary, whereby we draw back from the act to which perception inclines us: the latter would urge us toward the future; we have to go backwards into the past. In this sense, movement rather tends to drive away the image. Yet, in one way, it contributes to its approach. For, though the whole series of our past images remains present within us, still the representation which is analogous to the present perception has to be *chosen* from among all possible representations. Movements, accomplished or merely nascent, prepare this choice or at the very least mark out the field in which we shall seek the image we need. By the very constitution of our nervous system, we are beings in whom present impressions find their way to appropriate movements: if it so happens that former images can just as well be prolonged in these movements, they take advantage of the opportunity to slip into the actual perception and get themselves adopted

by it. They then appear, in fact, to our consciousness, though it seems as if they ought, by right, to remain concealed by the present state. So we may say that the movements which bring about mechanical recognition hinder in one way, and encourage in another, recognition by images. In principle, the present supplants the past. But, just because the disappearance of former images is due to their inhibition by our present attitude, those whose shape might fit into this attitude encounter less resistance than the others; if, then, any one of them is indeed able to overcome the obstacle, it is the image most similar to the present perception that will actually do so.

If our analysis is correct, the diseases which affect recognition will be of two widely differing forms, and facts will show us two kinds of psychic blindness. For we may presume that, in some cases, it is the memory-image which can no longer reappear, and that, in other cases, it is merely the bond between perception and the accompanying habitual movements which is broken — perception provoking *diffused* movements, as though it were wholly new. Do the facts confirm this hypothesis?

There can be no dispute as to the first point. The apparent abolition of visual memory in psychic blindness is so common a fact that it served, for a time, as a definition of that disorder. We shall have to consider how far, and in what sense, memories can really disappear. What interests us for the moment is that cases occur in which there is no recognition, and yet visual memory is not altogether lost. Have we here then, as we maintain, merely a disturbance of motor habits or at most an interruption of the chain which unite them to sense perceptions? As no observer has considered a question of this nature, we should be hard put for an answer to it if we had not noticed here and there in their descriptions certain facts which appear to us significant.

The first of these facts is the loss of the sense of direction. All

those who have treated the subject of psychic blindness have been struck by this peculiarity. Lissauer's patient had completely lost the faculty of finding his way about his own house.²⁴ Fr. Müller insists on the fact that, while blind men soon learn to find their way, the victim of psychic blindness fails, even after months of practice, to find his way about his own room.²⁵ But is not this faculty of orientation the same thing as the faculty of coordinating the movements of the body with the visual impression, and of mechanically prolonging perceptions in useful reactions?

There is a second, and even more characteristic fact, and that is the manner in which these patients draw. We can conceive two fashions of drawing. In the first, we manage, by tentative efforts, to set down here and there on the paper a certain number of points, and we then connect them together, verifying continually the resemblance between the drawing and the object. This is what is known as "point to point" drawing. But our habitual method is quite different. We draw with a continuous line, after having looked at, or thought of, our model. How shall we explain such a faculty, except by our habit of discovering at once the *organization* of the outlines of common objects, that is to say, by a motor tendency to draft their diagram in one continuous line? But if it is just such habits or correspondences which are lost in certain forms of psychic blindness, the patient may still perhaps be able to draw bits of a line which he will connect together more or less well; but he will no longer be able to draw at a stroke because the tendency to adopt and reproduce the general *movement* of the outline is no longer present in his hand. Now this is just what experiment verifies. Lissauer's observations are instructive on this head.²⁶ His patient had the greatest difficulty in drawing simple objects; if he tried to draw them from memory, he traced detached portions of them chosen at random and was unable to unite these into a whole. Cases of complete psychic blindness are, however, rare. Those of

word-blindness are much more numerous — cases of a loss, that is, of visual recognition limited to the characters of the alphabet. Now it is a fact of common observation that the patient in such cases is unable to seize what may be called the *movement* of the letters when he tries to copy them. He begins to draw them at any point, passing back and forth between the copy and the original to make sure that they agree. And this is the more remarkable in that he often retains unimpaired the faculty of writing from dictation or spontaneously. What is lost is clearly the habit of distinguishing the articulations of the object perceived, that is to say, of completing the visual perception by a motor tendency to sketch its diagram. Whence we may conclude that such is indeed the primordial condition of recognition.

But we must pass now from automatic recognition, which is mainly achieved through movements, to that which requires the regular intervention of memory-images. The first is recognition by *inattention*; the second, as we shall see, is attentive recognition.

This form also begins by movements. But, whereas, in automatic recognition, our movements prolong our perception in order to draw from it useful effects and thus *take us away* from the object perceived, here, on the contrary, they *bring us back* to the object, to dwell upon its outlines. Thus is explained the preponderant, and no longer merely accessory, part taken here by memory-images. For, if we suppose that the movements forego their practical end, and that motor activity, instead of continuing perception by useful reactions, turns back to mark out its more striking features, then the images which are analogous to the present perception — images of which these movements have already sketched out, so to speak, the form — will come regularly, and no longer accidentally, to flow into this mold, though they may have to give up much of their detail in order to get in more easily.

III. *Gradual passage of recollections into movements. Recognition and attention.* Here we come to the essential point of our discussion. In those cases where recognition is attentive, i. e., where memory-images are *regularly* united with the present perception, is it the perception which determines mechanically the appearance of the memories, or is it the memories which spontaneously go to meet the perception?

On the answer to this question will depend the nature of the relation which philosophers will have to establish between the brain and memory. For in every perception there is a disturbance communicated by the nerves to the perceptive centers. If the passing on of this movement to other cortical centers had, as its real effect, the springing up of images in these, then we might in strictness maintain that memory is but a function of the brain. But if we can establish that here, as elsewhere, movement produces nothing but movement, that the office of the sense-stimulation is merely to impress on the body a certain attitude into which recollections will come to insert themselves, then, as it would be clear that the whole effect of the material vibrations is exhausted in this work of motor adaptation, we should have to look for memory elsewhere. On the first hypothesis, the disorders of memory occasioned by a cerebral lesion would result from the fact that the recollections occupied the damaged region and were destroyed with it. On the second hypothesis, these lesions would affect our nascent or possible action, but our action alone. Sometimes they would hinder the body from taking, in regard to the object, the attitude that may call back its memory-image; sometimes they would sever the bonds between remembrance and the present reality; that is, by suppressing the last phase of the realization of a memory — the phase of action — they would thereby hinder the memory from becoming actual. But in neither case would a lesion of the brain really destroy memories.

The second hypothesis is ours; but, before we attempt to verify it, we must briefly state how we understand the general relations of perception, attention and memory. In order to show how a memory may, by gradual stages, come to graft itself on an attitude or a movement, we shall have to anticipate in some degree the conclusions of our next chapter.

What is attention? In one point of view, the essential effect of attention is to render perception more intense and to spread out its details; regarded in its *content*, it would resolve itself into a certain magnifying of the intellectual state.²⁷ But, on the other hand, consciousness testifies to an irreducible difference of *form* between this increase of intensity and that which is owing to a higher power of the external stimulus: it seems indeed to come from within and to indicate a certain *attitude* adopted by the intellect. But it is just here that the difficulty begins, for the idea of an intellectual attitude is not a clear idea. Psychologists will here speak of a "concentration of the mind,"²⁸ or again of an "apperceptive"²⁹ effort to bring perception into the field of distinct intelligence. Some of them, materializing this idea, will suppose a higher tension of cerebral energy,³⁰ or even the setting free of a certain amount of central energy which reinforces the stimulation received.³¹ But either the fact observed psychologically is merely translated thereby into a physiological symbolism which seems to us even less clear, or else we always come back to a metaphor.

Stage by stage we shall be led on to define attention as an adaptation of the body rather than of the mind and to see in this attitude of consciousness mainly the consciousness of an attitude. Such is the position assumed by Ribot³² in the discussion, and, though it has been attacked,³³ it appears to have retained all its strength, provided, however, that we are content to see, in the movements described by Ribot, only the negative condition of

the phenomenon. For, even if we suppose that the accompanying movements of voluntary attention are mainly movements of arrest, we still have to explain the accompanying work of the mind, that is to say, the mysterious operation by which the same organ, perceiving in the same surroundings the same object, discovers in it a growing number of things. But we may go farther and maintain that the phenomena of inhibition are merely a preparation for the actual movements of voluntary attention. Suppose for a moment that attention, as we have already suggested, implies a backward movement of the mind which thus gives up the pursuit of the useful effect of a present perception: there will indeed be, first, an inhibition of movement, an arresting action. But, upon this general attitude, more subtle movements will soon graft themselves, some of which have been already remarked and described,³⁴ and all of which combine to retrace the outlines of the object perceived. With these movements the positive, no longer merely negative, work of attention begins. It is continued by memories.

For, while external perception provokes on our part movements which retrace its main lines, our memory directs upon the perception received the memory-images which resemble it and which are already sketched out by the movements themselves. Memory thus creates anew the present perception, or rather it doubles this perception by reflecting upon it either its own image or some other memory-image of the same kind. If the retained or remembered image will not cover all the details of the image that is being perceived, an appeal is made to the deeper and more distant regions of memory, until other details that are already known come to project themselves upon those details that remain unperceived. And the operation may go on indefinitely – memory strengthening and enriching perception, which, in its turn becoming wider, draws into itself a growing number of complementary recollections. So let us no longer think of a mind which disposes of some

fixed quantity of light, now diffusing it around, now concentrating it on a single point. Metaphor for metaphor, we would rather compare the elementary work of attention to that of the telegraph clerk who, on receipt of an important dispatch, sends it back again, word for word, in order to check its accuracy.

But, to send a telegram, we must know how to use the machine. And, in the same way, in order to reflect upon a perception the image which we have received from it, we must be able to reproduce it, i.e., to reconstruct it by an effort of synthesis. It has been said that attention is a power of analysis, and it is true; but it has not been sufficiently shown how an analysis of this kind is possible, nor by what process we are able to discover in a perception that which could not be perceived in it at first. The truth is that this analysis is effected by a series of attempts at a synthesis, i.e., by so many hypotheses: our memory chooses, one after the other, various analogous images which it launches in the direction of the new perception. But the choice is not made at random. What suggests the hypotheses, what presides, even from afar, over the choice is the movement of imitation, which continues the perception, and provides for the perception and for the images a common framework.

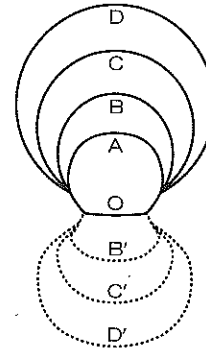
But, if this be so, the mechanism of distinct perception must be different from what it is usually thought to be. Perception does not consist merely in impressions gathered, or even elaborated, by the mind. This is the case, at most, with the perceptions that are dissipated as soon as received, those which we disperse in useful actions. But every *attentive* perception truly involves a *reflection*, in the etymological sense of the word, that is to say the projection, outside ourselves, of an actively created image, identical with, or similar to, the object on which it comes to mold itself. If, after having gazed at any object, we turn our eyes abruptly away, we obtain an "afterimage" of it: must we not suppose that

this image existed already while we were looking? The recent discovery of centrifugal fibers of perception inclines us to think that this is the usual course of things and that, beside the afferent process which carries the impression to the center, there is another process, of contrary direction, which brings back the image to the periphery. It is true that we are dealing here with images photographed upon the object itself, and with memories following immediately upon the perception of which they are but the echo. But, behind these images, which are identical with the object, there are others, stored in memory, which merely resemble it, and others, finally, which are only more or less distantly akin to it. All these go out to meet the perception, and, feeding on its substance, acquire sufficient vigor and life to abide with it in space. The experiments of Münsterberg³⁵ and of Külpe³⁶ leave no doubt as to this latter point: any memory-image that is capable of interpreting our actual perception inserts itself so thoroughly into it that we are no longer able to discern what is perception and what is memory. The ingenious experiments of Goldscheider and Müller on the mechanism of reading are most interesting in this regard.³⁷ Arguing against Grashey, who, in a well-known essay,³⁸ maintained that we read words letter by letter, these observers proved by experiments that rapid reading is a real work of divination. Our mind notes here and there a few characteristic lines and fills all the intervals with memory-images which, projected on the paper, take the place of the real printed characters and may be mistaken for them. Thus we are constantly creating or reconstructing. Our distinct perception is really comparable to a closed circle, in which the perception-image, going toward the mind, and the memory-image, launched into space, careen the one behind the other.

We must emphasize this latter point. Attentive perception is often represented as a series of processes which make their way in single file; the object exciting sensations, the sensations causing

ideas to start up before them, each idea setting in motion, one in front of the other, points more and more remote of the intellectual mass. Thus there is supposed to be a rectilinear progress, by which the mind goes further and further from the object, never to return to it. We maintain, on the contrary, that reflective perception is a *circuit*, in which all the elements, including the perceived object itself, hold each other in a state of mutual tension as in an electric circuit, so that no disturbance starting from the object can stop on its way and remain in the depths of the mind: it must always find its way back to the object from where it proceeds. Now it must not be thought that this is a mere matter of words. We have here two radically different conceptions of the intellectual process. According to the first, things happen mechanically and by a merely accidental series of successive additions. At each moment of an attentive perception, for example, new elements sent up from a deeper stratum of the mind might join the earlier elements, without thereby creating a general disturbance and without bringing about a transformation of the whole system. In the second, on the contrary, an act of attention implies such a solidarity between the mind and its object, it is a circuit so well closed that we cannot pass to states of higher concentration without creating, whole and entire, so many new circuits which envelop the first and have nothing in common between them but the perceived object. Of these different circles of memory, which later we shall study in detail, the smallest, A, is the nearest to immediate perception. It contains only the object O, with the afterimage which comes back and overlies it. Behind it, the larger and larger circles B, C, D correspond to growing efforts at intellectual expansion. It is the whole of memory, as we shall see, that passes over into each of these circuits, since memory is always present; but that memory, capable, by reason of its elasticity, of expanding more and more, reflects upon the object a growing number of suggested

Fig. 1



images — sometimes the details of the object itself, sometimes concomitant details which may throw light upon it. Thus, after having rebuilt the object perceived, as an independent whole, we reassemble, together with it, the more and more distant conditions with which it forms one system. If we call B', C', D', these causes of growing depth, situated behind the object and virtually given with the object itself, it will be seen that the progress of attention results in creating anew not only the object perceived, but also the ever widening systems with which it may be bound up; so that in the measure in which the circles B, C, D represent a higher expansion of memory, their reflection attains in B', C', D' deeper strata of reality.

The same psychical life, therefore, must be supposed to be repeated an endless number of times on the different stories of memory, and the same act of the mind may be performed at varying heights. In the effort of attention, the mind is always concerned in its entirety, but it simplifies or complicates itself according to the level on which it chooses to go to work. Usually it is the present perception which determines the direction of our mind; but, according to the degree of tension which our mind adopts

and the height at which it takes its stand, the perception develops a greater or smaller number of images.

In other words, personal recollections, exactly localized, the series of which represents the course of our past existence, make up, all together, the last and largest enclosure of our memory. Essentially fugitive, they become materialized only by chance, either when an accidentally precise determination of our bodily attitude attracts them or when the very indetermination of that attitude leaves a clear field to the caprices of their manifestation. But this outermost envelope contracts and repeats itself in inner and concentric circles, which in their narrower range enclose the same recollections grown smaller, more and more removed from their personal and original form, and more and more capable, from their lack of distinguishing features, of being applied to the present perception and of determining it after the manner of a species which defines and absorbs the individual. There comes a moment when the recollection thus brought down is capable of blending so well with the present perception that we cannot say where perception ends or where memory begins. At that precise moment, memory, instead of capriciously sending in and calling back its images, follows regularly, in all their details, the movements of the body.

But, in the degree that these recollections draw nearer to movements, and so to external perception, the work of memory acquires a higher practical importance. Past images, reproduced exactly as they were, with all their details and even with their affective coloring, are the images of idle fancy or of dream: to act is just to induce this memory to shrink, or rather to become thinned and sharpened, so that it presents nothing thicker than the edge of a blade to actual experience, into which it will thus be able to penetrate. In truth, it is because psychology has failed to separate out the motor element in memory that we have sometimes overlooked and sometimes exaggerated what is automatic in the evocation of

remembrances. According to our view, an appeal is made to activity at the precise moment when perception gives rise to imitative movements which scan it, as it were, automatically. A sketch is thereby furnished to us, into which we put the right details and the right coloring by projecting into it memories more or less remote. But such is not the usual way of describing the process. Sometimes the mind is supposed to be absolutely independent of circumstances, to work exactly as it likes on present or absent objects — and then we can no longer understand how it is that the normal process of attention may be seriously impaired by even a slight disturbance of the sensori-motor equilibrium. Sometimes, on the contrary, the evocation of images is supposed to be a mere mechanical effect of present perception: it is assumed that, by a necessary concatenation of processes supposed to be all alike, the object calls forth sensations and the sensations ideas which cling to them — but then, since there is no reason why the operation, which is mechanical to begin with, should change its character as it goes on, we are led to the hypothesis of a brain wherein mental states may dwell in order to slumber and to awaken. In both cases the true function of the body is misunderstood, and as neither theory teaches how and why the intervention of a mechanism is necessary, neither of them is able to show where such intervention should stop if it is once brought in.

But it is time to leave these general considerations. We must ascertain whether our hypothesis is confirmed or contradicted by the facts of cerebral localization known at the present day. The disorders of imaginative memory, which correspond to local lesions of the cortex, are always diseases of the faculty of recognition, either of visual or auditory recognition in general (psychic blindness and deafness) or of the recognition of words (word blindness, word deafness, etc.). These disorders we have now to examine.

If our hypothesis is well founded, these failures of recognition

are in no sense due to the fact that the recollections occupied the injured region of the brain. They must be due to one of two causes: sometimes our body is no longer able automatically to adopt, under the influence of the external stimulus, the precise attitude by means of which a choice could be automatically made among our memories; sometimes the memories are no longer able to find a fulcrum in the body, a means of prolonging themselves in action. In the first case, the lesion affects the mechanisms which continue, in an automatically executed movement, the stimulation received: attention can no longer be fixed by the object. In the second case, the lesion involves those particular cortical centers which *prepare* voluntary movements by lending them the required sensory antecedent, centers which, rightly or wrongly, are termed image-centers: attention can no longer be fixed by the subject. But, in either case, it is actual movements, which are hindered, or future movements, which are no longer prepared: there has been no destruction of memories.

Now pathology confirms this forecast. It rereveals to us two absolutely distinct kinds of psychic blindness and deafness and word blindness and deafness. In the first kind, visual and auditory memories are still evoked, but they cannot apply themselves to the corresponding perceptions. In the second, evocation of the memories themselves is hindered. Is it true that the lesion involves, as we said, the sensori-motor mechanisms of automatic attention in the first case, and the imaginative mechanisms of voluntary attention in the second? In order to verify our hypothesis, we must limit demonstration to a definite example. No doubt we could show that visual recognition of things in general, and of words in particular, implies a semiautomatic motor process to begin with, and then an active projection of memories which engraft themselves on the corresponding attitudes. But we prefer to confine ourselves to impressions of hearing, and more particularly to the

hearing of articulate language, because this example is the most comprehensive. To hear speech is, in fact, first of all to recognize a sound, then to discover its sense, and finally to interpret it more or less thoroughly: in short, it is to pass through all the stages of attention and to exercise several higher or lower powers of memory. Moreover, no disorders are more common or better studied than those of the auditive memory of words. And, lastly, acoustic verbal images are not destroyed without a serious lesion of certain determined convolutions of the cortex: so that we are provided here with an undisputed example of localization, in regard to which we can enquire whether the brain is really capable of storing up memories. We have, then, to show in the auditory recognition of words: first, an automatic sensori-motor process; secondly, an active and, so to speak, excentric projection of memory-images.

1. I listen to two people speaking in a language which is unknown to me. Do I therefore hear them talk? The vibrations which reach my ears are the same as those which strike theirs. Yet I perceive only a confused noise, in which all sounds are alike. I distinguish nothing and could not repeat anything. In this same sonorous mass, however, the two interlocutors distinguish consonants, vowels and syllables which are not at all alike, in short, separate words. Between them and me where is the difference?

The question is, how can the knowledge of a language, which is only memory, modify the material content of a present perception and cause some listeners actually to hear what others, in the same physical conditions, do not hear. It is alleged, indeed, that the auditory recollections of words, accumulated in memory, are called up by the sound-impression and come to strengthen its effect. But if the conversation to which I listen is, for me, only a noise, we may suppose the sound increased as much as we like: the noise will be none the more intelligible for being louder. I grant that

the memory of a word will be called up by the sound of that word: yet it is necessary, for this, that the sound of the word should have been heard by the ear. How can the sounds perceived speak to memory, how can they choose, in the storehouse of auditory images, those which should come to rejoin them, unless they have been already separated, distinguished – in short, perceived – as syllables and as words?

This difficulty does not appear to have been sufficiently noticed by the theorists of sensory aphasia. For in word-deafness the patient finds himself, in regard to his own language, in the same position as we all are when we hear an unknown tongue. He has generally preserved intact his sense of hearing, but he has no understanding of the words spoken to him and is frequently even unable to distinguish them. The explanation generally given of the disease is that the auditory recollection of words has been destroyed in the cortex or that a lesion, sometimes transcortical, sometimes sub-cortical, hinders the auditive memory from evoking the idea, or the perception, from uniting with the memory. But in the latter case, at least, the psychological question has still to be answered: what is the conscious process which the lesion has abolished, and what is the intermediary process that we go through in our normal condition in order to discern words and syllables which are, at first, given to the ear as a continuity of sound?

The difficulty would be insuperable if we really had only auditory impressions on the one hand, and auditory memories, on the other hand. Not so however, if auditory impressions organize nascent movements, capable of scanning the phrase which is heard and of emphasizing its main articulations. These automatic movements of internal accompaniment, at first undecided or uncoordinated, might become more precise by repetition; they would end by sketching a simplified figure in which the listener would find, in their main lines and principal directions, the very movements of

the speaker. Thus would unfold itself in consciousness, under the form of nascent muscular sensations, the *motor diagram*, as it were, of the speech we hear. To adapt our hearing to a new language would then consist, at the outset, neither in modifying the crude sound nor in supplementing the sounds with memories; it would be to coordinate the motor tendencies of the muscular apparatus of the voice to the impressions of the ear; it would be to perfect the motor accompaniment.

In learning a physical exercise, we begin by imitating the movement as a whole, as our eyes see it from without, as we think we have seen it done. Our perception of it is confused; confused, therefore, will be the movement whereby we try to repeat it. But whereas our visual perception was of a *continuous* whole, the movement by which we endeavor to reconstruct the image is *compound* and made up of a multitude of muscular contractions and tensions; our consciousness of these itself includes a number of sensations resulting from the varied play of the articulations. The confused movement which copies the image is, then, already its virtual decomposition; it bears within itself, so to speak, its own analysis. The progress which is brought about by repetition and practice consists merely in unfolding what was previously wrapped up, in bestowing one of the elementary movements that *autonomy* which ensures precision without, however, breaking up that *solidarity* with the others without which it would become useless. We are right when we say that habit is formed by the repetition of an effort; but what would be the use of repeating it, if the result were always to reproduce the same thing? The true effect of repetition is to decompose and then to recompose, and thus appeal to the intelligence of the body. At each new attempt it separates movements which were interpenetrating; each time it calls the attention of the body to a new detail which had passed unperceived; it bids the body discriminate and classify; it teaches what is the essential; it points

out, one after another, within the total movement, the lines that mark off its internal structure. In this sense, a movement is learned when the body has been made to understand it.

So a motor accompaniment of speech may well break the continuity of the mass of sound. But we have now to point out in what this accompaniment consists. Is it speech itself, repeated internally? If this were so, the child would be able to repeat all the words that its ear can distinguish and we ourselves should only need to understand a foreign language to be able to pronounce it with a correct accent. The matter is far from being so simple. I may be able to catch a tune, to follow its phrasing, even to fix it in memory, without being able to sing it. I can easily distinguish the peculiarities of inflection and tone in an Englishman speaking German — I correct him therefore, mentally — but it by no means follows that I could give the right inflection and tone to the German phrase if I were to utter it. Here, moreover, the observation of everyday life is confirmed by clinical facts. It is still possible to follow and understand speech when one has become incapable of speaking. Motor aphasia does not involve word deafness.

This is because the diagram, by means of which we divide up the speech we hear, indicates only its salient outlines. It is to speech itself what the rough sketch is to the finished picture. For it is one thing to understand a difficult movement, another to be able to carry it out. To understand it, we need only to realize in it what is essential, just enough to distinguish it from all other possible movements. But to be able to carry it out, we must have also brought our *body* to understand it. Now the logic of the body admits of no tacit implications. It demands that all the constituent parts of the required movement shall be set forth one by one, and then put together again. Here a *complete* analysis is necessary, in which no detail is neglected, and an *actual* synthesis, in which nothing is curtailed. The imagined diagram, composed of a few nascent mus-

cular sensations, is but a sketch. The muscular sensations, really and completely experienced, give it color and life.

It remains to be considered how an accompaniment of this kind can be produced and whether it really is always produced. We know that in order effectively to pronounce a word the tongue and lips must articulate, the larynx must be brought into play for phonation, and the muscles of the chest must produce an expiratory movement of air. Thus, for every syllable uttered there corresponds the play of a number of mechanisms already prepared in the cerebral and bulbar centers. These mechanisms are joined to the higher centers of the cortex by the axis-cylinder processes of the pyramidal cells in the psycho-motor zone. Along this path the impulse of the will travels. So, when we desire to articulate this or that sound, we transmit the order to act to this or that group of motor mechanisms selected from among them all. But, while the ready-made mechanisms which correspond to the various possible movements of articulation and phonation are connected with the causes (whatever these may be) which set them to work in voluntary speech, there are facts which put beyond all doubt the linkage of these same mechanisms with the auditory perception of words. First of all, among the numerous varieties of aphasia described in clinical reports, we know of two (Lichtheim's fourth and sixth forms) which appear to imply a relation of this kind. Thus, in a case observed by Lichtheim himself, the subject had lost, as the result of a fall, the memory of the articulation of words and, consequently, the faculty of spontaneous speech; yet he repeated quite correctly what was said to him.³⁹ On the other hand, in cases where spontaneous speech is unaffected, but where word deafness is absolute and the patient no longer understands what is said to him, the faculty of repeating another person's words may still be completely retained.⁴⁰ It may be said, with Bastian, that these phenomena merely point to a fatigue of the articula-

tory or auditive memory of words, the acoustic impressions only serving to awaken that memory from its torpor.⁴¹ We may have to allow for this hypothesis, but it does not appear to us to account for the curious phenomena of *echolalia*, long since pointed out by Romberg,⁴² Voisin⁴³ and Forbes Winslow,⁴⁴ which are termed by Kussmaul⁴⁵ (probably with some exaggeration) acoustic reflexes. Here the subject repeats mechanically, and perhaps unconsciously, the words he hears, as though the auditory sensations converted themselves automatically into movements of articulation. From these facts some have inferred that there is a special mechanism which unites a so-called acoustic center of words with an articulatory center of speech.⁴⁶ The truth appears to lie between these two hypotheses. There is more in these various phenomena than absolutely mechanical actions but less than an appeal to voluntary memory. They testify to a *tendency* of verbal auditory impressions to prolong themselves in movements of articulation; a tendency which assuredly does not escape, as a rule, the control of the will, and perhaps even implies a rudimentary discrimination, and expresses itself, in the normal state, by an internal repetition of the striking features of the words that are heard. Now our motor diagram is nothing else.

Considering this hypothesis more closely, we shall perhaps find in it the psychological explanation, which we were just now seeking, of certain forms of word deafness. A few cases of word deafness are known where there was a complete survival of acoustic memory. The patient had retained, unimpaired, both the auditive memory of words and the sense of hearing; yet he recognized no word that was said to him.⁴⁷ A subcortical lesion is here supposed, which prevents the acoustic impressions from going to join the verbal auditory images in the cortical centers where they are supposed to be deposited. But, in the first place, the question is whether the brain *can* store up images. And, secondly, even if it

were proved that there is some lesion in the paths that the acoustic impressions have to follow, we should still be compelled to seek a psychological interpretation of the final result. For, by hypothesis, the auditory memories can still be recalled to consciousness; by hypothesis also, the auditory impressions still reach consciousness; there must therefore be in consciousness itself a gap, a solution of continuity, something, whatever it is, which hinders the perception from joining the memories. Now we may throw some light on the case if we remember that crude auditory perception is really that of a continuity of sound, and that the sensori-motor connections established by habit must have as their office, in the normal state, to decompose this continuity. A lesion of these conscious mechanisms, by hindering the decomposition, might completely check the upsurge of memories which tend to alight upon the corresponding perceptions. Therefore, the "motor diagram" might be what is injured by the lesion. If we pass in review the cases (which are, indeed, not very numerous) of word-deafness, where acoustic memories were retained, we notice certain details that are interesting in this respect. Adler notes, as a remarkable fact in word-deafness, that the patients no longer react even to the loudest sounds, though their hearing has preserved all its acuteness.⁴⁸ In other words, sound no longer finds in them its motor echo. A patient of Charcot's, attacked by a passing word-deafness, relates that he heard his clock strike but that he could not count the strokes.⁴⁹ Probably he was unable to separate and distinguish them. Another patient declares that he perceives the words of a conversation, but as a confused noise.⁵⁰ Lastly, the patient who has lost the understanding of the spoken word recovers it if the word is repeated to him several times, and especially if it is pronounced with marked divisions, syllable by syllable.⁵¹ This last fact, observed in several cases of word-deafness, where acoustic memories were unimpaired, is particularly significant.

Stricker's⁵² mistake was to believe in a complete internal repetition of the words that are heard. His assertion is already contradicted by the simple fact that we do not know of a single case of motor aphasia which brought out word-deafness. But all the facts combine to prove the existence of a motor tendency to separate the sounds and to establish their diagram. This automatic tendency is not without (as we said above) a certain elementary mental effort: how otherwise could we identify with each other, and, consequently, follow with the same diagram, similar words pronounced on different notes and by different qualities of voice? These inner movements of repeating and recognizing are like a prelude to voluntary attention. They mark the limit between the voluntary and the automatic. By them, as we hinted before, the characteristic phenomena of intellectual recognition are first prepared and then determined. But what is this complete and fully conscious recognition?

2. We come to the second part of our subject: from movements we pass to memories. We have said that attentive recognition is a kind of *circuit* in which the external object yields to us deeper and deeper parts of itself, as our memory adopts a correspondingly higher degree of tension in order to project recollections toward it. In the particular case we are now considering, the object is an interlocutor whose ideas develop within his consciousness into auditory representations which are then materialized into uttered words. So, if we are right, *the hearer places himself at once in the midst of the corresponding ideas*, and then develops them into acoustic memories which go out to overlie the crude sounds perceived, while fitting themselves into the motor diagram. To follow an arithmetical addition is to do it over again for ourselves. To understand another's words is, in like manner, to reconstruct intelligently, starting from the ideas, the continuity of sound which the ear per-

ceives. And, more generally, to attend, to recognize intellectually, to interpret, may be summed up in a single operation whereby the mind, having chosen its level, having selected within itself, with reference to the crude perceptions, the point that is exactly symmetrical with their more or less immediate cause, allows to flow toward them the memories that will go out to overlie them.

Such, however, is certainly not the usual way of looking at the matter. The associationist habit is there; in accordance with it, we find men maintaining that, by the mere effect of contiguity, the perception of a sound brings back the memory of the sound, and memories bring back the corresponding ideas. And then, we have the cerebral lesions which seem to bring about a destruction of memories; more particularly, in the case we are studying, there are the lesions of the brain found in word deafness. Thus psychological observations and clinical facts seem to conspire. Together they seem to point to the existence, within the cortex, of auditory memories slumbering whether as a physico-chemical modification of certain cells or under some other form. A sensory stimulation is then supposed to awaken them; finally, by an intracerebral process, perhaps by transcortical movements that go to find the complementary representations, they are supposed to evoke ideas.

Now consider for a moment the amazing consequences of an hypothesis of this kind. The auditory image of a word is not an object with well-defined outlines, for the same word pronounced by different voices, or by the same voice on different notes, gives a different sound. So, if you adopt the hypothesis of which we have been speaking, you must assume that there are as many auditory images of the same word as there are pitches of sound and qualities of voice. Do you mean that *all* these images are treasured up in the brain? Or is it that the brain chooses? If the brain chooses one of them, where does its preference come from? Suppose, even,

that you can explain why the brain chooses one or the other; how is it that this same word, uttered by a new person, gives a sound which, although different, is still able to rejoin the same memory? For you must bear in mind that this memory is supposed to be an inert and passive thing and consequently, incapable of discovering, beneath external differences, an internal similitude. You speak of the auditory image of a word as if it were an entity or a genus: such a genus can, indeed, be constructed by an active memory which extracts the resemblance of several complex sounds and only retains, as it were, their common diagram. But for a brain that is supposed – nay, is bound – to record only the materiality of the sounds perceived, there must be, of one and the same word, thousands of distinct images. Uttered by a new voice, it will constitute a new image which will simply be added to the others.

But there is something still more perplexing: a word has an individuality for us only from the moment that we have been taught to abstract it. What we first hear are short phrases, not words. A word is always continuous with the other words which accompany it and takes different aspects according to the cadence and movement of the sentences in which it is set: just as each note of a melody vaguely reflects the whole musical phrase. Suppose, then, that there are indeed model auditory memories, consisting in certain intracerebral arrangements, and lying in what for analogous impressions of sound: these impressions may come, but they will pass unrecognized. How could there be a common measure; how could there be a point of contact, between the dry, inert, isolated image and the living reality of the word organized with the rest of the phrase? I understand clearly enough that beginning of automatic recognition which would consist, as I have said above, in emphasizing inwardly the principal division of the sentence that is heard, and so in adopting its movement. But, unless we are to suppose in all men identical voices pronouncing in the same tone

the same stereotyped phrases, I fail to see how the words we hear are able to rejoin their images in the brain.

Now, if memories are really deposited in the cortical cells, we should find in sensory aphasia, for instance, the irreparable loss of certain determined words, the integral conservation of others. But, as a matter of fact, things happen quite differently. Sometimes it is the whole set of memories that disappears, the faculty of mental hearing being purely and simply abolished; sometimes there is a general weakening of the function, but it is usually the function which is diminished and not the number of recollections. It seems as if the patient had no longer strength to grasp his acoustic memories, as if he turned round about the verbal image without being able to hit upon it. To enable him to recover a word, it is often enough to put him on the track of it by giving him its first syllable,⁵³ or even by merely encouraging him.⁵⁴ An emotion may produce the same effect.⁵⁵ There are, however, cases in which it does indeed seem that definite groups of representations have disappeared from memory. I have passed in review a large number of these facts, and it has seemed that they could be referred to two absolutely distinct categories. In the first, the loss of memories is usually abrupt; in the second, it is progressive. In the first, the recollections detached from memory are arbitrarily and even *capriciously* chosen: they may be certain words, certain figures, or often all the words of an acquired language. In the second, the disappearance of the words is governed by a methodical and grammatical order, that which is indicated by Ribot's law: proper names go first, then common nouns, and lastly verbs.⁵⁶ Such are the external differences. Now this, I believe, is the internal difference. In the amnesias of the first type, which are nearly always the result of a violent shock, I incline to think that the memories which are apparently destroyed are really present, and not only present but acting. To take an example frequently borrowed from Forbes Winslow,⁵⁷ that

of a patient who had forgotten the letter F, and the letter F only, I wonder how it is possible to subtract a given letter wherever met with – to detach it, that is, from the spoken or written words in which it occurs – if it were not first implicitly recognized. In another case cited by the same author,⁵⁸ the patient had forgotten languages he had learnt and poems he had written. Having begun to write again, he reproduced nearly the same lines. Moreover, in such cases the patient may often recover the lost memories. Without wishing to be too dogmatic on a question of this kind, we cannot avoid noticing the analogy between these phenomena and that dividing of the self of which instances have been described by Pierre Janet:⁵⁹ some of them bear a remarkable resemblance to the “negative hallucinations,” and suggestions with *point de repère*, induced by hypnotizers.⁶⁰ Entirely different are the aphasias of the second kind, which are indeed the true aphasias. These are due, as we shall try to show presently, to the progressive diminution of a well-localized function, the faculty of actualizing the recollection of words. How are we to explain the fact that amnesia here follows a methodical course, beginning with proper nouns and ending with verbs? We could hardly explain it if the verbal images were really deposited in the cells of the cortex: it would be wonderful indeed that disease should always attack these cells in the same order.⁶¹ But the fact can be explained, if we admit that memories need, for their actualization, a motor ally, and that they require for their recall a kind of mental attitude which must itself be engrafted upon an attitude of the body. If such be the case, verbs in general, which essentially express *imitable actions*, are precisely the words that a bodily effort might enable us to recapture when the function of language has all but escaped us: proper names, on the other hand, being of all words the most remote from those impersonal actions which our body can sketch out, are those which a weakening of the function will earliest affect. It is a noteworthy

fact that the aphasic patient, who has become as a rule incapable of finding the noun he seeks, may replace it by an appropriate periphrasis into which other nouns,⁶² and perhaps even the evasive noun itself, enter. Unable to think of the precise word, he has thought of the corresponding action, and this attitude has determined the general direction of a movement from which the phrase then springs. So likewise it may happen to any of us that, having retained the initial of a forgotten name, we recover the name by repeating the initial.⁶³ Therefore, in facts of the second kind, it is the function that is attacked as a whole, and in those of the first kind the forgetting, though in appearance more complete, is never really final. Neither in the one case nor in the other do we find memories localized in certain cells of the cerebral substance and abolished by their destruction.

But let us question our own consciousness, and ask of it what happens when we listen to the words of another person with the desire to understand them. Do we passively wait for the impressions to go in search of their images? Do we not rather feel that we are adopting a certain disposition, which varies with our interlocutor, with the language he speaks, with the nature of the ideas which he expresses – and varies, above all, with the general movement of his phrase, as though we were choosing the key in which our own intellect is called upon to play? The motor diagram, emphasizing his utterance, following through all its windings the curve of his thought, shows our thought the road. It is the empty vessel, which determines, by its form, the form which the fluid mass, rushing into it, already tends to take.

But psychologists may be unwilling to explain in this way the mechanism of interpretation because of the invincible tendency which impels us to think on all occasions of *things* rather than of movements. We have said that we start from the idea, and that we develop it into auditory memory-images capable of inserting them-

selves in the motor diagram, so as to overlie the sounds we hear. We have here a continuous movement, by which the nebulosity of the idea is condensed into distinct auditory images, which, still fluid, will be finally solidified as they coalesce with the sounds materially perceived. At no moment is it possible to say with precision that the idea or the memory-image or the sensation begins. And, in fact, where is the dividing line between the confusion of sounds perceived in the lump and the clearness which the remembered auditory images add to them, between the discontinuity of these remembered images themselves and the continuity of the original idea which they dissociate and refract into distinct words? But scientific thought, analyzing this unbroken series of changes, and yielding to an irresistible need of symbolic presentment, arrests and solidifies into finished things the principal phases of this development. It erects the crude sounds heard into separate and complete words, then the remembered auditory images into entities independent of the idea they develop: these three terms, crude perception, auditory image and idea, are thus made into distinct wholes of which each is supposed to be self-sufficing. And while, if we really confined ourselves to pure experience, the idea is what we should start from – since it is to the idea that the auditory memories owe their connection and since it is by the memories that the crude sounds become completed. On the contrary, when once we have arbitrarily supposed the crude sound to be by itself complete and arbitrarily also assumed the memories to be connected together, we see no harm in reversing the real order of the processes, and in asserting that we go from the perception to the memories and from the memories to the idea. Nevertheless, we cannot help feeling that we must bring back again, under one form or another, at one moment or another, the continuity which we have thus broken between the perception, the memory and the idea. So we make out that these three things, each lodged in a

certain portion of the cortex or of the medulla, intercommunicate, the perceptions going to awaken the auditory memories, and the memories going to rouse up the ideas. As we have begun by solidifying into distinct and independent things what were only phases – the main phases – of a continuous development, we go on materializing the development itself into lines of communication, contacts and impulsions. But not with impunity can we thus invert the true order, and as a necessary consequence, introduce into each term of the series elements which are only realized by those that follow. Not with impunity, either, can we congeal into distinct and independent things the fluidity of a continuous undivided process. This symbolism may indeed suffice as long as it is strictly limited to the facts which have served to invent it: but each new fact will force us to complicate our diagram, to insert new stations along the line of the movement; yet all those stations laid side by side will never be able to reconstitute the movement itself.

Nothing is more instructive in this regard than the history of the diagrams of sensory aphasia. In the early period, marked by the work of Charcot,⁶⁴ Broadbent,⁶⁵ Kussmaul⁶⁶ and Lichtheim,⁶⁷ the theorists confined themselves to the hypothesis of an “ideational center” linked by transcortical paths to the various speech centers. But, as the analysis of cases was pushed further, this center for ideas receded and finally disappeared. For, while the physiology of the brain was more and more successful in localizing sensations and movements, but never ideas, the diversity of sensory aphasias obliged clinicians to break up the intellectual center into a growing multiplicity of image centers – a center for visual representations, for tactile representations, for auditory representations, etc. – nay, to divide sometimes into two different tracks, the one ascending and the other descending, the line of communication between any two of them.⁶⁸ This was the characteristic feature of the diagrams of the later period, those of

Wysman,⁶⁹ of Moeli,⁷⁰ of Freud,⁷¹ etc. Thus the theory grew more and more complicated, yet without ever being able to grasp the full complexity of reality. And, as the diagrams became more complicated, they figured and suggested the possibility of lesions which, just because they were more diverse, were more special and more simple, the complication of the diagram being due precisely to that dissociation of centers which had at first been confounded. Experience, however, was far from justifying the theory at this point, since it nearly always showed, in partial and diverse combinations, several of those simple psychical lesions which the theory isolated. The complication of the theories of aphasia being thus self-destructive, it is no wonder that modern pathology, becoming more and more sceptical with regard to diagrams, is returning purely and simply to the description of facts.⁷²

But how could it be otherwise? To hear some theorists discourse on sensory aphasia, we might imagine that they had never considered with any care the structure of a sentence. They argue as if a sentence were composed of nouns which call up the images of things. What becomes of those parts of speech, of which the precise function is to establish, between images, relations and shades of meaning of every kind? Is it said that each of such words still expresses and evokes a material image, more confused, no doubt, but yet determined? Consider then the host of different relations which can be expressed by the same word, according to the place it occupies and the terms which it unites. Is it urged that these are the refinements of a highly developed language, but that speech is possible with concrete nouns that all summon up images of things? No doubt it is, but the more primitive the language you speak with me and the poorer in words which express relations, the more you are bound to allow for my mind's activity, since you compel me to find out the relations which you leave unexpressed: which amounts to saying that you abandon more and more the

hypothesis that each verbal image goes up and fetches down its corresponding idea. In truth, there is here only a question of degree: every language, whether elaborated or crude, leaves many more things to be understood than it is able to express. Essentially discontinuous, since it proceeds by juxtaposing words, speech can only indicate by a few guideposts placed here and there the chief stages in the movement of thought. That is why I can indeed understand your speech if I start from a thought analogous to your own and follow its windings by the aid of verbal images which are so many signposts that show me the way from time to time. But I shall never be able to understand it if I start from the verbal images themselves, because between two consecutive verbal images there is a gulf which no amount of concrete representations can ever fill. For images can never be anything but things, and thought is a movement.

It is vain, therefore, to treat memory-images and ideas as ready-made things, and then assign to them an abiding place in problematical centers. Nor is it of any avail to disguise the hypothesis under the cover of a language borrowed from anatomy and physiology; it is nothing but the association theory of mind; it has nothing in its favor but the constant tendency of discursive intellect to cut up all progress into *phases* and afterwards to solidify these phases into *things*; and since it is born a priori from a kind of metaphysical prepossession, it has neither the advantage of following the movement of consciousness nor that of simplifying the explanation of the facts.

But we must follow this illusion up to the point where it issues in a manifest contradiction. We have said that ideas — pure recollections summoned from the depths of memory — develop into memory-images more and more capable of inserting themselves into the motor diagram. To the degree that these recollections take the form of a more complete, more concrete and more con-

scious representation, they tend to confound themselves with the perception which attracts them or of which they adopt the outline. Therefore, there is not, there cannot be in the brain a region in which memories congeal and accumulate. The alleged destruction of memories by an injury to the brain is but a break in the continuous progress by which they actualize themselves. And, consequently, if we insist on localizing the auditory memory of words, for instance, in a given part of the brain, we shall be led by equally cogent reasons to distinguish this image-center from the perceptive center or to confound the two in one. Now this is just what experience teaches.

For notice the strange contradiction to which this theory is led by psychological analysis on the one hand, by pathological facts, on the other hand. On the one hand, it would seem that if perception, once it has taken place, remains in the brain in the state of a stored-up memory, this can only be as an acquired disposition of the very elements that perception has affected: how, at what precise moment, can it go in search of others? This is, indeed, the most natural hypothesis, and Bain⁷³ and Ribot⁷⁴ are content to rest upon it. But, on the other hand, there is pathology, which tells us that *all* the recollections of a certain kind may have gone while the corresponding faculty of perception remains unimpaired. Psychic blindness does not hinder seeing, any more than psychic deafness hinders hearing. More particularly, in regard to the loss of the auditory memory of words – the only one we are now considering – there are a number of facts which show it to be regularly associated with a destructive lesion of the first and second left temporo-sphenoidal convolutions,⁷⁵ though not a single case is on record in which this lesion was the cause of deafness properly so-called: it has even been produced experimentally in the monkey without determining anything but psychic deafness, that is to say, a loss of the power to interpret the sounds which it was

still able to hear.⁷⁶ So we must attribute to perception and to memory separate nervous elements. But then this hypothesis will be contradicted by the most elementary psychological observation; for we see that a memory, as it becomes more distinct and more intense, tends to become a perception, though there is no precise moment at which a radical transformation takes place, nor, consequently, a moment when we can say that it moves forward from imaginative elements to sensory elements. Thus these two contrary hypotheses, the first identifying the elements of perception with the elements of memory, the second distinguishing among them, are of such a nature that each sends us back to the other without allowing us to rest in either.

How should it be otherwise? Here again distinct perception and memory-image are taken in the static condition, as *things* of which the first is supposed to be already complete without the second; whereas we ought to consider the dynamic *progress* by which the one passes into the other.

For, on the one hand, complete perception is only defined and distinguished by its coalescence with a memory-image, which we send forth to meet it. Only thus is attention secured, and without attention there is but a passive juxtaposing of sensations, accompanied by a mechanical reaction. But, as we shall show later, the memory-image itself, if it remained pure memory, would be ineffectual. Virtual, this memory can only become actual by means of the perception which attracts it. Powerless, it borrows life and strength from the present sensation in which it is materialized. Does not this amount to saying that distinct perception is brought about by two opposite currents, of which the one, centripetal, comes from the external object, and the other, centrifugal, has for its point of departure that which we term "pure memory"? The first current, alone, would only give a passive perception with the mechanical reactions which accompany it. The second, left

to itself, tends to give a recollection that is actualized — more and more actual as the current becomes more marked. Together, these two currents make up, at their point of confluence, the perception that is distinct and recognized.

This is the witness of introspection. But we have no right to stop there. Undoubtedly, there is considerable risk in venturing, without sufficient evidence, into the obscure problems of cerebral localization. But we have said that to separate from one another the completed perception and the memory image is to bring clinical observation into conflict with psychological analysis and that the result is a serious antinomy in the theory of the localization of memories. We are bound to consider what becomes of the known facts when we cease to regard the brain as a storehouse of memories.⁷⁷

Let us admit, for the moment, in order to simplify the argument, that stimuli from without give birth, either in the cortex or in other cerebral centers, to elementary sensations. In fact, every perception includes a considerable number of such sensations, all coexisting and arranged in a determined order. Where does this order come from, and what ensures this coexistence? In the case of a present material object, there is no doubt as to the answer: order and coexistence come from an organ of sense, receiving the impression of an external object. This organ is constructed precisely with a view to allowing a plurality of simultaneous excipients to impress it in a certain order and in a certain way, by distributing themselves, all at one time, over selected portions of its surface. It is like an immense keyboard, on which the external object executes at once its harmony of a thousand notes, thus calling forth in a definite order, and at a single moment, a great multitude of elementary sensations corresponding to all the points of the sensory center that are concerned. Now suppress the external object or the organ of sense or both: the same elementary sensations may be excited, for the same strings are there, ready to vibrate

in the same way; but where is the keyboard which permits thousands of them to be struck at once, and so many single notes to unite in one accord? In our opinion the “region of images,” if it exists, can only be a keyboard of this nature. Certainly, it is in no way inconceivable that a purely psychical cause should directly set in action all the strings concerned. But, in the case of mental hearing — which we are considering alone now — the localization of the function appears certain, since a definite injury of the temporal lobe abolishes it; yet we have set forth the reasons which make it impossible for us to admit, or even to conceive, traces of images deposited in any region of the cerebral substance. Hence only one plausible hypothesis remains, namely, that this region occupies with regard to the center of hearing itself the place that is exactly symmetrical with the organ of sense. It is, in this case, a mental ear.

But then the contradiction we have spoken of disappears. We see, on the one hand, that the auditory image called back by memory must set in motion the same nervous elements as the first perception and that recollection must thus change gradually into perception. And we see also, on the other hand, that the faculty of recalling to memory complex sounds, such as words, may concern other parts of the nervous substance than does the faculty of perceiving them. This is why in psychic deafness real hearing survives mental hearing. The strings are still there, and to the influence of external sounds they vibrate still; it is the internal keyboard which is lacking.

In other terms, the centers in which the elementary sensations seem to originate may be actuated, in some way, from two different sides, from the front and from behind. From the front they receive impressions sent in by the sense-organs, and, consequently, by a *real object*; from behind they are subject, through successive intermediaries, to the influence of a *virtual object*. The centers of

images, if these exist, can only be the organs that are exactly symmetrical with the organs of the senses in reference to the sensory centers. They are no more the depositories of pure memories, that is, of virtual objects, than the organs of the senses are depositories of real objects.

We would add that this is but a much abridged version of what may happen in reality. The various sensory aphasias are sufficient proof that the calling up of an auditory image is not a single act. Between the intention, which is what we call the pure memory, and the auditory memory-image properly so called, intermediate memories are commonly intercalated which must first have been realized as memory-images in more or less distant centers. It is, then, by successive degrees that the idea comes to embody itself in that particular image which is the verbal image. Thereby mental hearing may depend upon the integrity of the various centers and of the paths which lead to them. But these complications change nothing at the root of things. Whatever be the number and the nature of the intervening processes, we do not go from the perception to the idea, but from the idea to the perception; the essential process of recognition is not centripetal, but centrifugal.

Here, indeed, the question arises how stimulation from within can give birth to sensations, either by its action on the cerebral cortex or on other centers. But it is clear enough that we have here only a convenient way of expressing ourselves. Pure memories, as they become actual, tend to bring about, within the body, all the corresponding sensations. But these virtual sensations themselves, in order to become real, must tend to urge the body to action and to impress upon it those movements and attitudes of which they are the habitual antecedent. The modifications in the centers called sensory, modifications which usually precede movements accomplished or sketched out by the body and of which the normal office is to prepare them while they begin them, are,

then, less the real cause of the sensation than the mark of its power and the condition of its efficacy. The progress by which the virtual image realizes itself is nothing else than the series of stages by which this image gradually obtains from the body useful actions or useful attitudes. The stimulation of the so-called sensory centers is the last of these stages: it is the prelude to a motor reaction, the beginning of an action in space. In other words, the virtual image evolves toward the virtual sensation and the virtual sensation toward real movement: this movement, in realizing itself, realizes both the sensation of which it might have been the natural continuation and the image which has tried to embody itself in the sensation. We must now consider these virtual states more carefully, and, penetrating further into the internal mechanism of psychical and psycho-physical actions, show by what continuous progress the past tends to reconquer, by actualizing itself, the influence it had lost.