Creative Evolution

HENRI BERGSON
1859–1941

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L'Évolution créatrice

Translated from the French with AI (Claude) and edited



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CONTENTS

Introduction ix

Introduction 1

Theory of knowledge and theory of life 5

Chapter I: The Evolution of Life—Mechanism and Finality . . 9

Inert matter has no history 15

Waiting for the sugar to melt 16

The living body as an individual 19

The organism ages and has a history 22

Living time and mathematical time 26

Accepting transformism 29

Life as a current from germ to germ 32

The intellect against novelty 35

Can chemistry imitate life? 38

Against radical mechanism 42

Against radical finalism 44

Two habits of an intellect made for action 48

A finalism looking backward 54

The test case: identical organs on divergent lines 57

The eye of the vertebrate and the scallop 63

Chance variations, small or sudden 66

The direct action of light 71

Three meanings of cause 74

Neo-Lamarckism and inherited habits 78

What each theory gets right 85

The original vital impetus 88

A complex organ, a simple act 89

Manufacture and organization 92

The hand in the iron filings 94

Chapter II: The Divergent Directions of the Evolution of Life—Torpor, Intelligence, Instinct 99
Life divides like a sheaf 100
Neither adaptation nor plan 102
Plant and animal 106
Mobility and consciousness 110
Storing and releasing energy 114
The nervous system at the center 119
A limited force 125
Armor and torpor 127
The two summits: insects and humans 131
Three divergent directions 132
Homo faber 134
Instinct and organized instruments 136
Consciousness as a gap 140
Things and relations 142
The intellect and the solid 149
Language and the mobile sign 152
The intellect cannot think life 156
Instinct molded on life 160
The paralyzing wasps 165
Instinct as sympathy 167
Intuition 170
Consciousness and the brain 172
What invention does for man 176
The boy and the steam engine 177

Chapter III: On the Meaning of Life—The Order of Nature and the Form of Intelligence 181
Spencer and Fichte take the intellect for granted 183
A collective philosophy 185
Learning to swim 186
Philosophy cannot leave the facts to science 188
Science touches the absolute in matter 192
Tension and relaxation 193

Matter extends without being extended 196
Kant and the origin of space 197
Knowledge approximate but not relative 200
Order that comes of letting go 201
Natural geometry and deduction 204
Induction and the boiling water 207
Why mathematics fits matter 210
The idea of disorder 213
The two kinds of order 216
Genera and laws, ancients and moderns 219
Heredity and the vital order 223
The untidy room and chance 224
The principle that relaxes into matter 229
Creation of form and creation of matter 230
Energy and its degradation 232
Life delays the fall 236
The vessel of steam and the rising arm 238
No things, only actions 239
Storing and spending energy 242
What is contingent and what necessary 245
Unity, multiplicity and individuation 247
Consciousness and the brain 251
Man breaks the chain 253
In what sense man is the goal 255
Intellect, intuition and the soul 256
The charge of all the living 260

Chapter IV: The Cinematographic Mechanism of Thought and the Mechanistic Illusion 261
Why is there something rather than nothing? 264
Trying to imagine nothing 266
Trying to conceive nothing 268
More in the non-existent than the existent 272
Negation as a judgment on a judgment 274
The ground is not wet 278
How the idea of nothing arises 281

Thinking duration directly 285
Stable views of instability 285
The cinematograph 290
A method made for action 292
Zeno's arrow and Achilles 294
The child becomes a man 297
The philosophy of Ideas 299
Time as small change for eternity 302
The physical as the logical spoiled 304
The ancient idea of causality 307
The natural metaphysics of the intellect 310
Ancient and modern science 313
The Parthenon frieze and the snapshot 316
The time that science counts 319
Time is invention 321
A second kind of knowledge 324
Descartes between two roads 327
Spinoza and Leibniz 329
Parallelism of mind and body 331
The nut and the machine 335
Kant's critique 337
After Kant 342
Spencer's false evolutionism 344
True evolutionism 348

INTRODUCTION

In 1907 Henri Bergson, then the most celebrated philosopher in France, published a book that tried to think about life the way life actually happens: as something that endures, grows and invents, rather than as a machine assembled from parts. Its argument begins from our own experience of time. We do not pass through a string of separate states; our past gathers into our present like a rolling snowball, and nothing that lives ever simply repeats itself.

From there Bergson turns to biology. Neither the mechanist, for whom evolution is the sum of blind causes, nor the finalist, for whom it follows a plan, can explain how the same complex eye arose on separate lines of descent. Instead he proposes an original impetus of life, the *élan vital*, that splits as it advances into plants and animals, and in animals into instinct and intelligence. Our intellect, made for handling solid things and building tools, grasps matter well but life badly; to know life we need intuition, an instinct that has become aware of itself.

The last chapter asks why philosophy has so often missed this. Our thinking works like a cinematograph, taking still snapshots of a movement and then trying to rebuild the movement from them; Bergson traces this habit from Zeno and Plato to Kant and Herbert Spencer. The book made Bergson famous across the world and helped win him the Nobel Prize in Literature in 1927.

Introduction

Introduction
Why an intellect shaped for acting on solid matter cannot grasp life, and why a theory of knowledge and a theory of life must go together.

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[i] The history of the evolution of life, incomplete as it still is, already lets us glimpse how the intellect has been formed by an uninterrupted progress, along a line that rises through the vertebrate series up to humankind. It shows us, in the faculty of understanding, an appendage of the faculty of acting: an ever more precise, ever more complex and supple adaptation of the consciousness of living beings to the conditions of existence imposed on them. From this the consequence should follow that our intellect, in the narrow sense of the word, is meant to ensure the perfect insertion of our body into its environment, to represent to itself the relations of external things to one another —in short, to think matter. Such, indeed, will be one of the conclusions of the present essay. We shall see that the human intellect feels at home as long as it is left among inert objects, and more especially among solids, where our action finds its fulcrum and our industry its tools. We shall see that our concepts have been formed in the image of solids, and that our logic is above all the logic of solids. For that very reason, our intellect triumphs in geometry, where [ii] the kinship of logical thought with inert matter is revealed. There the intellect has only to follow its natural movement, after the slightest possible contact with experience, to go from discovery to discovery, certain that

experience is walking behind it and will invariably prove it right.

But from this it should also follow that our thought, in its purely logical form, is incapable of representing the true nature of life, the deep meaning of the evolutionary movement. Created by life, in definite circumstances, to act on definite things, how could it embrace life, of which it is only an emanation or an aspect? Deposited along the way by the evolutionary movement, how could it be laid along the evolutionary movement itself? One might as well claim that the part equals the whole, that the effect can reabsorb its cause into itself, or that the pebble left on the beach traces the shape of the wave that brought it there. In fact, we clearly feel that none of the categories of our thought—unity, multiplicity, mechanical causality, intelligent finality, and so on—applies exactly to the things of life. Who can say where individuality begins and ends, whether the living being is one or many, whether it is the cells that associate into an organism or the organism that dissociates into cells? In vain we push the living being into one or another of our frames. All the frames crack. They are too narrow, and above all too rigid, for what we would like to put into them. Our reasoning, moreover, so sure of itself when it moves among inert things, feels ill at ease on this new ground.[1] It would be hard to cite a single [iii] biological discovery due to pure reasoning. And most often, when experience has finally shown us how life goes about obtaining a certain result, we find that its way of working is precisely the one we would never have thought of.

And yet evolutionist philosophy unhesitatingly extends to the things of life the methods of explanation that have succeeded with inert matter. It began by showing us in the intellect a local effect of evolution, a glimmer, perhaps accidental, that lights up the comings and goings of living beings in the narrow passage open to their action. And now, suddenly forgetting what it has just told us, it turns this lantern, handled at the bottom of an underground tunnel, into a Sun that would illuminate the

1 Finality: purposiveness, the explanation of things by the ends they serve.

world. Boldly, with the powers of conceptual thought alone, it sets about the ideal reconstruction of all things, even of life. True, along the way it runs into such formidable difficulties, and sees its logic lead here to such strange contradictions, that it very quickly gives up its original ambition. It will no longer recompose reality itself, it says, but only an imitation of the real, or rather a symbolic image. The essence of things escapes us and always will; we move among relations; the absolute is beyond our reach; let us stop before the Unknowable. But after so much pride on behalf of the human intellect, this is truly an excess of humility.[2] If the intellectual form of the living being has been gradually modeled on the reciprocal actions and reactions of certain bodies and their material surroundings, how could it fail to give us something of the very essence of which bodies are [iv] made? Action cannot move in the unreal. Of a mind born to speculate or to dream, I could grant that it remains external to reality, that it deforms and transforms it, perhaps even that it creates it, as we create the figures of people and animals that our imagination cuts out of a passing cloud. But an intellect intent on the action that will be accomplished and on the reaction that will follow, feeling its object so as to receive its shifting impression at every moment, is an intellect that touches something of the absolute. Would it ever have occurred to us to doubt this absolute value of our knowledge, if philosophy had not shown us what contradictions our speculation runs into, what dead ends it reaches? But these difficulties, these contradictions, arise because we apply the habitual forms of our thought to objects on which our industry has no call to work, and for which, consequently, our frames were not made. Intellectual knowledge, insofar as it relates to a certain aspect of inert matter, must on the contrary give us a faithful imprint of it, having been cast from this particular object. It becomes relative only when it claims, just as it is, to represent life to us—that is, the maker of the cast who took the imprint.

2 The Unknowable: Herbert Spencer's term, in *First Principles* (1862), for the ultimate reality lying beyond all knowledge.

Must we then give up probing the nature of life? Must we keep to the mechanistic representation that the understanding will always give us of it? That representation is necessarily artificial and symbolic, since it shrinks the total activity of life to the form of a certain human activity, which is only a manifestation, [v] partial and local, of life—an effect or a residue of the vital operation.

We would have to, if life had spent all the psychical potentialities it contains on making pure understandings, that is, on preparing geometers. But the line of evolution that leads to humankind is not the only one. Along other, divergent paths, other forms of consciousness have developed. They have not managed to free themselves from external constraints, or to regain mastery of themselves, as the human intellect has done; but they too nonetheless express something immanent and essential in the evolutionary movement. By bringing them together, and then making them merge with the intellect, might we not this time obtain a consciousness coextensive with life? Such a consciousness, by turning sharply back against the vital push it feels behind it, might obtain an integral vision of it, though no doubt a vanishing one.

It will be said that even so we do not go beyond our intellect, since it is still with our intellect, through our intellect, that we look at the other forms of consciousness. And this would be right if we were pure intellects, if there had not remained, around our conceptual and logical thought, a vague nebulosity made of the very substance at whose expense the luminous nucleus we call intellect was formed. There reside certain powers complementary to the understanding. We have only a confused feeling of them when we stay shut up within ourselves, but they will grow clear and distinct when they perceive themselves at work, so to [vi] speak, in the evolution of nature. They will thus learn what effort they must make to intensify themselves, and to expand in the very direction of life.

THEORY OF KNOWLEDGE AND THEORY OF LIFE

The two inquiries must go together, replacing Spencer's false evolutionism with a true one.

This amounts to saying that the *theory of knowledge* and the *theory of life* seem to us inseparable from each other. A theory of life that is not accompanied by a critique of knowledge is obliged to accept, as they stand, the concepts the understanding puts at its disposal: it can only enclose the facts, by fair means or foul, in preexisting frames that it regards as final. It thus obtains a convenient symbolism, perhaps even one necessary to positive science, but not a direct vision of its object. On the other hand, a theory of knowledge that does not put the intellect back into the general evolution of life will teach us neither how the frames of knowledge were formed nor how we can enlarge them or go beyond them. These two inquiries, theory of knowledge and theory of life, must meet and, by a circular process, push each other on indefinitely.

Together they may solve the great problems that philosophy raises by a surer method, one closer to experience. For if they succeeded in their common undertaking, they would let us witness the formation of the intellect and, thereby, the genesis of the matter whose general configuration our intellect traces. They would dig down to the very root of nature and of mind. They would replace the false evolutionism of Spencer—which consists in cutting up present reality, already evolved, into little pieces no less [vii] evolved, then recomposing it with these fragments, and so granting itself in advance everything that is to be explained—with a true evolutionism, in which reality would be followed in its generation and its growth.[3]

But a philosophy of this kind will not be made in a day. Unlike systems properly so called, each of which was the work of one man of genius and presented itself as a block, to be taken or left,

3 Herbert Spencer (1820–1903), English philosopher whose "synthetic philosophy" applied the idea of evolution to everything from the cosmos to society.

it can be built up only by the collective and progressive effort of many thinkers, and of many observers too, who complete, correct and set one another right. So the present essay does not aim to solve the greatest problems all at once. It would simply like to define the method, and to give a glimpse, on a few essential points, of the possibility of applying it.

The plan was laid down by the subject itself. In the first chapter we try on the evolutionary progress the two ready-made garments our understanding has at its disposal, mechanism and finality[4]. We show that neither [viii] fits, but that one of the two could be recut and resewn and, in this new form, fit less badly than the other. To go beyond the point of view of the understanding, we try in our second chapter to reconstruct the main lines of evolution that life has traveled alongside the one that led to the human intellect. The intellect is thus put back into its generating cause, which it would then be a matter of grasping in itself and following in its movement. It is an effort of this kind that we attempt—very incompletely—in our third chapter. A fourth and final part is meant to show how our understanding itself, by submitting to a certain discipline, might prepare a philosophy that goes beyond it. For this, a glance at the history of systems became necessary, together with an analysis of the

4 BERGSON'S NOTE. The idea of regarding life as transcending finality as well as mechanism is, moreover, far from new. In particular, it will be found set out with great depth in three articles by Ch. Dunan on *Le problème de la vie* (*Revue philosophique*, 1892). In developing this idea, our thinking has more than once coincided with Dunan's. Nevertheless, the views we present on this point, as on the questions connected with it, are the very ones we put forward long ago in our *Essai sur les données immédiates de la conscience* (Paris, 1889). Indeed, one of the main aims of that Essay was to show that psychological life is neither unity nor multiplicity, and that it transcends both the *mechanical* and the *intelligent*, since mechanism and finalism have meaning only where there is "distinct multiplicity," "spatiality," and consequently an assemblage of preexisting parts: "real duration" signifies at once undivided continuity and creation. In the present work we apply these same ideas to life in general, which is itself, moreover, considered from the psychological point of view.

TRANSLATOR'S NOTE. Charles Dunan (1849–1931), French philosopher; his title means "The Problem of Life." Bergson's *Essai* ("Essay on the Immediate Data of Consciousness") appeared in English as *Time and Free Will*.

two great illusions to which the human understanding is exposed as soon as it speculates on reality in general.

Chapter I: The Evolution of Life—Mechanism and Finality

De l'évolution de la vie.—Mécanisme et finalité
Duration, the living being as a whole that endures, and why neither mechanism nor finalism explains evolution: the eye of the scallop and the vital impetus.

---

[1] The existence of which we are most certain and which we know best is unquestionably our own. For of all other objects we have notions that may be judged external and superficial, whereas we perceive ourselves inwardly, deeply. What, then, do we find? In this privileged case, what is the precise meaning of the word "exist"? Let us briefly recall here the conclusions of an earlier work.

I find, first of all, that I pass from state to state. I am warm or I am cold, I am cheerful or I am sad, I am working or I am doing nothing, I am looking at what surrounds me or I am thinking of something else. Sensations, feelings, volitions, representations: these are the modifications among which my existence is divided, and which color it in turn. I change, then, unceasingly. But that is not saying enough. Change is far more radical than one would at first believe.

For I speak of each of my states as if it formed a block. I do say that I change, but the change seems to me to reside in the passage from one state to the [2] next. Of each state, taken by itself, I like to believe that it remains what it is for the whole time it is occurring. Yet a slight effort of attention would reveal to me that there is no affect, no representation, no volition that is not changing at every moment; if a state of mind ceased to

vary, its duration would cease to flow. Let us take the most stable of internal states, the visual perception of a motionless external object. The object may stay the same, and I may look at it from the same side, at the same angle, in the same light: the vision I have of it nonetheless differs from the one I have just had, if only because it is an instant older. My memory is there, pushing something of that past into this present. My state of mind, as it advances along the road of time, continually swells with the duration it gathers up; it snowballs, so to speak, upon itself. All the more is this true of the more deeply inward states—sensations, affects, desires, and so on—which do not correspond, as a simple visual perception does, to an invariable external object. But it is convenient to pay no attention to this uninterrupted change, and to notice it only when it grows large enough to impress a new attitude on the body, a new direction on the attention. At that precise moment we find that we have changed state. The truth is that we change unceasingly, and that the state itself is already change.

This amounts to saying that there is no essential difference between passing from one state to another and persisting in the same state. If the state that "remains the same" is more varied than we think, conversely the passage from one state to another is more like a single state being prolonged than we imagine; the transition is continuous. But precisely because we shut our eyes to the unceasing variation [3] of each psychological state, we are obliged, when the variation has become so considerable that it forces itself on our attention, to speak as though a new state had been set alongside the previous one. Of this new state we suppose that it in turn remains unvarying, and so on indefinitely. The apparent discontinuity of psychological life is therefore due to the fact that our attention fixes on it through a series of discontinuous acts: where there is only a gentle slope, we think we see, as we follow the broken line of our acts of attention, the steps of a staircase. It is true that our psychological life is full of the unforeseen. A thousand incidents crop up which seem to stand out sharply from what precedes them and to have no con-

nection with what follows. But the discontinuity of their appearances stands out against the continuity of a background on which they are drawn, and to which they owe the very intervals that separate them: they are the kettledrum beats that break out now and then in the symphony. Our attention fixes on them because they interest it more, but each of them is borne along by the fluid mass of our whole psychological existence. Each is only the best-lit point of a moving zone that comprises everything we feel, think and will—everything, in short, that we are at a given moment. It is this entire zone that in reality constitutes our state. Now, of states so defined it can be said that they are not distinct elements. They continue one another in an endless flow.

But since our attention has distinguished and separated them artificially, it is obliged to reunite them afterwards by an artificial bond. It thus imagines an amorphous, indifferent, immutable *self*, on which the psychological states it has set up as independent [4] entities would file past or be strung. Where there is a fluidity of fleeting shades encroaching on one another, it perceives sharply defined and, so to speak, solid colors, set side by side like the varied beads of a necklace; it is then forced to suppose a thread, no less solid, that holds the beads together. But if this colorless substratum is unceasingly colored by what covers it, then, in its indeterminacy, it is for us as though it did not exist. Now, what we perceive is precisely the colored, that is, psychological states. In truth, this "substratum" is not a reality. For our consciousness it is simply a sign, meant to remind it constantly of the artificial character of the operation by which attention sets one state beside another where there is a continuity unfolding. If our existence were made up of separate states which an impassive "self" had to synthesize, there would be no duration for us. For a self that does not change does not endure, and a psychological state that remains identical to itself until it is replaced by the next state does not endure either. However much, then, we line these states up side by side on the "self" that supports them, these solids strung on a solid will never

make flowing duration. The truth is that in this way we obtain an artificial imitation of inner life, a static equivalent that will lend itself better to the demands of logic and language, precisely because real time has been eliminated from it. But as for psychological life, as it unfolds beneath the symbols that cover it, we readily see that time is its very stuff.

There is, moreover, no stuff more resistant or more substantial. For our duration is not one instant replacing another: if it were, there would never be anything but the [5] present—no prolongation of the past into the present moment, no evolution, no concrete duration. Duration is the continuous progress of the past which gnaws into the future and which swells as it advances. Since the past grows without ceasing, it is also preserved indefinitely. Memory, as we have tried to prove[1], is not a faculty of filing recollections in a drawer or of writing them down in a register. There is no register, no drawer; strictly speaking, there is not even a faculty here, for a faculty works intermittently, when it wants to or when it can, whereas the piling up of past upon past goes on without respite. In reality the past is preserved by itself, automatically. No doubt it follows us in its entirety at every moment: all that we have felt, thought and willed since our earliest childhood is there, leaning over the present that is about to join it, pressing against the door of consciousness, which would like to leave it outside. The cerebral mechanism is made precisely to push almost all of it back into the unconscious, and to let into consciousness only what is of a nature to throw light on the present situation, to help the action being prepared—in short, to do *useful* work. At most, a few luxury recollections manage to slip in as contraband through the half-open door. These messengers of the unconscious alert us to what we are dragging behind us without knowing it. But even if we had no distinct idea of it, we would vaguely feel that our past remains present to us. What are we, in fact, what is our *character*, if not the condensation of the history we have lived

1 BERGSON'S NOTE. *Matière et Mémoire*, Paris, 1896, chs. II and III.
TRANSLATOR'S NOTE. Bergson's *Matter and Memory* (1896).

since our birth—even before our birth, since we bring [6] prenatal dispositions with us? Doubtless we think with only a small part of our past; but it is with our entire past, including our soul's original bent, that we desire, will and act. Our past thus manifests itself to us in its entirety through its thrust and in the form of tendency, although only a small part of it becomes representation.

From this survival of the past follows the impossibility for a consciousness to go through the same state twice. The circumstances may be the same, but it is no longer the same person they act on, since they find that person at a new moment of their history. Our personality, which is built up at every instant from accumulated experience, changes unceasingly. By changing, it prevents a state, even one identical to itself on the surface, from ever being repeated in depth. That is why our duration is irreversible. We could not relive a single particle of it, for we would first have to erase the memory of everything that followed. We could, at a pinch, strike this memory from our intellect, but not from our will.

Thus our personality shoots up, grows and ripens without ceasing. Each of its moments is something new added to what was there before. Let us go further: it is not only new, but unforeseeable. Doubtless my present state is explained by what was in me and by what was acting on me a moment ago. Analyzing it, I would find no other elements in it. But no intellect, even a superhuman one, could have foreseen the simple, indivisible form that gives these wholly abstract elements their concrete organization. For to foresee consists in projecting into the future what one has perceived in the past, or in picturing for later a new assemblage, [7] in a different order, of elements already perceived. But what has never been perceived, and is at the same time simple, is necessarily unforeseeable. Now, such is the case with each of our states, regarded as a moment of an unfolding history. It is simple, and it cannot have been perceived already, since it concentrates in its indivisibility all that has been per-

ceived, together with what the present adds to it. It is an original moment of a no less original history.

The finished portrait is explained by the features of the model, by the nature of the artist, by the colors mixed on the palette. But even with knowledge of what explains it, no one, not even the artist, could have foreseen exactly what the portrait would be, for to predict it would have been to produce it before it was produced—an absurd hypothesis that refutes itself. So it is with the moments of our life, of which we are the artisans. Each of them is a kind of creation. And just as the painter's talent is formed or deformed—in any case modified—by the very works it produces, so each of our states, at the same time as it issues from us, modifies our person, being the new form we have just given ourselves. It is right, then, to say that what we do depends on what we are; but we must add that we are, to a certain extent, what we do, and that we are continually creating ourselves. This creation of self by self is all the more complete, moreover, the better we reason about what we do. For reason does not proceed here as in geometry, where the premises are given once and for all, impersonal, and an impersonal conclusion is compelled. Here, on the contrary, the same reasons may dictate to different persons, or to the same [8] person at different moments, profoundly different acts, though equally reasonable ones. In truth, they are not quite the same reasons, since they are not those of the same person, nor of the same moment. That is why we cannot work on them *in abstracto*, from outside, as in geometry, nor solve for others the problems that life sets them. It is for each person to solve them from within, for themselves. But we need not go further into this point. We are seeking only the precise meaning that our consciousness gives to the word "exist," and we find that, for a conscious being, to exist is to change, to change is to mature, and to mature is to go on creating oneself endlessly. Could the same be said of existence in general?

INERT MATTER HAS NO HISTORY

Material systems can return to earlier states, so for them time changes nothing.

A material object, taken at random, presents the opposite characteristics to those we have just listed. Either it remains what it is, or, if it changes under the influence of an external force, we represent this change to ourselves as a displacement of parts which themselves do not change. If these parts took it into their heads to change, we would break them up in turn. We will thus go down to the molecules of which the fragments are made, to the atoms that make up the molecules, to the corpuscles that generate the atoms, to the "imponderable" within which the corpuscle is supposed to form by a mere whirling motion. In short, we will push division or analysis as far as necessary. But we will stop only before the unchanging.[2]

Now, we say that the composite object changes by the displacement of its parts. But when a part has left its position, nothing prevents it from returning to it. A group of elements that has passed through a state can therefore [9] always return to it, if not by itself, at least through the effect of an external cause that puts everything back in place. This amounts to saying that a state of the group can be repeated as often as we like, and that consequently the group does not grow old. It has no history.

Thus nothing is created in it, neither form nor matter. What the group will be is already present in what it is, provided we include in what it is all the points of the universe with which it is supposed to be connected. A superhuman intellect could calculate, for any moment of time, the position of any point of the system in space. And since there is nothing more in the form of

2 An allusion to the physics of the day: the "imponderable" ether and vortex theories of the atom, such as Lord Kelvin's.

the whole than the arrangement of the parts, the future forms of the system are theoretically visible in its present configuration.[3]

All our belief in objects, all our operations on the systems that science isolates, rest in fact on the idea that time does not bite into them. We touched on this question in an earlier work, and we will return to it in the course of the present study. For the moment, let us simply point out that the abstract time *t* attributed by science to a material object or an isolated system consists only of a definite number of *simultaneities*, or more generally of *correspondences*, and that this number remains the same whatever the nature of the intervals separating the correspondences from one another. These intervals are never in question when we speak of inert matter; or, if they are considered, it is in order to count new correspondences within them, between which, again, anything we like may happen. Common sense, which deals only with detached objects, and science, which considers only isolated systems, alike take their stand at the ends of the [10] intervals and not along the intervals themselves. That is why we could suppose that the flow of time took on infinite speed, and that the whole past, present and future of material objects or isolated systems was spread out all at once in space: nothing would need to be changed, either in the scientist's formulas or even in the language of common sense. The number *t* would still mean the same thing. It would still count the same number of correspondences between the states of the objects or systems and the points of the ready-drawn line that "the course of time" would now be.

WAITING FOR THE SUGAR TO MELT

The time we must wait for sugar to dissolve shows that the universe itself endures.

Yet succession is an undeniable fact, even in the material world. Our reasoning about isolated systems may well imply that the

past, present and future history of each of them could be unfolded all at once, like a fan; that history nonetheless unrolls little by little, as if it occupied a duration analogous to our own. If I want to make myself a glass of sugared water, do what I may, I must wait for the sugar to melt. This little fact is big with lessons. For the time I have to wait is no longer that mathematical time which would apply just as well along the entire history of the material world, even if that history were spread out all at once in space. It coincides with my impatience, that is, with a certain portion of my own duration, which cannot be lengthened or shortened at will. It is no longer something thought; it is something lived. It is no longer a relation; it is the absolute. What does this mean, if not that the glass of water, the sugar and the process of the sugar dissolving in the water are no doubt abstractions, and that the Whole from which my senses and my understanding have cut them out perhaps progresses in the manner of a consciousness?

[11] Certainly the operation by which science isolates and closes off a system is not altogether artificial. If it had no objective foundation, we could not explain why it is plainly called for in some cases and impossible in others. We shall see that matter has a tendency to form isolable systems that can be treated geometrically. It is, indeed, by this very tendency that we shall define it. But it is only a tendency. Matter does not go all the way, and the isolation is never complete. If science goes all the way and isolates completely, it does so for the convenience of study. It tacitly assumes that the so-called isolated system remains subject to certain external influences. It simply leaves them aside, either because it finds them weak enough to be neglected, or because it reserves the right to take them into account later. It is nonetheless true that these influences are so many threads linking the system to another, larger one, that one to a third which encompasses them both, and so on, until we reach

3 Pierre-Simon Laplace (1749–1827), French mathematician and astronomer, supposed (1814) an intellect able to calculate the whole future of the universe from its present state, later known as "Laplace's demon."

the most objectively isolated and most independent system of all, the solar system as a whole. But even here the isolation is not absolute. Our sun radiates heat and light beyond the most distant planet. And, on the other hand, it moves in a definite direction, carrying the planets and their satellites along with it. The thread that attaches it to the rest of the universe is no doubt very slender. Yet it is along this thread that the duration immanent in the whole of the universe is transmitted, down to the smallest particle of the world we live in.

The universe endures. The more deeply we probe the nature of time, the better we shall understand that duration means invention, the creation of forms, the continual elaboration of [12] the absolutely new. The systems marked out by science endure only because they are inseparably bound up with the rest of the universe. It is true that within the universe itself we must distinguish, as we shall explain later, two opposite movements, one of "descent" and the other of "ascent." The first merely unwinds a roll already prepared. It could, in principle, be accomplished almost instantaneously, as happens with a spring that is released. But the second, which corresponds to an inner work of ripening or creation, essentially endures, and imposes its rhythm on the first, which is inseparable from it.

Nothing prevents us, then, from attributing to the systems that science isolates a duration, and thereby a form of existence analogous to our own, provided we reintegrate them into the Whole. But we must reintegrate them. And the same could be said, *a fortiori*, of the objects marked out by our perception. The distinct outlines we attribute to an object, and which confer its individuality on it, are only the sketch of a certain kind of *influence* we might exert at a certain point in space. It is the plan of our possible actions that is sent back to our eyes, as if by a mirror, when we perceive the surfaces and edges of things. Take away this action, and with it the main roads it opens up in advance, through perception, in the tangle of the real, and the individuality of the body is reabsorbed into the universal interaction which is no doubt reality itself.

THE LIVING BODY AS AN INDIVIDUAL

Nature itself isolates the living body, though individuality is never complete.

Now, we have been considering material objects taken at random. Are there not privileged objects? We were saying that inert bodies are cut out of the stuff of nature by a *perception* whose scissors follow, in a [13] sense, the dotted lines along which *action* would pass. But what of the body that will exert this action—the body that, before performing real actions, already projects onto matter the sketch of its virtual actions, the body that has only to point its sense organs at the flux of the real to make it crystallize into definite forms and so create all the other bodies? Is the *living body*, in short, a body like the others?

No doubt it too consists of a portion of extension connected with the rest of extension, bound up with the Whole, and subject to the same physical and chemical laws that govern any portion of matter whatever. But whereas the subdivision of matter into isolated bodies is relative to our perception, and whereas the construction of closed systems of material points is relative to our science, the living body has been isolated and closed off by nature itself. It is made up of heterogeneous parts that complement one another. It performs diverse functions that involve one another. It is an *individual*, and of no other object, not even the crystal, can as much be said, since a crystal has neither heterogeneity of parts nor diversity of functions. Admittedly, it is hard to determine, even in the organized world, what is an individual and what is not. The difficulty is already great in the animal kingdom; it becomes almost insurmountable when it comes to plants. This difficulty, moreover, stems from deep causes, on which we shall dwell later. It will be seen that individuality admits of infinitely many degrees, and that nowhere, not even in humans, is it fully realized. But that is no reason to refuse to see it as a characteristic property of life. The biologist who proceeds like a geometer triumphs too easily here over our

inability to give [14] individuality a precise and general definition. A perfect definition applies only to a completed reality; but vital properties are never entirely realized, always in the process of being realized; they are not so much *states* as *tendencies*. And a tendency achieves all it aims at only if no other tendency thwarts it. How could that happen in the domain of life, where, as we shall show, antagonistic tendencies always imply one another? In particular, in the case of individuality, it may be said that while the tendency to individuate is present everywhere in the organized world, it is everywhere opposed by the tendency to reproduce. For individuality to be perfect, no part detached from the organism would have to be able to live separately. But then reproduction would become impossible. For what is reproduction, if not the reconstitution of a new organism from a fragment detached from the old one? Individuality thus harbors its enemy within itself. The very need it feels to perpetuate itself in time condemns it never to be complete in space. It is for the biologist to assign, in each case, the share of each of the two tendencies. So it is in vain that we ask the biologist for a definition of individuality that can be formulated once and for all and applied automatically.

But all too often we reason about the things of life as we do about the modes of inert matter. Nowhere is the confusion as visible as in the debates about individuality. We are shown the segments of a *Lumbriculus*, each regenerating its own head and living from then on as so many independent individuals; a hydra whose pieces become so many new hydras; a sea-urchin egg whose fragments develop into complete embryos. Where, then, we are asked, [15] was the individuality of the egg, the hydra or the worm?—But from the fact that there are several individualities now, it does not follow that there was not a single individuality a moment ago.[4] I grant that when I have seen several drawers fall out of a piece of furniture, I no longer have the right to say that it was all of a piece. But that is because there can be

4 *Lumbriculus*: a genus of freshwater worms that can regenerate whole bodies from fragments.

nothing more in the present of this piece of furniture than in its past, and if it is made of several heterogeneous pieces now, it was so from the time it was made. More generally, unorganized bodies—which are the ones we need in order to act, and on which we have modeled our way of thinking—are governed by this simple law: "the present contains nothing more than the past, and what is found in the effect was already in the cause. " But suppose that the distinctive feature of the organized body is to grow and to change without ceasing, as indeed the most superficial observation testifies: then there would be nothing surprising in its being *one* at first and *many* afterwards. The reproduction of unicellular organisms consists in precisely this: the living being divides into two halves, each of which is a complete individual. It is true that in more complex animals nature localizes the power to produce the whole anew in so-called sexual cells, which are more or less independent. But something of this power may remain diffused through the rest of the organism, as the facts of regeneration prove, and it is conceivable that in certain privileged cases the faculty survives in full in a latent state and shows itself at the first opportunity. Truth to tell, for me to have the right to speak of individuality, it is not necessary that the organism be incapable of splitting into viable fragments. It is enough that the organism displayed a certain systematization of parts before the fragmentation, and that the same systematization tends to [16] reproduce itself in the fragments once they are detached. Now, this is exactly what we observe in the organized world. Let us conclude, then, that individuality is never perfect, that it is often difficult, sometimes impossible, to say what is an individual and what is not, but that life nonetheless displays a quest for individuality, and that it tends to constitute systems that are naturally isolated, naturally closed.

In this a living being is distinguished from everything that our perception or our science isolates or closes off artificially. It would therefore be wrong to compare it to an *object*. If we wished to find a term of comparison in the unorganized, it is not

to a particular material object, but rather to the totality of the material universe, that we ought to liken the living organism. True, the comparison would then be of little use, since a living being is observable, whereas the whole of the universe is constructed or reconstructed by thought. At least our attention would thus have been drawn to the essential character of organization.

THE ORGANISM AGES AND HAS A HISTORY

Like consciousness, a living body carries its past with it; aging continues embryonic development.

Like the universe as a whole, like each conscious being taken separately, the living organism is something that endures. Its past is prolonged in its entirety into its present, and remains there, present and at work. Otherwise, how could we understand its passing through well-regulated phases, its changing with age—in short, its having a history? If I consider my own body in particular, I find that, like my consciousness, it matures little by little from childhood to old age; like me, it grows old. Indeed, maturity and old age are, strictly speaking, attributes only of my body; it is by metaphor that I give the same names to the corresponding changes in my conscious self. Now if I travel from the top to the bottom of the scale of [17] living beings, if I pass from one of the most differentiated to one of the least differentiated, from the multicellular organism of man to the unicellular organism of the infusorian, I find the same process of aging in this single cell. The infusorian becomes exhausted after a certain number of divisions, and although by modifying its environment[5] we may delay the moment when rejuvenation by conjugation becomes necessary, we cannot put it off indefinitely.[6] It is true that between these two extreme cases, in which

5 BERGSON'S NOTE. Calkins, *Studies on the life history of Protozoa* (*Arch J. Entwickelungs-mechanik*, vol. XV, 1903, pp. 139–186).

6 Infusorian: an older name for microscopic single-celled organisms such as ciliates.

the organism is completely individualized, we would find a multitude of others in which individuality is less marked, and in which, though there is no doubt aging somewhere, we could not say exactly what it is that ages. Once again, there is no universal biological law that applies as it stands, automatically, to any living being whatever. There are only *directions* in which life launches species in general. Each particular species, in the very act by which it constitutes itself, asserts its independence, follows its whim, deviates more or less from the line, sometimes even climbs back up the slope and seems to turn its back on the original direction. It will be easy enough to show us that a tree does not grow old, since its terminal shoots are always just as young, always just as able to produce new trees from cuttings. But in such an organism—which is, besides, a society rather than an individual—something does grow old, if only the leaves and the inside of the trunk. And each cell, considered separately, evolves in a determinate way. *Wherever anything lives, there is, open somewhere, a register in which time is being inscribed.*

[18] "That is only a metaphor," it will be said.—Indeed, it is of the essence of mechanism to regard as metaphorical any expression that attributes to time an effective action and a reality of its own. In vain does immediate observation show us that the very ground of our conscious existence is memory—that is, the prolongation of the past into the present, that is, in short, a duration that acts and is irreversible. In vain does reasoning prove to us that the further we move away from the objects cut out, and the systems isolated, by common sense and by science, the more we are dealing with a reality that changes as a whole in its inner arrangements, as though an accumulating memory of the past made it impossible to go back. The mechanistic instinct of the mind is stronger than reasoning, stronger than immediate observation. The metaphysician we unconsciously carry within us—whose presence is explained, as we shall see later, by the very place that man occupies among living beings as a whole—has his fixed demands, his ready-made explanations, his irreducible theses: all of them come down to the denial of concrete

duration. Change *must* reduce to an arranging or disarranging of parts; the irreversibility of time must be an appearance relative to our ignorance; the impossibility of going back must be nothing but man's inability to put things back in place. From then on, aging can be nothing but the progressive acquisition or the gradual loss of certain substances, perhaps both at once. Time has exactly as much reality for a living being as for an hourglass, in which the upper bulb empties while the lower one fills, and in which things can be put back in place by turning the apparatus over.

It is true that there is no agreement about what is gained [19] and what is lost between the day of birth and the day of death. Some have fastened on the continual increase in the volume of protoplasm, from the birth of the cell to its death[7]. More plausible and more profound is the theory that places the decrease in the quantity of nutritive substance contained in the "internal environment" in which the organism renews itself, and the increase in the quantity of unexcreted residual substances which, accumulating in the body, end by "encrusting" it[8]. Must we nevertheless, with an eminent microbiologist, declare inadequate any explanation of aging that does not take phagocytosis into account[9]?[10] We are not qualified to settle the question. But the fact that both theories agree in affirming the constant accumulation or the constant loss of a certain kind of matter, while in determining what is gained and what is lost they have little left in common, shows clearly enough that the framework of the explanation was supplied *a priori*. We shall see this more and

7 BERGSON'S NOTE. Sedgwick Minot, *On certain phenomena of growing old.* (*Proc. of The American Assoc. for The advancement of science,* 39th meeting. Salem, 1891, pp. 271–288).

8 BERGSON'S NOTE. Le Dantec, *L'individualité et l'erreur individualiste,* Paris, 1905, pp. 84 ff.

9 BERGSON'S NOTE. Metchnikoff, *La dégénérescence sénile* (*Année biologique,* III, 1897, pp. 249 ff.). Cf., by the same author, *La nature humaine,* Paris, 1903, pp. 312 ff.

TRANSLATOR'S NOTE. Élie Metchnikoff (1845–1916), Russian-born microbiologist at the Pasteur Institute, discoverer of phagocytosis.

10 "Internal environment" (*milieu intérieur*): the physiologist Claude Bernard's term for the fluid environment within the body in which its cells live.

more clearly as we proceed with our study: when we think about time, it is not easy to escape the image of the hourglass.

The cause of aging must lie deeper. We hold that there is unbroken continuity between the evolution of the embryo and that of the complete organism. The impulse by virtue of which the living being grows, [20] develops and ages is the very one that carried it through the phases of embryonic life. The development of the embryo is a perpetual change of form. Anyone who tried to record all its successive aspects would be lost in an infinity, as always happens when we are dealing with a continuity. Life is the prolongation of this prenatal evolution. The proof is that it is often impossible to say whether we are dealing with an organism that is aging or with an embryo that is continuing to evolve: such is the case, for example, with the larvae of insects and crustaceans. On the other hand, in an organism like ours, crises such as puberty or menopause, which bring about a complete transformation of the individual, are entirely comparable to the changes that take place in the course of larval or embryonic life—and yet they are an integral part of our aging. Though they occur at a definite age, and within a period that may be quite short, no one will maintain that they arrive *ex abrupto*, from outside, simply because a certain age has been reached, as the call-up for military service comes to someone who has turned twenty. It is evident that a change like that of puberty is being prepared at every moment from birth, and even before birth, and that the aging of the living being up to that crisis consists, at least in part, in this gradual preparation. In short, what is properly vital in aging is the imperceptible, infinitely divided continuation of the change of form. It is, no doubt, accompanied by phenomena of organic destruction. It is to these that a mechanistic explanation of aging will attach itself. It will note the facts of sclerosis, the gradual accumulation of residual substances, the growing hypertrophy of the protoplasm [21] of the cell. But beneath these visible effects an inner cause lies hidden. The evolution of the living being, like that of the embryo, implies a continual recording of duration, a persist-

ence of the past in the present, and hence at least an appearance of organic memory.

LIVING TIME AND MATHEMATICAL TIME

The state of a living body depends on its whole past, not on the preceding instant.

The present state of an inert body depends exclusively on what was happening at the previous instant. The position of the material points of a system defined and isolated by science is determined by the position of these same points at the immediately preceding moment. In other words, the laws that govern unorganized matter can be expressed, in principle, by differential equations in which time (in the sense in which the mathematician takes the word) would play the role of the independent variable. Is it so with the laws of life? Does the state of a living body find its complete explanation in the immediately preceding state? Yes, if we agree *a priori* to liken the living body to the other bodies of nature and to identify it, for the sake of the argument, with the artificial systems on which the chemist, the physicist and the astronomer operate. But in astronomy, physics and chemistry the proposition has a quite definite meaning: it signifies that certain aspects of the present, important for science, can be calculated as a function of the immediate past. There is nothing of the kind in the domain of life. Here calculation gets a grip, at most, on certain phenomena of organic *destruction*. Of organic *creation,* on the contrary—of the evolutionary phenomena that properly constitute life—we cannot even glimpse how we might subject them to mathematical treatment. It will be said that this inability is due solely to our ignorance. But it may just as well mean that the present moment of a living [22] body does not find its reason for being in the immediately preceding moment, that we must add to it the whole past of the organism, its heredity—in short, the sum of a very long history. In fact, it is the second of these two hypotheses that expresses the current state of the biological sciences, and even

their direction. As for the idea that the living body could be subjected by some superhuman calculator to the same mathematical treatment as our solar system, it has gradually emerged from a certain metaphysics which has taken a more precise form since the physical discoveries of Galileo, but which—as we shall show—has always been the natural metaphysics of the human mind. Its apparent clarity, our impatient desire to find it true, the eagerness with which so many excellent minds accept it without proof—in short, all the attractions it holds for our thought—ought to put us on our guard against it. The appeal it has for us shows clearly enough that it satisfies an innate inclination. But, as we shall see later, the intellectual tendencies, innate today, which life must have created in the course of its evolution, are made for something quite other than to furnish us with an explanation of life.

It is against the opposition of this tendency that we run up the moment we try to distinguish between an artificial system and a natural system, between the dead and the living. Because of it, we find it equally difficult to think that the organized endures and that the unorganized does not. What! it will be said: in asserting that the state of an artificial system depends exclusively on its state at the previous moment, are you not bringing in time, are you not placing the system in duration? And, on the other hand, this past which, according to you, is bound up with the present moment of the living [23] being—does not organic memory contract the whole of it into the immediately preceding moment, which thereby becomes the sole cause of the present state? —To speak thus is to overlook the cardinal difference between concrete time, along which a real system develops, and the abstract time that enters into our speculations about artificial systems. When we say that the state of an artificial system depends on what it was at the immediately preceding moment, what do we mean by that? There is not, and there cannot be, an instant immediately preceding an instant, any more than there is a mathematical point contiguous to a mathematical point. The "immediately preceding" instant is in reality the one connected

to the present instant by the interval *dt*. All we mean, then, is that the present state of the system is defined by equations into which there enter differential coefficients such as de/dt, dv/dt, *present* accelerations. So in the end it is only the present that is in question—a present taken, it is true, together with its *tendency*. And in fact the systems on which science operates exist in an instantaneous present that is constantly renewed, never in the real, concrete duration in which the past is bound up with the present. When the mathematician calculates the future state of a system at the end of the time *t*, nothing prevents him from supposing that, between now and then, the material universe vanishes, only to reappear all of a sudden. It is the *t*th moment alone that counts—something that will be a pure snapshot. What will flow in the interval, that is, real time, does not count and cannot enter into the calculation. If the mathematician says he is placing himself within this interval, it is always to a certain point, a certain moment, [24] I mean to the end of a time t', that he transports himself, and then it is the interval extending to T' that is no longer in question. And if he divides the interval into infinitely small parts by considering the differential *dt*, he merely expresses thereby that he will consider accelerations and velocities, that is, numbers that record tendencies and make it possible to calculate the state of the system at a given moment; but it is always a given moment—I mean a stopped moment—that is in question, and not time that flows. In short, *the world the mathematician operates on is a world that dies and is reborn at every instant, the very world Descartes had in mind when he spoke of continued creation.* But in time so conceived, how can we picture an evolution, that is, the characteristic feature of life?[11] Evolution, for its part, implies a real continuation of the past by the present, a duration that is a *connecting link*. In other words, knowledge of a living being, or *natural system*, is knowledge that bears on the very interval of duration, whereas know-

11 Descartes held that God's keeping the world in existence from moment to moment amounts to creating it anew at every instant ("continued creation").

ledge of an *artificial* or mathematical *system* bears only on the endpoint.

Continuity of change, preservation of the past in the present, true duration—these attributes, then, the living being does seem to share with consciousness. Can we go further, and say that life is invention, as conscious activity is, and unceasing creation, as it is?

ACCEPTING TRANSFORMISM

Why the theory that species descend from one another is adopted as the language of this work.

It is no part of our plan to list here the proofs of transformism. We wish only to explain in a few words why, in the present work, we shall accept it as a sufficiently exact and precise rendering of the known facts. The idea of transformism is already present in germ in the natural classification of organized [25] beings. The naturalist, in fact, brings together the organisms that resemble one another, then divides the group into subgroups within which the resemblance is greater still, and so on: all through the operation, the characters of the group appear as general themes on which each of the subgroups performs its own particular variations.[12] Now this is precisely the relation we find, in the animal world and in the plant world, between what begets and what is begotten: on the canvas that the ancestor hands down to its descendants, and which they possess in common, each adds its own original embroidery. It is true that the differences between descendant and ancestor are slight, and we may wonder whether one and the same living matter has enough plasticity to take on in succession forms as different as those of a fish, a reptile and a bird. But to this question observation gives a decisive answer. It shows us that, up to a certain period of its development, the embryo of the bird is scarcely distinguishable from that of the reptile, and that throughout

12 Transformism: the usual French term of the period for the theory that species descend from one another by gradual transformation, that is, evolution.

embryonic life in general the individual develops through a series of transformations comparable to those by which, according to evolutionism, one would pass from one species to another. A single cell, obtained by the combination of the two cells, male and female, accomplishes this work by dividing. Every day, before our eyes, the highest forms of life emerge from a very elementary form. Experience therefore establishes that the most complex could have emerged from the simplest by way of evolution. Now, did it actually emerge from it? Paleontology, in spite of the inadequacy of its records, invites us to believe so, for wherever it recovers the order of succession [26] of species with some precision, that order is exactly the one that considerations drawn from comparative embryogeny and comparative anatomy would have led us to suppose, and each new paleontological discovery brings transformism a fresh confirmation. Thus the proof drawn from pure and simple observation keeps growing stronger, while on the other hand experiment removes the objections one by one: the recent experiments of H. de Vries, for example, by showing that important variations can occur suddenly and be transmitted regularly, dispose of some of the greatest difficulties the thesis raised.[13] They allow us to shorten considerably the time that biological evolution seemed to require. They also make us less demanding of paleontology. So that, to sum up, the transformist hypothesis looks more and more like an at least approximate expression of the truth. It cannot be rigorously demonstrated; but below the certainty given by theoretical or experimental demonstration there is that indefinitely increasing probability which takes the place of self-evidence and tends toward it as toward its limit: such is the kind of probability that transformism offers.

Let us suppose, however, that transformism were convicted of error. Suppose it were established, by inference or by experiment, that species arose by a discontinuous process of which today we have no idea. Would the doctrine be affected in what is

13 Hugo de Vries (1848–1935), Dutch botanist whose theory of sudden "mutations" was based on experiments with the evening primrose.

most interesting about it and, for us, most important? The classification would no doubt remain in its broad outlines. The current data of embryology would remain as well. The correspondence between comparative embryogeny and comparative anatomy would remain. Consequently [27] biology could and should go on establishing among living forms the same relations that transformism assumes today, the same kinship. It would be, it is true, an ideal kinship, and no longer a material descent. But since the current data of paleontology would also remain, we should still be obliged to admit that the forms between which an ideal kinship appears came into being successively, and not simultaneously. Now evolutionary theory, in what makes it important in the eyes of the philosopher, asks no more than this. It consists chiefly in noting relations of ideal kinship and in maintaining that, wherever there is this relation of so to speak *logical* descent between forms, there is also a relation of *chronological* succession between the species in which these forms are materialized. This twofold thesis would hold in any event. And so we should still have to suppose an evolution somewhere—either in a creative Thought in which the ideas of the various species would have engendered one another exactly as transformism holds that the species themselves engendered one another on earth—or in a plan of vital organization immanent in nature, gradually unfolding, in which the relations of logical and chronological descent between the pure forms would be precisely those that transformism presents to us as relations of real descent between living individuals—or, finally, in some unknown cause of life, which would develop its effects *as if* they engendered one another. We should thus simply have *transposed* evolution. We should have moved it from the visible to the invisible. Almost everything that transformism tells us today would be preserved, though open to a different interpretation. Is it not better, then, to hold to the letter of [28] transformism, as professed by the near-unanimity of scientists? If we leave aside the question of how far this evolutionism describes the facts and how far it symbolizes them, it has nothing irreconcilable with the doc-

trines it claimed to replace, not even with that of separate creations, to which it is generally opposed. That is why we hold that the language of transformism now forces itself upon every philosophy, just as the dogmatic affirmation of transformism forces itself upon science.

LIFE AS A CURRENT FROM GERM TO GERM

The organism is a bud through which life passes on its way to a new germ.

But then we must no longer speak of *life in general* as an abstraction, or as a mere heading under which all living beings are entered. At a certain moment, at certain points in space, a clearly visible current came into being: this current of life, passing through the bodies it has organized one after another, passing from generation to generation, has divided among species and scattered among individuals without losing any of its force—growing more intense, rather, as it advanced. We know that, according to the thesis of the "continuity of the germ plasm" upheld by Weismann, the sexual elements of the parent organism would transmit their properties directly to the sexual elements of the offspring.[14] In this extreme form the thesis has seemed open to dispute, for it is only in exceptional cases that the sex glands are seen to take shape from the segmentation of the fertilized ovum onward. But even if the cells that generate the sexual elements do not, in general, appear at the very beginning of embryonic life, it is nonetheless true that they are always formed from those tissues of the embryo that have not yet undergone any particular functional differentiation and whose cells consist of unmodified protoplasm[15]. In other words, the [29] generative power of the fertilized ovum weakens as it is spread over the growing mass of the embryo's tissues; but while it is being diluted in this way, it concentrates something of itself

14 August Weismann (1834–1914), German biologist who held that heredity passes only through an unbroken line of reproductive cells, the "germ plasm."
15 BERGSON'S NOTE. Roule, *L'embryologie générale,* Paris. 1893, p. 319.

anew at a certain special point, in the cells from which the ova or spermatozoa will be born. We might say, then, that if the germ plasm is not continuous, there is at least a continuity of generative energy, this energy being expended only for a few moments, just long enough to give the impulse to embryonic life, and gathering itself up again as soon as possible in new sexual elements, where once more it will wait its hour. Seen from this point of view, *life appears as a current passing from germ to germ by way of a developed organism*. Everything happens as though the organism itself were only an outgrowth, a bud thrust out by the old germ as it works to continue itself in a new germ. The essential thing is the continuity of progress that goes on indefinitely, an invisible progress on which each visible organism rides during the short interval of time it is given to live.

Now, the more we fix our attention on this continuity of life, the more we see organic evolution come close to that of a consciousness, in which the past presses against the present and makes a new form spring from it, incommensurable with its antecedents. That the appearance of a plant or animal species is due to precise causes, no one will dispute. But this must be understood to mean that if we knew the details of these causes after the fact, we should succeed in explaining by them the form that has been produced: foreseeing it is out of the question[16]. Will it be said that we could [30] foresee it if we knew, in all their details, the conditions under which it will be produced? But these conditions are bound up with it, and are even one with it, being characteristic of the moment life has then reached in its history: how can we suppose known in advance a situation that is unique of its kind, that has not yet occurred and will never occur again? Of the future we can foresee only what resembles the past, or what can be recomposed from elements like those of the past. Such is the case with astronomical, physical and chemical facts, with all those that belong to a system in which ele-

16 BERGSON'S NOTE. The irreversibility of the series of living beings has been well brought out by Baldwin (*Development and evolution*, New York, 1902, especially p. 327).

ments supposed to be unchanging are simply set side by side, in which only changes of position occur, in which there is no theoretical absurdity in imagining things put back in place, and in which, consequently, the same total phenomenon, or at least the same elementary phenomena, can recur. But an original situation, which communicates something of its originality to its elements—that is, to the partial views taken of it—how could we picture it as given before it occurs[17]? All that can be said is that, once it has occurred, it is explained by the elements that analysis discovers in it. But what is true of the production of a new species is true also of the production of a new individual, and more generally of any moment of any living form. For although variation must reach a certain magnitude and a certain generality in order to give rise to a new species, it is occurring at every moment, continuous and imperceptible, in every living being. And the sudden mutations we hear about [31] today are clearly possible only if a work of incubation, or rather of maturation, has been carried out through a series of generations that seemed not to change. In this sense we might say of life, as of consciousness, that at each moment it creates something[18].

17 BERGSON'S NOTE. We have insisted on this point in the *Essai sur les données immédiates de la conscience*, pages 140–151.

18 BERGSON'S NOTE. In his fine book *Le génie dans l'art*, Séailles develops the twofold thesis that art prolongs nature and that life is creation. We would readily accept the second formula; but must creation be understood, as the author understands it, as a *synthesis* of elements? Where the elements preexist, the synthesis that will be made of them is virtually given, being only one of the possible arrangements: a superhuman intellect could have perceived this arrangement in advance among all the possibilities surrounding it. We hold, on the contrary, that in the domain of life the elements have no real and separate existence. They are the mind's many views of an indivisible process. And that is why there is radical contingency in progress, incommensurability between what precedes and what follows—in short, duration.

TRANSLATOR'S NOTE. Gabriel Séailles (1852–1922), French philosopher; his *Genius in Art* appeared in 1883.

THE INTELLECT AGAINST NOVELTY

The intellect and science look only for repetition and so miss what is new in life.

But against this idea of the absolute originality and unforeseeability of forms our whole intellect rises in revolt. Our intellect, as the evolution of life has shaped it, has as its essential function to light the way for our conduct, to prepare our action on things, to foresee, for a given situation, the favorable or unfavorable events that may follow from it. It therefore instinctively isolates in a situation whatever resembles the already known; it seeks the same, in order to apply its principle that "like produces like." In this consists common sense's foresight of the future. Science carries this operation to the highest possible degree of exactness and precision, but it does not alter its essential character. Like ordinary knowledge, science retains only the aspect of *repetition* in things. If the whole is original, science manages to analyze it into elements or aspects that are *roughly* reproductions of the past. It can operate only on what is supposed to repeat itself, that is, on what is withdrawn, by [32] hypothesis, from the action of duration. What is irreducible and irreversible in the successive moments of a history escapes it. To picture this irreducibility and irreversibility, we must break with scientific habits that answer to the fundamental demands of thought; we must do violence to the mind and climb back up the natural slope of the intellect. But that is precisely the role of philosophy.

That is why, however much life may evolve before our eyes as a continuous creation of unforeseeable form, the idea always persists that form, unforeseeability and continuity are mere appearances, reflecting so many forms of ignorance. What presents itself to the senses as a continuous history would break down, we shall be told, into successive states. What gives you the impression of an original state resolves itself, on analysis, into elementary facts, each of which is the repetition of a known fact. What you call an unforeseeable form is only a new arrange-

ment of old elements. The elementary causes whose combination determined this arrangement are themselves old causes repeating themselves in a new order. Knowledge of the elements and of the elementary causes would have made it possible to sketch in advance the living form that is their sum and result. Having resolved the biological aspect of phenomena into physicochemical factors, we shall if necessary leap over physics and chemistry themselves; we shall go from masses to molecules, from molecules to atoms, from atoms to corpuscles; we must surely arrive in the end at something that can be treated astronomically, as a kind of solar system. If you deny this, you are challenging the very principle of scientific mechanism, and declaring arbitrarily that living matter is not made [33] of the same elements as other matter. —We shall reply that we do not dispute the fundamental identity of inert matter and organized matter. The only question is whether the natural systems we call living beings are to be likened to the artificial systems that science cuts out of inert matter, or whether they should not rather be compared to that natural system which is the whole of the universe. That life is a kind of mechanism, I readily grant. But is it the mechanism of parts that can be artificially isolated within the whole of the universe, or that of the real whole? The real whole might well be, as we said, an indivisible continuity: the systems we cut out of it would then not be, strictly speaking, parts of it; they would be partial views taken of the whole. And by putting these partial views end to end you will not obtain even the beginning of a recomposition of the whole, any more than by multiplying photographs of an object, from a thousand different angles, you will reproduce its materiality. So it is with life and with the physicochemical phenomena into which some would claim to resolve it. Analysis will no doubt discover in the processes of organic creation an increasing number of physicochemical phenomena. And that is as far as chemists and physicists will go. But it does not follow from this that chemistry and physics must give us the key to life.

A very small element of a curve is almost a straight line. The smaller we take it, the more closely it will resemble a straight line. In the limit, we may say, as we please, that it belongs to a straight line or to a curve. For at each of its points the curve coincides with its tangent. In the same way, "vitality" is tangent at any point whatever to physical and [34] chemical forces; but these points are, after all, only the views of a mind that imagines stops at this or that moment of the movement that generates the curve. In reality, life is no more made of physicochemical elements than a curve is composed of straight lines.

Generally speaking, the most radical progress a science can achieve consists in fitting the results already obtained into a new whole. In relation to this whole, they become instantaneous, motionless views taken at intervals of the continuity of a movement. Such, for example, is the relation of modern geometry to that of the ancients. The latter, purely static, worked on figures once they had been drawn; the former studies the variation of a function, that is, the continuity of the movement that describes the figure. No doubt, for greater rigor, all consideration of movement can be eliminated from our mathematical procedures. It is nonetheless true that the introduction of movement into the genesis of figures lies at the origin of modern mathematics. We believe that if biology could ever grasp its object as closely as mathematics grasps its own, it would become, in relation to the physics and chemistry of organized bodies, what modern mathematics has proved to be in relation to ancient geometry. The wholly superficial displacements of masses and molecules that physics and chemistry study would become, in relation to that vital movement which takes place in depth, which is transformation and no longer translation, what the stationary position of a moving body is to that body's movement in space. And, as far as we can foresee, the procedure by which one would pass from the definition of a certain vital action to the system of physicochemical facts it implies would not be unlike the operation by which one goes from the function [35] to its derivative, from the equation of the curve (that is, from

the law of the continuous movement by which the curve is generated) to the equation of the tangent that gives its instantaneous direction. Such a science would be a *mechanics of transformation*, of which our *mechanics of translation* would become a particular case, a simplification, a projection onto the plane of pure quantity. And just as there exists an infinity of functions having the same differential, these functions differing from one another by a constant, so perhaps the integration of the physicochemical elements of a properly vital action would determine that action only in part: some share would be left to indeterminacy. But at most we can dream of such an integration; we do not claim that the dream will ever become reality. We have only wished, by developing a certain comparison as far as possible, to show where our thesis comes close to pure mechanism, and how it differs from it.

CAN CHEMISTRY IMITATE LIFE?

Laboratory imitations of cells and protoplasm prove little; histologists doubt a physicochemical explanation.

The imitation of the living being by the unorganized can, moreover, be carried quite far. Not only does chemistry carry out organic syntheses, but it has become possible to reproduce artificially the outward pattern of certain facts of organization, such as the indirect division of the cell and protoplasmic circulation. The protoplasm of the cell, as is well known, performs various movements inside its envelope. On the other hand, the so-called indirect division of the cell takes place through operations of extreme complexity, some of which concern the nucleus and others the cytoplasm. The latter begin with the doubling of the centrosome, a small spherical body located beside the nucleus.[19] The two centrosomes thus obtained move apart and draw toward themselves the cut, and likewise doubled, segments of the filament that [36] essentially made up the original nucleus. They end by forming two new nuclei, around which the two new

19 "Indirect division" is the older term for mitosis.

cells that will succeed the first are built up. Now, some of these operations at least have been successfully imitated in their broad outlines and outward appearance. If sugar or table salt is ground to powder, some very old oil is added, and a drop of the mixture is examined under the microscope, one sees a foam with an alveolar structure. According to certain theorists its configuration resembles that of protoplasm, and in any case movements take place in it that strongly recall those of protoplasmic circulation[20]. If, in a foam of the same kind, the air is extracted from one alveolus, a cone of attraction is seen to take shape, analogous to those that form around the centrosomes and lead to the division of the nucleus[21]. Even the outward movements of a single-celled organism, or at least of an amoeba, are believed to be mechanically explicable. The amoeba's movements in a drop of water would be comparable to the to-and-fro of a speck of dust in a room where open doors and windows set drafts circulating. Its mass constantly absorbs certain soluble substances contained in the surrounding water and gives certain others back to it. These continual exchanges, similar to those that take place between two vessels separated by a porous partition, would create around the tiny organism an ever-changing eddy. As for the temporary extensions, or pseudopodia, that the amoeba [37] seems to give itself, they would be not so much sent out by it as drawn out of it by a kind of aspiration or suction exerted by the surrounding medium[22]. Step by step, this mode of explanation will be extended to the more complex movements that the infusorian itself performs with its vibratile cilia—which, moreover, are probably nothing but consolidated pseudopodia.

20 BERGSON'S NOTE. Bütschli, *Untersuchungen über mikroskopische Schäume und das Protoplasma* [Investigations on Microscopic Foams and Protoplasm], Leipzig, 1892, Part I.

21 BERGSON'S NOTE. Rhumbler, *Versuch einer mechanischen Erklärung der indirekten Zell— und Kerntheilung* [Attempt at a Mechanical Explanation of Indirect Cell and Nuclear Division] (*Roux's Archiv*, 1896).

22 BERGSON'S NOTE. Berthold, *Studien über Protoplasmamechanik* [Studies on the Mechanics of Protoplasm], Leipzig, 1886, p. 102.—Cf. the explanation proposed by Le Dantec, *Théorie nouvelle de la vie*, Paris, 1896, p. 60.

Scientists, however, are far from agreeing among themselves about the value of explanations and schemes of this kind. Chemists have pointed out that, even if we consider only the organic and do not go as far as the organized, science has so far reconstituted only the waste products of vital activity; the properly active, plastic substances remain resistant to synthesis. One of the most remarkable naturalists of our time has insisted on the opposition between two orders of phenomena observed in living tissues: *anagenesis* on one side and *catagenesis* on the other. The role of anagenetic energies is to raise lower energies to their own level through the assimilation of inorganic substances. They build the tissues. The very functioning of life, on the contrary (with the exception, however, of assimilation, growth and reproduction), is of the catagenetic order: a descent of energy and no longer an ascent. Physicochemistry would have a hold only on these catagenetic facts—that is, in short, on what is dead and not on what is living[23]. And it is certain that facts of the first kind appear resistant to physicochemical [38] analysis, even if they are not, in the strict sense of the word, anagenetic. As for the artificial imitation of the outward appearance of protoplasm, should any real theoretical importance be attached to it, when the physical configuration of this substance has not yet been settled? Still less can there be any question, for the moment, of recomposing it chemically. Finally, a physicochemical explanation of the movements of the amoeba, and all the more of the behavior of an infusorian, seems impossible to many of those who have closely observed these rudimentary organisms. Even in these humblest manifestations of life they perceive the trace of an effective psychological activity[24]. But what is most

23 BERGSON'S NOTE. Cope, *The primary factors of organic evolution*, Chicago, 1896, pp. 475–484.

24 BERGSON'S NOTE. Maupas, *Étude des Infusoires ciliés* (*Arch. de zoologie expérimentale*, 1883), pp. 47, 491, 518, 549 in particular.—P. Vignon, *Recherches de cytologie générale sur les épithéliums*, Paris, 1902, p. 655.—A thorough study of the movements of the infusorian, and a very penetrating critique of the idea of tropism, has recently been made by Jennings (*Contributions to the study of the behavior of lower organisms*, Washington, 1904). The "type of behavior" of these lower organisms, as Jennings defines it (pp. 237–202), is unquestionably psychological in character.

instructive of all is to see how often the thorough study of histological phenomena discourages, instead of strengthening, the tendency to explain everything by physics and chemistry. Such is the conclusion of the truly admirable book that the histologist E. B. Wilson devoted to the development of the cell: "The study of the cell has on the whole seemed to widen rather than to narrow the enormous gap that separates even the lowest forms of life from the inorganic world.[25]"

In short, those who concern themselves only with the functional activity of the living being are inclined to believe [39] that physics and chemistry will give us the key to biological processes[26]. They deal chiefly, in fact, with phenomena that are endlessly *repeated* in the living being, as in a retort. This partly explains the mechanistic tendencies of physiology. By contrast, those whose attention is focused on the fine structure of living tissues, on their genesis and evolution—histologists and embryologists on the one hand, naturalists on the other—are confronted with the retort itself, and no longer merely with its contents. They find that this retort creates its own form through a *unique* series of acts constituting a true history. These, whether histologists, embryologists or naturalists, are far from believing as readily as the physiologists in the physicochemical character of vital actions.

To tell the truth, neither of the two theses—neither the one that affirms nor the one that denies the possibility of ever producing an elementary organism chemically—can invoke the authority of experience. Both are unverifiable: the first because science has not yet taken a single step toward the chemical synthesis of a living substance, the second because there is no conceivable means of proving experimentally that a fact is impossible. But we have set out the theoretical reasons that prevent us from likening the living being, a system closed off by

25 BERGSON'S NOTE. "The study of the cell has on the whole seemed to widen rather than to narrow the enormous gap that separates even the lowest forms of life from the inorganic world." (E. B. Wilson, *The cell in development and inheritance*, New York, 1807, p. 330.)

26 BERGSON'S NOTE. Dastre, *La vie et la mort*, p. 43.

nature, to the systems our science isolates. These reasons carry less weight, we admit, in the case of a rudimentary organism like the amoeba, which hardly evolves at all. But they gain in force when we consider a more complex organism, one that goes through a regular cycle of transformations. The more [40] duration marks the living being with its imprint, the more obviously the organism differs from a mere mechanism, over which duration glides without penetrating it. And the demonstration attains its greatest force when it bears on the whole evolution of life, from its humblest origins to its highest present forms, inasmuch as this evolution, through the unity and continuity of the animated matter that sustains it, constitutes one single indivisible history. That is why we do not understand how the evolutionist hypothesis can generally be regarded as akin to the mechanistic conception of life. We do not claim, of course, to offer a mathematical and definitive refutation of this mechanistic conception. But the refutation we draw from considerations of duration—which is, in our view, the only possible refutation—becomes all the more rigorous and all the more convincing the more frankly we adopt the evolutionist hypothesis. We must insist on this point. But first let us indicate more clearly the conception of life toward which we are heading.

AGAINST RADICAL MECHANISM

Mechanism assumes that all is given and makes time useless; experience of duration refutes it.

Mechanistic explanations, we said, are valid for the systems that our thought artificially detaches from the whole. But of the whole itself, and of the systems that form naturally within it in its image, we cannot admit *a priori* that they are mechanically explicable, for then time would be useless, and even unreal. The essence of mechanical explanations, in fact, is to regard the future and the past as calculable functions of the present, and thus to claim that *all is given*. On this hypothesis, past, present and future would be visible at a single glance to a superhuman

intellect capable of carrying out the calculation. So the scientists who have believed in the universality [41] and perfect objectivity of mechanical explanations have made, consciously or unconsciously, a hypothesis of this kind. Laplace was already formulating it with the greatest precision: "An intellect which, at a given instant, knew all the forces by which nature is animated and the respective situation of the beings that compose it, and which was, moreover, vast enough to submit these data to Analysis, would embrace in the same formula the movements of the greatest bodies in the universe and those of the lightest atom: nothing would be uncertain for it, and the future, like the past, would be present to its eyes.[27]" And Du Bois-Reymond: "We can imagine the knowledge of nature reaching a point where the universal process of the world would be represented by a single mathematical formula, by one immense system of simultaneous differential equations, from which could be derived, for each moment, the position, direction and velocity of every atom in the world.[28]"[29] Huxley, for his part, expressed the same idea in a more concrete form: "If the fundamental proposition of evolution is true, namely that the entire world, animate and inanimate, is the result of the mutual interaction, according to definite laws, of the forces possessed by the molecules of which the primitive nebulosity of the universe was composed, then it is no less certain that the present world lay potentially in the cosmic vapor, and that a sufficient intellect, knowing the properties of the molecules of that vapor, could have predicted, for example, the state of the fauna of Great Britain in 1868, with as much certainty as [42] when one says what will happen to the vapor of the breath on a cold winter's day.[30] "—In such a doctrine one still speaks of time, one pronounces the word, but one hardly thinks

27 BERGSON'S NOTE. Laplace, *Introduction à la théorie analytique des probabilités* (*Œuvres complètes*, vol. VII, Paris, 1886, p. VI).

28 BERGSON'S NOTE. Du Bois-Reymond, *Ueber die Grenzen des Naturerkennens* [On the Limits of Our Knowledge of Nature], Leipzig, 1892.

29 Emil du Bois-Reymond (1818–1896), German physiologist.

30 Thomas Henry Huxley (1825–1895), English biologist and leading defender of Darwin's theory.

of the thing. For time is here deprived of efficacy, and, since it does nothing, it is nothing. Radical mechanism implies a metaphysics in which the totality of the real is posited all at once, in eternity, and in which the apparent duration of things merely expresses the infirmity of a mind that cannot know everything at once. But duration is something quite different from this for our consciousness, that is, for what is most indisputable in our experience. We perceive duration as a stream that we could never go back up. It is the very ground of our being and, as we clearly feel, the very substance of the things with which we are in communication. In vain is the prospect of a universal mathematics dangled before our eyes; we cannot sacrifice experience to the demands of a system. That is why we reject radical mechanism.

AGAINST RADICAL FINALISM

Finalism is mechanism in reverse, and shrinking it to individual organisms does not rescue it.

But radical finalism seems to us just as unacceptable, and for the same reason. The doctrine of finality in its extreme form, as we find it in Leibniz for example, implies that things and beings merely carry out a program laid down once and for all. But if there is nothing unforeseen, no invention or creation in the universe, time again becomes useless. As in the mechanistic hypothesis, it is again assumed here that *all is given*. Finalism thus understood is only mechanism in reverse.[31] It draws on the same postulate, with this sole difference: as our finite intellects run their course along the wholly apparent succession of things, it sets the light with [43] which it claims to guide us in front of us instead of behind. It substitutes the attraction of the future for the impulsion of the past. But succession remains no less a mere appearance, as indeed does the course itself. In Leibniz's doctrine, time is reduced to a confused perception, relative to the

31 Gottfried Wilhelm Leibniz (1646–1716), German philosopher, held that the world unfolds according to a harmony pre-established by God.

human point of view, which would vanish, like a fog that falls away, for a mind placed at the center of things.

Finalism, however, is not, like mechanism, a doctrine with fixed outlines. It admits of as many inflections as one cares to give it. Mechanistic philosophy is to be taken or left: it would have to be left if the tiniest speck of dust, by deviating from the path foreseen by mechanics, showed the slightest trace of spontaneity. The doctrine of final causes, on the contrary, will never be definitively refuted. If one form of it is set aside, it will take on another. Its principle, which is psychological in essence, is very supple. It is so extensible, and therefore so broad, that one accepts something of it as soon as one rejects pure mechanism. The thesis we shall set out in this book will therefore necessarily partake of finalism to a certain extent. That is why it is important to indicate precisely what we are going to take from it, and what we intend to leave.

Let us say at once that it seems to us a wrong turn to soften Leibnizian finalism by breaking it up into infinitely many pieces. Yet such is the direction the doctrine of finality has taken. It is clearly felt that if the universe as a whole is the realization of a plan, this cannot be shown empirically. It is also clearly felt that, even if we confine ourselves to the organized world, it is hardly easier to prove that everything there is [44] harmony. The facts, if questioned, would just as well say the opposite. Nature pits living beings against one another. Everywhere it shows us disorder alongside order, regression alongside progress. But might not what can be affirmed neither of matter as a whole nor of life as a whole be true of each organism taken separately? Do we not observe in it an admirable division of labor, a marvelous solidarity among the parts, perfect order amid infinite complexity? In this sense, does not each living being carry out a plan immanent in its substance? This thesis amounts, at bottom, to breaking the ancient conception of finality into pieces. People do not accept—indeed they readily ridicule—the idea of an *external* finality, by virtue of which living beings would be coordinated with one another: it is absurd, they say, to

suppose that grass was made for the cow, the lamb for the wolf. But there is an *internal* finality: each being is made for itself, all its parts work in concert for the greatest good of the whole and organize themselves intelligently with this end in view. Such is the conception of finality that was long the classic one. Finalism has shrunk to the point of never embracing more than one living being at a time. By making itself smaller, it no doubt thought it would offer less surface to attack.

The truth is that it laid itself far more open to it. However radical our own thesis may seem, finality is external or it is nothing at all.

Consider, indeed, the most complex and most harmonious organism. All the elements, we are told, conspire for the greatest good of the whole. Granted—but let us not forget that each of the elements may itself, in certain cases, be an organism, and that in [45] subordinating the existence of this little organism to the life of the large one, we accept the principle of an external finality. The conception of a finality that is always internal thus destroys itself. An organism is composed of tissues, each of which lives on its own account. The cells of which the tissues are made also have a certain independence. Strictly speaking, if the subordination of all the individual's elements to the individual itself were complete, one could refuse to see organisms in them, reserve that name for the individual, and speak only of internal finality. But everyone knows that these elements can possess a genuine autonomy. Not to mention the phagocytes, which push their independence so far as to attack the organism that nourishes them, nor the germ cells, which have their own life alongside the somatic cells, it is enough to mention the facts of regeneration. Here an element or a group of elements suddenly shows that, although in normal times it submitted to occupying only a small place and performing only a special function, it could do much more—it could even, in certain cases, regard itself as the equivalent of the whole.

Here lies the stumbling block of vitalist theories. We shall not reproach them, as is usually done, with answering the question

by the question itself. No doubt the "vital principle" does not explain much; at least it has the advantage of being a kind of signboard set up over our ignorance, one that may remind us of it on occasion[32], whereas mechanism [46] invites us to forget it. But the truth is that the position of vitalism is made very difficult by the fact that there is in nature neither purely internal finality nor absolutely clear-cut individuality. The organized elements that enter into the composition of the individual themselves have a certain individuality, and each will claim its own vital principle if the individual is to have one. But, on the other hand, the individual itself is not independent enough, not isolated enough from the rest, for us to grant it a "vital principle" of its own. An organism such as that of a higher vertebrate is the most individuated of all organisms. Yet consider that it is only the development of an ovum that was part of its mother's body and of a spermatozoon that belonged to its father's body, and that the egg (that is, the fertilized ovum) is a true connecting link between the two progenitors, since it is common to both their substances. We then realize that every individual organism, even that of a human being, is a mere bud that has sprouted on the combined body of its two parents. Where, then, does the individual's vital principle begin, and where does it end? Step by step, we shall go back to its most distant ancestors; we shall find

32 BERGSON'S NOTE. There are in fact two parts to be distinguished in contemporary neo-vitalism: on the one hand, the assertion that pure mechanism is insufficient—an assertion that carries great authority when it comes from a scientist such as Driesch or Reinke, for example—and on the other, the hypotheses that this vitalism superimposes on mechanism (Driesch's "entelechies," Reinke's "dominants," etc.). Of these two parts, the first is unquestionably the more interesting. See the fine studies by Driesch (*Die Lokalisation morphogenetischer Vorgänge* [The Localization of Morphogenetic Processes], Leipzig, 1899; *Die organischen Regulationen* [Organic Regulations], Leipzig, 1901; *Naturbegriffe und Natururteile* [Concepts and Judgments of Nature], Leipzig, 1904; *Der Vitalismus als Geschichte und als Lehre* [Vitalism as History and as Doctrine], Leipzig, 1905) and by Reinke (*Die Welt als That* [The World as Deed], Berlin, 1899; *Einleitung in die theoretische Biologie* [Introduction to Theoretical Biology], Berlin, 1901; *Philosophie der Botanik* [Philosophy of Botany], Leipzig, 1905).

TRANSLATOR'S NOTE. Hans Driesch (1867–1941) and Johannes Reinke (1849–1931), German biologists.

it bound up with each of them, bound up with that little mass of protoplasmic jelly which no doubt lies at the root of the genealogical tree of life. Being, to a certain extent, of one body with this primitive ancestor, it is equally bound up with everything [47] that has branched off from it by divergent descent: in this sense it can be said to remain united to the totality of living beings by invisible ties. It is therefore in vain that one tries to narrow finality down to the individuality of the living being. If there is finality in the world of life, it embraces the whole of life in a single indivisible embrace. This life common to all living beings undoubtedly presents many incoherences and many gaps; and, on the other hand, it is not so mathematically one that it cannot let each living being become individualized to a certain extent. It nonetheless forms a single whole; and we must choose between the outright denial of finality and the hypothesis that coordinates not only the parts of an organism with the organism itself, but also each living being with the totality of the others.

It is not by pulverizing finality that one will make it easier to accept. Either the hypothesis of a finality immanent in life must be rejected wholesale, or it must be modified, we believe, in a quite different direction.

TWO HABITS OF AN INTELLECT MADE FOR ACTION

Mechanism and finalism both come from an intellect shaped to make things and repeat.

The error of radical finalism, as indeed of radical mechanism, is to extend too far the application of certain concepts natural to our intellect. Originally, we think only in order to act. It is in the mold of action that our intellect was cast. Speculation is a luxury, whereas action is a necessity. Now, in order to act, we begin by setting ourselves a goal; we make a plan, then move on to the details of the mechanism that will carry it out. This last operation is possible only if we know what we can count on. We must have extracted from nature [48] similarities that allow us to anticipate the future. We must therefore have applied, consciously

or unconsciously, the law of causality. Moreover, the more clearly the idea of efficient causality takes shape in our mind, the more efficient causality takes the form of mechanical causality. This latter relation, in turn, is all the more mathematical the more rigorous the necessity it expresses. That is why we have only to follow the natural slope of our mind to become mathematicians. But, on the other hand, this natural mathematics is only the unconscious support of our conscious habit of linking the same causes to the same effects. And this habit itself ordinarily serves to guide actions inspired by intentions, or, what comes to the same thing, to direct movements combined with a view to carrying out a model: we are born artisans as we are born geometers, and indeed we are geometers only because we are artisans. Thus the human intellect, insofar as it has been shaped to the demands of human action, is an intellect that proceeds at once by intention and by calculation, by the coordination of means to an end and by the representation of mechanisms of increasingly geometrical form. Whether we picture nature as an immense machine governed by mathematical laws or see in it the realization of a plan, in both cases we are only following to the end two tendencies of the mind that are complementary to each other and that have their origin in the same vital necessities.

That is why radical finalism is very close to radical mechanism on most points. Both doctrines are reluctant to see in the course of things, or even simply in the [49] development of life, an unforeseeable creation of form. Mechanism considers only the aspect of reality that is similarity or repetition. It is therefore dominated by the law that there is in nature only the same reproducing the same. The more clearly the geometry it contains comes to light, the less it can admit that anything is created, even if only form. Insofar as we are geometers, then, we reject the unforeseeable. We might accept it, certainly, insofar as we are artists, for art lives on creation and implies a latent belief in the spontaneity of nature. But disinterested art is a luxury, like pure speculation. Long before being artists, we are artisans.

And all manufacture, however rudimentary, lives on similarities and repetitions, like the natural geometry that serves as its fulcrum. It works on models that it sets out to reproduce. And when it invents, it proceeds, or imagines it proceeds, by a new arrangement of known elements. Its principle is that "the same is needed to obtain the same." In short, the rigorous application of the principle of finality, like that of the principle of mechanical causality, leads to the conclusion that "all is given." The two principles say the same thing in their two languages, because they answer the same need.

That is why they also agree in making a clean sweep of time. Real duration is the duration that bites into things and leaves on them the mark of its tooth. If everything is in time, everything changes inwardly, and the same concrete reality never repeats itself. Repetition is therefore possible only in the abstract: what repeats is this or that aspect that our senses, and above all our intellect, have detached from reality—precisely because our action, on [50] which the whole effort of our intellect is bent, can move only among repetitions. Thus, concentrated on what repeats, solely concerned with welding the same to the same, the intellect turns away from the vision of time. It is averse to what flows, and solidifies everything it touches. We do not *think* real time. But we live it, because life overflows the intellect. The feeling we have of our own evolution and of the evolution of all things in pure duration is there, tracing around the intellectual representation proper an indistinct fringe that fades off into darkness. Mechanism and finalism agree in taking account only of the luminous nucleus shining at the center. They forget that this nucleus was formed at the expense of the rest by condensation, and that everything would have to be used, the fluid as much as the condensed and more, to recapture the inner movement of life.

Indeed, if the fringe exists, however indistinct and blurred, it must be of even greater importance to the philosopher than the luminous nucleus it surrounds. For it is its presence that allows us to affirm that the nucleus is a nucleus, that pure intellect is a

narrowing, by condensation, of a vaster power. And precisely because this vague intuition is of no help to us in directing our action on things—an action entirely localized at the surface of the real—we may presume that it is exercised no longer merely on the surface, but in depth.

As soon as we step outside the frames in which mechanism and radical finalism confine our thought, reality appears to us as an uninterrupted upsurge of novelties, each of which has no sooner sprung forth to make the present than it has already fallen back into the past. At that [51] precise instant it comes under the gaze of the intellect, whose eyes are eternally turned backward. Such is already the case with our inner life. For each of our acts we shall easily find antecedents of which it would be, in a sense, the mechanical resultant. And one may equally say that each action is the fulfillment of an intention. In this sense mechanism is everywhere, and finality everywhere, in the evolution of our conduct. But if the action involves our whole person to any extent, and is truly ours, it could not have been foreseen, even though its antecedents explain it once it has been accomplished. And, while realizing an intention, it—a present and new reality—differs from the intention, which could only be a plan for beginning the past over again or rearranging it. Mechanism and finalism are therefore, here, only external views taken of our conduct. They extract its intellectuality from it. But our conduct slips between the two and extends much further. This does not mean, once again, that free action is capricious, unreasonable action. To act from caprice is to oscillate mechanically between two or more *ready-made* alternatives and yet finally to settle on one of them. It is not to have matured an inner situation, it is not to have evolved; it is, however paradoxical this assertion may seem, to have bent the will to imitate the mechanism of the intellect. Conduct that is truly ours, on the contrary, is that of a will which does not try to counterfeit the intellect and which, remaining itself—that is, evolving—arrives by gradual ripening at acts that the intellect can resolve indefinitely into intelligible elements without ever quite succeeding.

The free act is incommensurable with the idea, and its "rationality" must be defined by this very [52] incommensurability, which allows us to find in it as much intelligibility as we like. Such is the character of our inner evolution. And such too, no doubt, is the character of the evolution of life.

Our reason, incurably presumptuous, imagines that it possesses, by right of birth or by right of conquest, innate or learned, all the essential elements for knowing the truth. Even where it admits that it does not know the object presented to it, it believes that its ignorance bears only on which of its old categories suits the new object. Into what drawer, ready to open, shall we put it? In what garment, already cut, shall we dress it? Is it this, or that, or something else? And "this" and "that" and "something else" are always, for us, the already conceived, the already known. The idea that we might have to create from scratch, for a new object, a new concept, perhaps a new method of thinking, is deeply repugnant to us. Yet the history of philosophy is there to show us the eternal conflict of systems, the impossibility of fitting reality once and for all into those ready-to-wear garments that are our ready-made concepts, the necessity of working to measure. Rather than go to that extreme, our reason prefers to announce once and for all, with a proud modesty, that it will know only the relative and that the absolute is outside its province. This preliminary declaration allows it to apply its habitual method of thinking without scruple and, on the pretext that it does not touch the absolute, to pass absolute judgment on all things. Plato was the first to set up as a theory that to know the real consists in finding its Idea, that is, in fitting it into a preexisting frame that is already at our [53] disposal—as if we implicitly possessed universal knowledge. But this belief is natural to the human intellect, always concerned to know under which old heading it will catalog any new object; and one could say, in a certain sense, that we are all born Platonists.

Nowhere is the impotence of this method displayed so plainly as in theories of life. If, in evolving in the direction of the vertebrates in general, and of humankind and the intellect in particu-

lar, Life had to abandon along the way many elements incompatible with this particular mode of organization and entrust them, as we shall show, to other lines of development, then it is the totality of these elements that we must seek out and fuse with the intellect proper, in order to recapture the true nature of vital activity. We shall doubtless be helped in this, moreover, by the fringe of confused representation that surrounds our distinct—I mean intellectual—representation. For what can this useless fringe be, if not the part of the evolving principle that did not shrink to the special form of our organization and slipped through as contraband? It is there, then, that we must look for indications for expanding the intellectual form of our thought; it is from there that we shall draw the impetus needed to raise ourselves above ourselves. To represent the whole of life cannot consist in combining simple ideas deposited in us by life itself in the course of its evolution. How could the part be equivalent to the whole, the content to the container, a residue of the vital operation to the operation itself? Yet such is our illusion when we define the evolution of life as "the passage from the homogeneous to the heterogeneous," or by any other [54] concept obtained by putting together fragments of the intellect.[33] We place ourselves at one of the end points of evolution—the principal one, no doubt, but not the only one. And even at that point we do not take all that is found there, for we retain of the intellect only one or two of the concepts in which it expresses itself. And it is this part of a part that we declare representative of the whole—and even of something that goes beyond the consolidated whole, I mean of the evolutionary movement of which this "whole" is only the present phase! The truth is that it would not be too much—indeed it would not be enough—here to take the entire intellect. We would also have to set beside it what we find at each of the other terminal points of evolution. And we would have to regard these diverse and divergent elements as so many extracts which are, or at least once were, in their humblest

33 "The passage from the homogeneous to the heterogeneous" is Herbert Spencer's formula for evolution.

form, complementary to one another. Only then would we have an inkling of the real nature of the evolutionary movement—and even then we would only have an inkling of it, for we would still be dealing only with the evolved, which is a result, and not with evolution itself, that is, with the act by which the result is obtained.

A FINALISM LOOKING BACKWARD

Bergson's view keeps something of finalism but places harmony at the origin, not the goal.

Such is the philosophy of life toward which we are making our way. It claims to go beyond both mechanism and finalism; but, as we announced at the outset, it comes closer to the second doctrine than to the first. It will not be useless to dwell on this point, and to show in more precise terms where it resembles finalism and where it differs from it.

Like radical finalism, though in a vaguer form, it will present the organized world to us as a harmonious whole. But this harmony is far from being as perfect as has been claimed. It admits [55] many discords, because each species, even each individual, retains from the overall impulse of life only a certain impetus, and tends to use this energy in its own interest; that is what *adaptation* consists in. Species and individual thus think only of themselves—whence a possible conflict with the other forms of life. Harmony, therefore, does not exist in fact; it exists rather in principle. I mean that the original vital impetus is a common impetus, and that the further back we go, the more the various tendencies appear complementary to one another. So the wind that rushes into a crossroads divides into diverging currents of air, which are all one and the same breath. Harmony, or rather "complementarity," reveals itself only broadly, in tendencies rather than in states. Above all (and this is the point on which finalism has been most seriously mistaken), harmony would be found behind rather than ahead. It is due to an identity of

impulse, and not to a common aspiration.[34] It is in vain that one would assign life a goal, in the human sense of the word. To speak of a goal is to think of a preexisting model that has only to be realized. It is thus to suppose, at bottom, that everything is given, that the future could be read in the present. It is to believe that life, in its movement and in its entirety, proceeds like our intellect, which is only a motionless and fragmentary view taken of it, and which always naturally places itself outside time. Life, for its part, progresses and endures. No doubt one can always, glancing back over the road once traveled, mark its direction, note it in psychological terms and speak as if a goal had been pursued. That is how we ourselves shall speak. But of the road that was yet to be traveled the human mind has nothing to say, [56] for the road was created as the act that traveled it went along, being nothing but the direction of that act itself. Evolution must therefore admit, at every moment, a psychological interpretation which is, from our point of view, the best explanation of it; but this explanation has value, and even meaning, only retrospectively. Never must the finalist interpretation, such as we shall propose it, be taken for an anticipation of the future. It is a certain vision of the past in the light of the present. In short, the classical conception of finality postulates at once too much and too little. It is too broad and too narrow. In explaining life by the intellect, it narrows the meaning of life excessively. The intellect, at least as we find it in ourselves, has been shaped by evolution along the way; it is cut out of something vaster, or rather it is only the necessarily flat projection of a reality that has relief and depth. It is this more comprehensive reality that true finalism ought to reconstitute, or rather to embrace, if possible, in a simple vision. But, on the other hand, precisely because it overflows the intellect—the faculty of linking same to same, of perceiving and also of producing repetitions—this reality is doubtless creative, that is, productive of effects in which it expands and surpasses itself. These effects,

34 Vital impetus renders Bergson's *élan originel*, later *élan vital*; the French *élan vital* is often kept in English.

then, were not given in it beforehand, and consequently it could not take them as ends, even though, once produced, they admit a rational interpretation, like that of the manufactured object which has realized a model. In short, the theory of final causes does not go far enough when it confines itself to putting intellect into nature, and it goes too far when it supposes that the future preexists in the present in the form of an idea. The second thesis, which [57] errs by excess, is moreover the consequence of the first, which errs by defect. For the intellect properly so called we must substitute the more comprehensive reality of which the intellect is only the narrowing. The future then appears as expanding the present. It was therefore not contained in the present in the form of a represented end. And yet, once realized, it will explain the present as much as the present explained it, and even more; it must be regarded as an end as much as, and more than, a result. Our intellect has the right to consider it abstractly from its habitual point of view, since the intellect is itself an abstraction performed upon the cause from which the future issues.

It is true that the cause then seems impossible to grasp. Already the finalist theory of life escapes all precise verification. What will become of it, people will say, if we go further than it in one of its directions? Here we are back, in fact, after a necessary digression, at the question we hold to be essential: can the inadequacy of mechanism be proved by the facts? We announced that, if this demonstration is possible, it is on condition that we place ourselves squarely within the evolutionist hypothesis. The moment has come to establish that, if mechanism is not enough to account for evolution, the way to prove this inadequacy is not to stop at the classical conception of finality, still less to narrow or weaken it, but on the contrary to go further than it.

THE TEST CASE: IDENTICAL ORGANS ON DIVERGENT LINES

If similar complex organs arise on separate lines of evolution, mechanism is refuted.

Let us indicate at once the principle of our demonstration. We said that life, from its origins, is the continuation of one and the same impetus, which has divided itself among divergent lines of evolution. Something has grown, something has developed through a series of additions [58] which have been so many creations. It is this very development that has caused tendencies to dissociate, tendencies which could not grow beyond a certain point without becoming incompatible with one another. Strictly speaking, nothing would prevent us from imagining a single individual in whom, through transformations spread over thousands of centuries, the evolution of life had taken place. Or again, failing a single individual, one could suppose a plurality of individuals succeeding one another in a single-line series. In both cases evolution would have had, if one may put it so, only one dimension. But evolution has in reality taken place through millions of individuals on divergent lines, each of which itself led to a crossroads from which new paths radiated, and so on indefinitely. If our hypothesis is well founded, if the essential causes at work along these various paths are psychological in nature, they must retain something in common despite the divergence of their effects, as comrades long separated keep the same childhood memories. Bifurcations may well have occurred, side paths may have opened in which the dissociated elements unfolded independently; it is nonetheless through the original impetus of the whole that the movement of the parts continues. Something of the whole must therefore persist in the parts. And this common element may become perceptible to the eye in a certain way, perhaps through the presence of identical organs in very different organisms. Let us suppose, for a moment, that mechanism is the truth. Evolution will then have come about through a series of accidents added one to another,

each new accident being preserved by selection if it is advantageous to that sum of earlier advantageous accidents which the [59] present form of the living being represents. What chance will there be that, through two entirely different series of accumulating accidents, two entirely different evolutions will arrive at similar results? The more two lines of evolution diverge, the less likely it will be that accidental external influences or accidental internal variations have determined on them the construction of identical apparatus, especially if there was no trace of this apparatus at the moment the bifurcation occurred. Such similarity would, on the contrary, be natural on a hypothesis like ours: one should find, even in the last little streams, something of the impulse received at the source. *Pure mechanism would therefore be refutable, and finality, in the special sense in which we understand it, demonstrable from a certain side, if it could be established that life manufactures certain identical apparatus, by dissimilar means, on divergent lines of evolution. The force of the proof would, moreover, be proportional to the degree of separation of the lines of evolution chosen, and to the degree of complexity of the similar structures found on them.*

It will be alleged that the similarity of structure is due to the identity of the general conditions in which life has evolved. These lasting external conditions, it will be said, have impressed the same direction on the forces constructing this or that apparatus, despite the diversity of passing external influences and of accidental internal variations.—We are not unaware, indeed, of the role the concept of *adaptation* plays in contemporary science. Certainly biologists do not all make the same use of it. For some, external conditions are capable of directly causing organisms to vary in a definite direction, through the physicochemical modifications they bring about [60] in the living substance: such is the hypothesis of Eimer, for example.[35] For others, more faithful to the spirit of Darwinism, the influence of conditions operates only indirectly, by favoring, in the struggle for life,

35 Theodor Eimer (1843–1898), German zoologist, defended "orthogenesis," evolution along definite lines directly caused by external conditions.

those representatives of a species whom the chance of birth has better adapted to their surroundings. In other words, some attribute to external conditions a positive influence and others a negative action: on the first hypothesis this cause would give rise to variations, on the second it would merely eliminate them. But in both cases it is supposed to bring about a precise adjustment of the organism to its conditions of existence. By this common adaptation people will no doubt try to explain mechanically the similarities of structure from which, we believe, the most formidable argument against mechanism could be drawn. That is why we must indicate at once, in broad outline, before going into detail, why the explanations one might draw here from "adaptation" seem to us inadequate.

Let us note first that, of the two hypotheses we have just formulated, the second is the only one that is free of ambiguity. The Darwinian idea of an adaptation brought about by the automatic elimination of the unadapted is a simple and clear idea. On the other hand—and precisely because it attributes an entirely negative influence to the external cause that directs evolution—it already has great difficulty accounting for the progressive and rectilinear development of complex apparatus such as those we are about to examine. What will happen when it tries to explain the identity of structure of extraordinarily complicated organs on divergent lines of evolution? An accidental variation, however slight, implies the action of a host of small physical and chemical causes. [61] An accumulation of accidental variations, such as is needed to produce a complicated structure, requires the concurrence of an infinite number, so to speak, of infinitesimal causes. How could these causes, all accidental, reappear the same, and in the same order, at different points of space and time? No one will maintain this, and the Darwinian himself will no doubt confine himself to saying that identical effects can arise from different causes, that more than one road leads to the same place. But let us not be taken in by a metaphor. The place one arrives at does not trace the shape of the road taken to get there, whereas an organic structure is the

very accumulation of the small differences that evolution had to pass through in order to reach it. The struggle for life and natural selection can be of no help to us in solving this part of the problem, for we are not concerned here with what has disappeared; we are simply looking at what has been preserved. Now, we see that on independent lines of evolution identical structures have taken shape through a gradual accumulation of effects added one to another. How can we suppose that accidental causes, presenting themselves in an accidental order, have more than once arrived at the same result, when the causes are infinitely numerous and the effect infinitely complicated?

The principle of mechanism is that "the same causes produce the same effects." This principle does not always imply, it is true, that the same effects have the same causes; yet it does entail this consequence in the particular case where the causes remain visible in the effect they produce and are its constituent elements. That two walkers setting out from different points and wandering [62] through the countryside as the fancy takes them should end up meeting is nothing out of the ordinary. But that, as they go, they should trace identical curves, exactly superimposable one upon the other, is altogether improbable. The improbability will, moreover, be all the greater the more complicated the turns of the paths each of them has taken. And it will become an impossibility if the zigzags of the two walkers are infinitely complex. Now, what is this complication of zigzags beside that of an organ in which thousands of different cells, each of them a kind of organism, are arranged in a certain order?

Let us pass, then, to the second hypothesis, and see how it would solve the problem. Adaptation will no longer consist simply in the elimination of the unadapted. It will be due to the positive influence of external conditions, which will have molded the organism on their own form. This time the similarity of the effects will indeed be explained by the similarity of the cause. We shall, to all appearances, be in pure mechanism. But let us look more closely. We shall see that the explanation is

entirely verbal, that we are again taken in by words, and that the trick of the solution lies in taking the term "adaptation" in two quite different senses at the same time.

If I pour water and wine in turn into the same glass, the two liquids will take the same form in it, and the similarity of form will be due to the identical adaptation of content to container. Adaptation then does mean mechanical insertion. This is because the form to which the matter adapts itself was already there, ready-made, and has imposed its own configuration on the matter. But when one speaks of the adaptation of an organism to the conditions in which it must live, where is the preexisting form [63] awaiting its matter? The conditions are not a mold into which life will fit and from which it will receive its form: when one reasons so, one is taken in by a metaphor. There is as yet no form, and it will be up to life to create for itself a form suited to the conditions it is given. It will have to turn these conditions to account, neutralize their drawbacks and use their advantages—in short, respond to external actions by constructing a machine that bears no resemblance to them. To adapt will no longer mean here to *repeat*, but to *reply*, which is quite different. If there is still adaptation, it will be in the sense in which one could say of the solution to a geometry problem, for instance, that it adapts itself to the conditions set out in the problem. I grant that adaptation understood in this way explains why different evolutionary processes arrive at similar forms; the same problem does indeed call for the same solution. But one will then have to bring in, as for the solution of a geometry problem, an intelligent activity, or at least a cause that behaves in the same way. It is finality that will be reintroduced—and a finality far too laden, this time, with anthropomorphic elements. In a word, if the adaptation in question is passive, a mere repetition in relief of what the conditions provide in hollow, it will build nothing of what one wants it to build; and if it is declared active, capable of answering with a calculated solution the problem the conditions set, one goes further than we do—too far, even, in our view—in the direction we indicated at the

outset. But the truth is that people pass surreptitiously from one of these two senses to the other, and take refuge in the first whenever they are about to be caught red-handed in finalism in their use of the second. It is [64] the second that really serves the everyday practice of science, but it is the first that most often supplies it with its philosophy. In each particular case people speak as if the process of adaptation were an effort by the organism to build a machine capable of making the best possible use of external conditions; then they speak of adaptation in general as if it were the very imprint of circumstances, passively received by an indifferent matter.

But let us come to the examples. It would be interesting, first, to draw here a general comparison between plants and animals. How can one fail to be struck by the parallel progress achieved on both sides in the direction of sexuality? Not only is fertilization itself identical in the higher plants and in the animal—since in both it consists in the union of two half-nuclei which differed in their properties and structure before coming together and which become, immediately afterward, equivalent to each other—but the preparation of the sexual elements proceeds on both sides under similar conditions: it consists essentially in the reduction of the number of chromosomes and the rejection of a certain quantity of chromatic substance[36]. Yet plants and animals have evolved on independent lines, favored by dissimilar circumstances, thwarted by different obstacles. Here are two great series that have gone on diverging. Along each of them, thousands upon thousands of causes have combined to determine morphological and functional evolution. And yet these [65] infinitely complicated causes have added up, on both sides, to one and the same effect. Of this effect, moreover, one will hardly dare say that it is a phenomenon of "adaptation." How can one speak of adaptation, how can one appeal to the pressure of external circumstances, when the very utility of sexual genera-

36 BERGSON'S NOTE. P. Guérin, *Les connaissances actuelles sur la fécondation chez les Phanérogames*, Paris, 1904, pp. 144–148. Cf. Delage, *L'Hérédité*, 2nd edition, 1903, pp. 140 ff.

tion is not apparent, when it has been interpreted in the most diverse ways, and when excellent minds see in the sexuality of the plant, at least, a luxury that nature could have done without[37]? But we do not wish to dwell on such controversial facts. The ambiguity of the term "adaptation," and the necessity of going beyond both the standpoint of mechanical causality and that of anthropomorphic finality, will appear more clearly from simpler examples. At all times the doctrine of finality has made use of the marvelous structure of the sense organs to liken the work of nature to that of an intelligent workman. Since, moreover, these organs are found in a rudimentary state in the lower animals, since nature offers us every intermediate stage between the pigment spot of the simplest organisms and the infinitely complicated eye of the vertebrates, one can just as well bring in here the purely mechanical play of natural selection bringing about increasing perfection. Finally, if there is one case in which we seem entitled to invoke adaptation, it is this one. For on the role and meaning of sexual generation, and on the relation linking it to the conditions in which it takes place, there is room for debate; but the relation of the eye to light is manifest, and when one speaks of adaptation here, one must know what one means. If, [66] then, we could show in this privileged case the inadequacy of the principles invoked on both sides, our demonstration would at once have attained a fairly high degree of generality.

THE EYE OF THE VERTEBRATE AND THE SCALLOP

Two lines that separated early have produced eyes of strikingly similar structure.

Let us consider the example on which the advocates of finality have always insisted: the structure of an eye such as the human eye. They have had no trouble showing that in this highly com-

37 BERGSON'S NOTE. Möbius, *Beiträge zur Lehre von der Fortpflanzung der Gewächse*, Jena, 1897, pp. 203–206 in particular.—Cf. Hartog, *Sur les phénomènes de reproduction* (*Année biologique*, 1895, pp. 707–709).

plicated apparatus all the elements are marvelously coordinated with one another. For vision to take place, says the author of a well-known book on "Final Causes," "the sclerotic must become transparent at one point of its surface, so as to allow the light rays to pass through it...; the cornea must correspond precisely to the very opening of the orbit of the eye...; behind this transparent opening there must be converging media...; at the far end of the dark chamber there must be the retina...[38]; there must be, perpendicular to the retina, a countless number of transparent cones which let only the light directed along their axis reach the nervous membrane[39], etc., etc.[40] "—To this the reply has been to invite the advocate of final causes to place himself within the evolutionist hypothesis. Everything does indeed seem marvelous if one considers an eye like ours, in which thousands of elements are coordinated to the unity of the function. But one would have to take the function at its origin, in the infusorian, when it amounts to the mere (almost purely chemical) sensitivity of a pigment spot to light. This function, which was at first only an accidental fact, may have brought about a slight complication of the organ—either directly, through an unknown mechanism [67] , or indirectly, through the mere effect of the advantages it procured for the living being and the hold it thus offered to natural selection—and this complication will in turn have entailed an improvement of the function. Thus, through an indefinite series of actions and reactions between function and organ, and without bringing in any extra-mechanical cause, one would explain the progressive formation of an eye as well contrived as ours.

The question is indeed hard to settle if it is posed straight away between function and organ, as the doctrine of finality did, and as mechanism itself does. For organ and function are two terms heterogeneous to each other, which condition each

38 BERGSON'S NOTE. Paul Janet, *Les causes finales*, Paris, 1876, p. 83.
39 BERGSON'S NOTE. *Ibid.*, p. 80.
40 Paul Janet (1823–1899), French philosopher, defended the argument from design in *Les causes finales* (Final Causes, 1876).

other so closely that it is impossible to say *a priori* whether, in stating their relation, it is better to begin with the first, as mechanism would have it, or with the second, as the thesis of finality would require. But the discussion would take quite another turn, we believe, if one first compared two terms of the same nature—an organ with an organ, and no longer an organ with its function. This time one could make one's way gradually toward a more and more plausible solution. And one would have all the more chance of succeeding the more resolutely one then placed oneself within the evolutionist hypothesis.

Here, beside the eye of a vertebrate, is that of a mollusc such as the scallop. In both there are the same essential parts, composed of analogous elements. The scallop's eye has a retina, a cornea and a lens of cellular structure like ours. One even finds in it that peculiar inversion of the retinal elements which is not generally met with [68] in the retina of invertebrates. Now, the origin of molluscs is no doubt disputed; but whatever opinion one adopts, it will be granted that molluscs and vertebrates separated from their common trunk long before the appearance of an eye as complex as the scallop's. Where, then, does the analogy of structure come from?[41]

Let us put this question, in turn, to the two opposed systems of evolutionist explanation: the hypothesis of purely accidental variations, and that of a variation directed along a definite line under the influence of external conditions.

As for the first, it is known that it appears today in two rather different forms. Darwin had spoken of very slight variations, which would add up through the effect of natural selection. He was not unaware of the facts of sudden variation; but these "sports," as he called them, produced in his view only monstrosities incapable of perpetuating themselves, and it was by an accumulation of imperceptible variations that he accounted for the genesis of species[42]. Such is still the opinion of many natur-

41 The scallop (*Pecten*) is a bivalve mollusc whose mantle edge bears numerous small but elaborate eyes.

42 BERGSON'S NOTE. Darwin, *Origine des espèces*, trans. Barbier, Paris, 1887, p. 46.

alists. It tends, however, to give way to the opposite idea: that a new species is formed all at once, through the simultaneous appearance of several new characters, rather different from the old ones. This latter hypothesis, already put forward by various authors, notably by Bateson in a remarkable book[43], has taken on a profound significance and acquired very great force since the fine experiments of Hugo de Vries. This botanist, [69] working on *Œnothera Lamarckiana*, obtained after a few generations a certain number of new species. The theory he draws from his experiments is of the highest interest. Species, on this view, pass through alternating periods of stability and transformation. When the period of "mutability" arrives, they produce unexpected forms in a host of different directions[44]. We shall not venture to take sides between this hypothesis and that of imperceptible variations.[45] It is possible, moreover, that each of them contains a share of truth. We simply wish to show that, small or large, the variations invoked are incapable, if they are accidental, of accounting for a similarity of structure such as the one we have pointed out.

CHANCE VARIATIONS, SMALL OR SUDDEN

Neither slight accumulated variations nor sudden mutations can explain the same eye twice.

Let us first accept, then, the Darwinian thesis of imperceptible variations. Let us suppose small differences due to chance, which keep adding up. We must not forget that all the parts of an organism are necessarily coordinated with one another. It matters little to me whether the function is the effect or the cause of the organ; one point is indisputable, namely that the organ will

43 BERGSON'S NOTE. Bateson, *Materials for the study of variation*, London, 1894, especially pp. 567 ff. Cf. Scott, *Variations and mutations* (*American Journal of Science*, November 1894).

44 BERGSON'S NOTE. De Vries, *Die Mutationstheorie*, Leipzig, 1901–1903. Cf. *Species and varieties*, Chicago, 1905.

45 William Bateson (1861–1926), English biologist and pioneer of the study of heredity. *Œnothera Lamarckiana* is an evening primrose.

be of service, and give selection a hold, only if it functions. Should the fine structure of the retina develop and grow more complex, this progress, instead of favoring vision, will doubtless disturb it, unless the visual centers develop at the same time, as well as various parts of the visual organ itself. If the variations are accidental, it is only too evident that they will not agree among themselves to occur in all the parts of the organ at once, in such a way that it continues to perform its function. Darwin understood this well, and it is one of the reasons [70] why he supposes variation to be imperceptible[46]. The difference that arises accidentally at one point of the visual apparatus, being very slight, will not hinder the functioning of the organ; and so this first accidental variation can, in a sense, *wait* for complementary variations to come and join it and raise vision to a higher degree of perfection. Granted; but if the imperceptible variation does not hinder the functioning of the eye, neither does it serve it, so long as the complementary variations have not occurred. How, then, would it be preserved through the effect of selection? Like it or not, one will reason as if the small variation were a stone laid in readiness by the organism and reserved for a later construction. This hypothesis, so little in keeping with Darwin's principles, already seems hard to avoid when one considers an organ that has developed along a single great line of evolution, the eye of vertebrates, for example. But it becomes absolutely unavoidable once one notes the similarity of structure between the eye of vertebrates and that of molluscs. How, indeed, can we suppose that the same small variations, incalculable in number, occurred in the same order on two independent lines of evolution, if they were purely accidental? And how were they preserved by selection and accumulated on both sides, the same ones in the same order, when each of them, taken by itself, was of no use?

Let us pass, then, to the hypothesis of sudden variations, and see whether it will solve the problem. It no doubt lessens the difficulty on one point. On the other hand, it [71] greatly aggravates it

46 BERGSON'S NOTE. Darwin, *Origine des espèces*, trans. Barbier, p. 198.

on another. If it is through a relatively small number of sudden leaps that the eye of molluscs, like that of vertebrates, has risen to its present form, I have less trouble understanding the similarity of the two organs than if this similarity were made up of an incalculable number of infinitesimal resemblances acquired one after another. In both cases it is chance that operates; but in the second we do not ask of it the miracle it would have to perform in the first. Not only is the number of resemblances I have to add together reduced, but I understand better how each of them could have been preserved so as to be added to the others, for the elementary variation is, this time, large enough to secure an advantage for the living being and thus to lend itself to the play of selection. But then another problem arises, no less formidable: how do all the parts of the visual apparatus, in changing suddenly, remain so well coordinated with one another that the eye continues to perform its function? For the isolated variation of one part will make vision impossible, once this variation is no longer infinitesimal. All the parts must now change at once, and each must consult the others. I grant that a host of variations not coordinated with one another may have arisen in less fortunate individuals, that natural selection eliminated them, and that only the viable combination—that is, the one capable of preserving and improving vision—survived. Still, that combination must have come about. And, supposing chance granted this favor once, how can we admit that it repeats it in the course of a species' history, so as to produce each time, all at once, new complications, marvelously adjusted to one another and lying along the [72] extension of the earlier complications? How, above all, can we suppose that, through a series of mere "accidents," these sudden variations occurred the same, and in the same order, each time implying a perfect harmony among ever more numerous and complex elements, along two independent lines of evolution?

The law of correlation will be invoked, it is true, to which Darwin himself already appealed[47]. It will be alleged that a change

47 BERGSON'S NOTE. *Origine des espèces*, pp. 11 and 12.

is not localized at a single point of the organism, that it necessarily has repercussions at other points. The examples cited by Darwin have become classic: white cats with blue eyes are generally deaf, hairless dogs have imperfect teeth, and so on. Granted; but let us not now play on the meaning of the word "correlation." A set of *interdependent* changes is one thing; a system of *complementary* changes—that is, changes coordinated with one another so as to maintain and even improve the functioning of an organ under more complicated conditions—is quite another. That an anomaly of the hair should be accompanied by an anomaly of the teeth calls for no special principle of explanation: hair and teeth are similar formations[48], and the same chemical alteration of the germ that impedes the formation of hair must no doubt hinder that of the teeth. It is probably to causes of the same kind that we must attribute the deafness of blue-eyed white cats. In these various examples the "correlative" changes are merely interdependent changes, [73] (not to mention that they are in reality *lesions*, I mean diminutions or suppressions of something, and not additions, which is very different). But when we are told of "correlative" changes occurring suddenly in the various parts of the eye, the word is taken in an entirely new sense. This time it is a matter of a set of changes that are not only simultaneous, not only linked to one another by a common origin, but also coordinated with one another in such a way that the organ continues to perform the same simple function, and even performs it better. That a modification of the germ which influences the formation of the retina should at the same time act on that of the cornea, the iris, the lens, the visual centers, and so on, I grant, if need be—even though these are formations far more heterogeneous to one another than hair and teeth doubtless are. But that all these simultaneous variations should occur in the direction of an improvement, or even simply a maintenance, of vision is what I cannot admit on the

48 BERGSON'S NOTE. On this homology of hair and teeth, see Brandt, *Ueber... eine mutmassliche Homologie der Haare und Zähne* (*Biol. Centralblatt,* vol. XVIII, 1898), especially pp. 262 ff.

hypothesis of sudden variation, unless one brings in some mysterious principle whose role would be to watch over the interests of the function. But that would be to give up the idea of an "accidental" variation. In reality these two senses of the word "correlation" often interfere with each other in the biologist's mind, just as those of the term "adaptation" do. And the confusion is almost legitimate in botany—precisely where the theory of the formation of species by sudden variation rests on the most solid experimental basis. In plants, indeed, function is far from being as closely tied to form as in the animal. Profound morphological differences, such as a change in the shape of the leaves, have no appreciable influence on [74] the exercise of the function, and therefore do not require a whole system of complementary adjustments for the plant to remain viable. But it is not so with the animal, especially if one considers an organ such as the eye, at once very complex in structure and very delicate in functioning. Here one would try in vain to treat as identical variations that are merely interdependent and variations that are, in addition, complementary. The two senses of the word "correlation" must be carefully distinguished: one would commit a genuine paralogism by adopting one of them in the premises of an argument and the other in its conclusion. Yet this is just what is done when the principle of correlation is invoked in explanations of detail to account for complementary variations, and correlation in general is then spoken of as if it were merely any set of variations brought about by any variation of the germ. One begins by using the idea of correlation in ordinary science as an advocate of finality might; one tells oneself that this is simply a convenient way of speaking, that one will correct it and return to pure mechanism when it comes to explaining the nature of principles and passing from science to philosophy. One does indeed return to mechanism then; but only on condition of taking the word "correlation" in a new sense—one that, this time, is unsuited to the details of explanation.

In short, if the accidental variations that bring about evolution are imperceptible variations, we shall have to appeal to a kindly genius—the genius of the future species—to preserve and add up these variations, for selection will not do it. If, on the other hand, the accidental variations are sudden, the old [75] function will continue to be performed, or a new function will replace it, only if all the changes that have occurred together complement one another with a view to accomplishing one and the same act. Here too we shall have to resort to the kindly genius, this time to obtain the *convergence* of the simultaneous changes, just as before it was needed to ensure the *continuity of direction* of the successive variations.

THE DIRECT ACTION OF LIGHT

Light could leave an imprint, but not build an instrument that uses it.

In neither case can the parallel development of identical complex structures on independent lines of evolution be due to a mere accumulation of accidental variations. Let us therefore turn to the second of the two great hypotheses we had to examine. Suppose that the variations are due no longer to accidental and internal causes, but to the direct influence of external conditions. Let us see how one would go about accounting for the similarity in the structure of the eye in series that are independent from the phylogenetic point of view.

Even if molluscs and vertebrates evolved separately, both have remained exposed to the influence of light. And light is a physical cause that produces determinate effects. Acting continuously, it may have produced a continuous variation in a constant direction. No doubt it is improbable that the eye of vertebrates and that of molluscs were built up by a series of variations due to mere chance. Suppose light then comes in as an instrument of selection, allowing only the useful variations to survive. Even so, there is no likelihood that the play of chance, though supervised in this way from outside, should end in both cases in the same juxtaposition of elements coordinated in the same

way. But it would be otherwise under the hypothesis that light acted directly on organized matter so as to modify its [76] structure and adapt it, in a sense, to its own form. The similarity of the two effects would then be explained simply by the identity of the cause. The increasingly complex eye would be something like the increasingly deep imprint of light on a matter which, being organized, has a *sui generis* aptitude for receiving it.

But can an organic structure be compared to an imprint? We have already pointed out the ambiguity of the term "adaptation." The gradual complication of a form that fits better and better into the mold of external conditions is one thing. The increasingly complex structure of an instrument that turns these conditions to better and better advantage is quite another. In the first case, matter merely receives an imprint; in the second, it reacts actively, it solves a problem. Of these two senses of the word, it is obviously the second that is used when we say that the eye has become better and better adapted to the influence of light. But we slip more or less unconsciously from the second sense to the first. A purely mechanistic biology will try to make the passive adaptation of inert matter, which undergoes the influence of its surroundings, coincide with the active adaptation of an organism, which turns that influence to fitting account. We admit, moreover, that nature itself seems to invite our mind to confuse these two kinds of adaptation. For it usually begins with a passive adaptation where it is later to build a mechanism that will react actively. Thus, in the case before us, it is beyond dispute that the first rudiment of the eye is found in the pigment spot of lower organisms. This spot may very well have been produced [77] physically by the very action of light, and we observe a host of intermediate forms between the simple pigment spot and an eye as complicated as that of the vertebrates.—But it does not follow, from the fact that we pass by degrees from one thing to another, that the two things are of the same nature. An orator may first adopt the passions of his audience in order later to master them. We shall not conclude from this that *following* is the same as *leading*. Now, living matter seems to have no other

means of turning circumstances to account than first adapting itself to them passively: where it must take control of a movement, it begins by adopting it. Life proceeds by insinuation. It is no use showing us all the intermediate forms between a pigment spot and an eye; there will still be the same gap between the two as between a photograph and a camera. No doubt the photograph has gradually bent, little by little, in the direction of a camera. But could light alone, a physical force, have brought about this bending, and converted an impression it left into a machine capable of using it?

It will be objected that we are wrongly bringing in considerations of utility. The eye, it will be said, is not made for seeing; rather, we see because we have eyes. The organ is what it is, and "utility" is a word by which we designate the functional effects of the structure. But when I say that the eye "turns light to account," I do not mean merely that the eye is capable of seeing. I am alluding to the very precise relations that exist between this organ and the apparatus of locomotion. The retina of vertebrates extends into an optic nerve, which is itself continued 78 by cerebral centers connected to motor mechanisms.[49] Our eye turns light to account in that it allows us, by movements of reaction, to make use of the objects we see to be advantageous and to avoid those we see to be harmful. Now, it will be easy to show me that, if light physically produced a pigment spot, it can also physically determine the movements of certain organisms: ciliated infusorians, for example, react to light. No one, however, will maintain that the influence of light physically caused the formation of a nervous system, a muscular system, a skeletal system—all of which are continuous with the visual apparatus in vertebrates. In truth, as soon as we speak of the gradual formation of the eye, and all the more when we connect the eye with what is inseparable from it, we bring in something quite other than the direct action of light. We implicitly attribute to organized matter a certain *sui generis* capacity: the mysterious power

49 The objection echoes Lucretius, *On the Nature of Things*, Book IV, who argued that organs were not made for their uses but that uses arose from existing organs.

of assembling very complicated machines to turn to account the simple stimulus whose influence it undergoes.

But that is precisely what people claim to do without. They want physics and chemistry to give us the key to everything. Eimer's major work is instructive in this respect. We know what a penetrating effort this biologist made to demonstrate that transformation takes place in a well-defined direction, through the effect of a continuous influence of the external on the internal, and not, as Darwin would have it, through accidental variations. His thesis rests on observations of the greatest interest, whose starting point was the study of the course followed by the variation in skin coloring in certain [79] lizards. Moreover, Dorfmeister's experiments, which date back some time, show that one and the same chrysalis gives rise to rather different butterflies depending on whether it is exposed to cold or to heat. These had long been regarded as independent species, *Vanessa levana* and *Vanessa prorsa*; an intermediate temperature produces an intermediate form. With these facts we might compare the considerable transformations observed in a small crustacean, *Artemia salina*, when the salinity of the water it lives in is increased or decreased[50]. In these various experiments, the external agent does seem to behave as a cause of transformation. But in what sense must the word cause be understood here?[51]

THREE MEANINGS OF CAUSE

Causes act by impulsion, triggering or unrolling; Eimer's causes only trigger or unroll.

Without undertaking an exhaustive analysis of the idea of causality, we shall simply point out that three quite different senses

50 BERGSON'S NOTE. It seems, moreover, to follow from the latest observations that the transformation of Artemia is a more complex phenomenon than was at first believed. See on this subject Samter and Heymons, *Die Variation bei Artemia salina* (*Anhang zu den Abhandlungen der k. preussischen Akad. der Wissenschaften*, 1902).

of this term are usually confused. A cause can act by *impulsion*, by *triggering* or by *unrolling*. The billiard ball that is thrown against another ball determines its motion by *impulsion*. The spark that sets off the explosion of the powder acts by *triggering*. The gradual release of the spring that turns the phonograph *unrolls* the melody inscribed on the cylinder. If I take the melody being played for an effect, and the release of the spring for the cause, I shall say that the cause here proceeds by unrolling. What distinguishes these three cases from one another is the greater or lesser interdependence of cause and effect. In the first, the quantity and quality [80] of the effect vary with the quantity and quality of the cause. In the second, neither the quality nor the quantity of the effect varies with the quality and quantity of the cause: the effect is invariable. In the third, finally, the quantity of the effect depends on the quantity of the cause, but the cause has no influence on the quality of the effect. The longer the cylinder turns through the action of the spring, the longer the portion of the melody I shall hear; but the nature of the melody heard, or of the portion I hear, does not depend on the action of the spring. In reality, it is only in the first case that the cause *explains* its effect. In the other two, the effect is more or less given in advance, and the antecedent invoked is its occasion rather than its cause—to varying degrees, it is true. Now, is it in the first sense that the word cause is taken when we say that the salinity of the water is the cause of the transformations of Artemia, or that the degree of temperature determines the color and markings that a certain chrysalis will take on in its wings when it becomes a butterfly? Obviously not: causality here has a sense intermediate between unrolling and triggering. That, moreover, is just how Eimer himself understands it, when he speaks of the "kaleidoscopic" character of variation[52], or when he says that the variation of organized matter takes place in a

51 Georg Dorfmeister (1810–1901), Austrian entomologist. *Vanessa levana* and *prorsa* are the spring and summer forms of the map butterfly; *Artemia salina* is the brine shrimp.

52 BERGSON'S NOTE. Eimer, *Orthogenesis der Schmetterlinge*, Leipzig, 1897, p. 24. Cf. *Die Entstehung der Arten*, p. 53.

definite direction, just as inorganic matter crystallizes in definite directions[53]. That this is a purely physicochemical process may be granted him, if need be, where changes in skin coloring are concerned. But suppose this mode of explanation is extended to the [81] case of the gradual formation of the vertebrate eye, for example. We shall then have to suppose that the physicochemistry of the organism is such, here, that the influence of light has made it build a progressive series of visual apparatuses, all extremely complex, yet all capable of seeing, and seeing better and better[54]. What more would the most determined partisan of the doctrine of finality say to characterize this very special physicochemistry? And will the position of a mechanistic philosophy not become much more difficult still once certain points are made to it? The egg of a mollusc cannot have the same chemical composition as that of a vertebrate. The organic substance that evolved toward the first of the two forms cannot have been chemically identical with the substance that took the other direction. And yet, under the influence of light, it is the same organ that was built in both cases.

The more one reflects on it, the more one will see how contrary to the principles invoked by mechanistic philosophy is this production of the same effect by two different accumulations of an enormous number of small causes. We have concentrated the whole effort of our discussion on an example drawn from phylogenesis. But ontogenesis would have furnished us with facts no less convincing. At every moment, before our eyes, nature arrives at identical results by entirely different embryogenic processes, in species that are sometimes closely related to one another. Observations of "heteroblasty" have multiplied in recent years[55], and it has been necessary to abandon the almost

53 BERGSON'S NOTE. Eimer, *Die Entstehung der Arten*, Jena, 1888, p. 25.

54 BERGSON'S NOTE. Eimer, *Ibid.*, pp. 165 ff.

55 BERGSON'S NOTE. Salensky, *Hétéroblastie* (*Proc. of the fourth international Congress of Zoology*, London, 1899, pp. 111–118). Salensky coined this word to designate cases in which equivalent organs form at the same points in animals related to one another, even though their embryological origin is different.

[82] classical theory of the specificity of the germ layers.[56] To keep, once again, to our comparison between the eye of vertebrates and that of molluscs, we shall point out that the vertebrate retina is produced by an outgrowth put out by the rudimentary brain in the young embryo. It is a genuine nerve center that has, one might say, moved out to the periphery. In molluscs, on the contrary, the retina derives from the ectoderm directly, and not indirectly by way of the embryonic brain. So it is indeed different evolutionary processes that lead, in humans and in the scallop, to the development of the same retina. But even without going so far as to compare two organisms so remote from each other, we should reach an identical conclusion by studying certain very curious facts of regeneration in one and the same organism. If the lens of a newt is removed, the lens is regenerated from the iris[57]. Now, the original lens had been formed from the ectoderm, whereas the iris is of mesodermal origin. What is more, if the lens of *Salamandra maculata* is removed while the iris is left intact, the lens is still regenerated from the upper part of the iris. But if this upper part of the iris is itself removed, regeneration begins in the inner or retinal layer of the remaining region[58]. Thus parts that are differently situated and differently constituted, and that perform [83] different functions in normal times, are capable of making the same substitutions and of manufacturing, when necessary, the same parts of the machine. Here we do indeed have the same effect obtained by different combinations of causes.

56 Phylogenesis is the evolutionary history of a group of organisms; ontogenesis is the development of an individual organism from the egg.

57 BERGSON'S NOTE. Wolff, *Die Regeneration der Urodelenlinse* (*Arch. f. Entwickelungsmechanik*, I, 1895, pp. 380 ff.).

58 BERGSON'S NOTE. Fischel, *Ueber die Regeneration der Linse* (*Anat. Anzeiger*, XIV, 1898, pp. 373–380).

NEO-LAMARCKISM AND INHERITED HABITS

An effort to adapt might explain convergence, but acquired characters are rarely inherited.

Like it or not, we shall have to appeal to an internal principle of direction to obtain this convergence of effects. The possibility of such a convergence does not appear in the Darwinian, and especially neo-Darwinian, thesis of imperceptible accidental variations. Nor does it appear in the hypothesis of sudden accidental variations. It does not even appear in the theory that assigns definite directions to the evolution of the various organs through a kind of mechanical composition of external and internal forces. Let us therefore turn to the only one of the current forms of evolutionism that remains for us to discuss: neo-Lamarckism.

We know that Lamarck attributed to the living being the faculty of varying as a result of the use or disuse of its organs, and also of transmitting the variation thus acquired to its descendants. A number of biologists today subscribe to a doctrine of the same kind. On this view, the variation that ends in producing a new species would not be an accidental variation inherent in the germ itself. Nor would it be governed by a *sui generis* determinism that develops determinate characters in a determinate direction, independently of any concern with utility. It would arise from the very effort of the living being to adapt itself to the conditions in which it has to live.[59] This effort might, moreover, be merely the mechanical exercise of certain organs, mechanically brought about by the pressure of external circumstances. But it might also imply consciousness and will, and this latter sense seems to be how one of the 84 most eminent representatives of the doctrine understands it: the American naturalist Cope[60]. Neo-Lamarckism is therefore, of all the current forms of

59 Jean-Baptiste Lamarck (1744–1829), French naturalist, author of *Philosophie zoologique* (1809), an early theory of the transformation of species.

60 BERGSON'S NOTE. Cope, *The Origin of the Fittest*, 1887; *The Primary Factors of Organic Evolution*, 1896.

evolutionism, the only one capable of admitting an internal and psychological principle of development, although it does not necessarily appeal to one. And it is also the only evolutionism that seems to us to account for the formation of identical complex organs on independent lines of development.[61] It is conceivable, indeed, that the same effort to turn the same circumstances to account should lead to the same result, especially if the problem posed by the external circumstances is one that admits of only one solution. It remains to be seen whether the term "effort" must not then be taken in a deeper sense, even more psychological than any neo-Lamarckian supposes.

For a simple variation in size is one thing, a change of form quite another. That an organ can be strengthened and enlarged by exercise, no one will dispute. But it is a far cry from that to the progressive development of an eye like that of molluscs and vertebrates. If this effect is attributed to the prolonged influence of light, passively received, we fall back on the thesis we have just criticized. If, on the contrary, it is indeed an internal activity that is invoked, then we are dealing with something quite other than what we usually call an effort. For never has effort produced before our eyes the slightest complication of an organ. And yet an enormous number of such complications, admirably coordinated with one another, was needed to pass from the pigment spot of the infusorian to the eye of the [85] vertebrate. But let us grant this conception of the evolutionary process for animals: how will it be extended to the world of plants? Here variations of form do not seem always to imply or bring about functional changes. And if the cause of variation is of a psychological order, it is hard still to call it effort, unless the meaning of the word is stretched considerably. The truth is that we must dig beneath effort itself and look for a deeper cause.

This is necessary above all, we believe, if we want to arrive at a cause of regularly hereditary variations. We shall not go here into the details of the controversies over the transmissibility of

61 Edward Drinker Cope (1840–1897), American paleontologist and a leading neo-Lamarckian.

acquired characters. Still less would we wish to take too firm a side on a question that lies outside our competence. Yet we cannot remain entirely indifferent to it. Nowhere is it more keenly felt that philosophers today cannot confine themselves to vague generalities. They are obliged to follow scientists into the details of experiments and to discuss the results with them. Had Spencer begun by asking himself the question of the heredity of acquired characters, his evolutionism would no doubt have taken quite a different form. Suppose (as seems probable to us) that a habit contracted by the individual were transmitted to its descendants only in very exceptional cases. Then the whole of Spencer's psychology would have to be redone, and a large part of his philosophy would collapse. Let us say, then, how the problem seems to us to be posed, and in what direction we think a solution might be sought.

After being affirmed as a dogma, the transmissibility of acquired characters has been denied no less dogmatically, for reasons drawn *a priori* from the [86] supposed nature of the germ cells. We know how Weismann was led by his hypothesis of the continuity of the germ plasm to regard the germ cells—ova and spermatozoa—as more or less independent of the somatic cells. Starting from there, it has been claimed, and many still claim, that the hereditary transmission of an acquired character is inconceivable. —But if, by chance, experience were to show that acquired characters are transmissible, it would prove by that very fact that the germ plasm is not as independent of the somatic environment as is claimed. The transmissibility of acquired characters would then *ipso facto* become conceivable. This amounts to saying that conceivability and inconceivability have nothing to do with such a matter, and that the question is solely one for experience. But this is precisely where the difficulty begins. The acquired characters in question are most often habits or the effects of habit. And it is rare for a contracted habit not to have some natural aptitude at its base. So one can always ask whether it is really the habit acquired by the individual's *soma* that has been transmitted, or whether it might not rather

be a natural aptitude, prior to the contracted habit. This aptitude would have remained inherent in the *germen* that the individual carries within it, just as it was already inherent in the individual and consequently in its germ. Thus nothing proves that the mole became blind because it took to living underground. It is perhaps because the mole's eyes were in the process of atrophying that it had to condemn itself to life underground[62].[63] In that case, the tendency to lose sight would have been transmitted from germen to germen without anything [87] being acquired or lost by the soma of the mole itself. The son of a fencing master may have become an excellent fencer much faster than his father. We cannot conclude from this that the parent's habit has been transmitted to the child. For certain natural dispositions on the increase may have passed from the father's producing germen to the son's producing germen, grown along the way through the effect of the original impetus, and ensured the son greater suppleness than his father had—without concerning themselves, so to speak, with what the father was doing. The same goes for many examples drawn from the progressive domestication of animals. It is hard to know whether it is the contracted habit that is transmitted, or whether it might not rather be a certain natural tendency—the very one that caused this or that particular species, or certain of its members, to be chosen for domestication. In truth, when we eliminate all doubtful cases and all facts open to more than one interpretation, hardly any absolutely indisputable examples of peculiarities acquired and transmitted remain, apart from the famous experiments of Brown-Séquard, which have moreover been repeated and confirmed by various physiologists[64]. By cutting the spinal cord or the sciatic nerve of guinea pigs, Brown-

62 BERGSON'S NOTE. Cuénot, *La nouvelle théorie transformiste* (*Revue générale des sciences*, 1894). Cf. Morgan, *Evolution and Adaptation*, London, 1903, p. 357.

63 *Soma* and *germen*: Weismann's terms for the body and for the line of germ cells passed from generation to generation.

64 BERGSON'S NOTE. Brown-Séquard, *Nouvelles recherches sur l'épilepsie due à certaines lésions de la moelle épinière et des nerfs rachidiens* (*Arch. de physiologie*, vol. II, 1869, pp. 211, 422 and 497).

Séquard brought about an epileptic condition which they transmitted to their descendants.[65] Lesions of this same sciatic nerve, of the restiform body, and so on, provoked various disorders in the guinea pig which its offspring could inherit, sometimes in a rather different form: exophthalmia, loss of toes, and so on.—But it has not been shown that in these various cases of hereditary transmission there was any real influence of the [88] animal's soma on its germen. Weismann had already objected that Brown-Séquard's operation might have introduced certain special microbes into the guinea pig's body. These would find their nourishing medium in nerve tissue and would transmit the disease by penetrating the sexual elements[66]. This objection was set aside by Brown-Séquard himself[67]; but another, more plausible one might be raised. It follows, in fact, from the experiments of Voisin and Peron that epileptic fits are followed by the elimination of a toxic substance which, when injected into animals, can produce convulsive seizures[68]. Perhaps the trophic disorders that follow the nerve lesions Brown-Séquard produced show themselves precisely in the formation of this convulsant poison. In that case, the toxin would pass from the guinea pig to its spermatozoon or its ovum. It would cause a general disturbance in the development of the embryo, which might nevertheless produce visible effects only at some particular point of the organism once developed. Things would happen here as in the experiments of Charrin, Delamare and Moussu. Pregnant guinea pigs whose liver or kidney had been damaged transmitted this lesion to their offspring. They did so simply because the damage to the mother's organ had produced specific "cytotoxins," which acted

65 Charles-Édouard Brown-Séquard (1817–1894), physiologist and neurologist, professor at the Collège de France.

66 BERGSON'S NOTE. Weismann, *Aufsätze über Vererbung*, Jena, 1893, pp. 376–378, and also *Vorträge über Descendenztheorie*, Jena, 1902, vol. II, p. 76.

67 BERGSON'S NOTE. Brown-Séquard, *Hérédité d'une affection due à une cause accidentelle* (*Arch. de physiologie*, 1892, pp. 686 ff.).

68 BERGSON'S NOTE. Voisin and Peron, *Recherches sur la toxicité urinaire chez les épileptiques* (*Archives de neurologie*, vol. XXIV, 1892, and XXV, 1893). Cf. Voisin's book *L'épilepsie*, Paris, 1897, pp. 125–133.

on the homologous organ of the fetus[69]. It is true that in these experiments, as [89] indeed in an earlier observation by the same physiologists[70], it is the already formed fetus that is affected by the toxins. But other research by Charrin has succeeded in showing that the same effect can be produced on spermatozoa and ova by an analogous mechanism[71]. In short, the heredity of an acquired peculiarity in Brown-Séquard's experiments could be explained by a poisoning of the germ. The lesion, however well localized it may seem, would be transmitted by the same process as the taint of alcoholism, for example. But might not the same be true of every acquired peculiarity that becomes hereditary?

There is one point, in fact, on which those who affirm and those who deny the transmissibility of acquired characters agree. Certain influences, such as that of alcohol, can act at once on the living being and on the germ plasm it holds. In such a case a taint is inherited, and everything happens *as if* the parent's soma had acted on its germen, although in reality germen and soma have simply both undergone the action of one and the same cause. This being so, let us grant that the soma can influence the germen, as is believed by those who hold acquired characters to be transmissible. Is not the most natural hypothesis to suppose that things will happen in this second case as in the first? The direct effect of this influence of the soma would then be a *general* alteration of the germ [90] plasm. If so, it would be by exception, and in a sense by accident, that the modification in the descendant would be the same as that in the parent. It will be as with the inheritance of the taint of alcoholism. This no doubt passes from father to children, but it can take a differ-

69 BERGSON'S NOTE. Charrin, Delamare and Moussu, *Transmission expérimentale aux descendants de lésions développées chez les ascendants* (*C. R. de l'Ac. des sciences*, vol. CXXXV, 1902, p. 191). Cf. Morgan, *Evolution and Adaptation*, p. 257, and Delage, *L'hérédité*, 2nd ed., p. 388.

70 BERGSON'S NOTE. Charrin and Delamare, *Hérédité cellulaire* (*C. R. de l'Ac. des sciences*, vol. CXXXIII, 1901, pp. 69–71).

71 BERGSON'S NOTE. Charrin, *L'hérédité pathologique* (*Revue générale des sciences*, 15 January 1896).

ent form in each of the children, and in none of them resemble what it was in the father. Let us call C the change that has occurred in the plasm; C may be either positive or negative, that is, it may represent either the gain or the loss of certain substances. The effect will reproduce its cause exactly only on one condition: all the other nascent parts of the new organism must enjoy a kind of immunity with respect to C. Only then will the modification of the germen, brought about by a certain modification of a certain part of the soma, produce the same modification of the same part of the new organism in the course of formation. The same part will then be modified in the new organism because the formation of that part alone will have proved sensitive to the new influence—and even then it may be modified in quite a different direction from the corresponding part of the parent organism.

We would therefore propose to introduce a distinction between the heredity of the *deviation* and that of the *character*. An individual that acquires a new character thereby *deviates* from the form it had—the form that the germs, or more often the half-germs, it holds would have reproduced in developing. Suppose this modification does not entail the production of substances capable of modifying the germen, or a general alteration of nutrition capable of depriving the germen of some of its elements. In that case it will have no effect on the individual's offspring. That is no doubt what happens most often. If, on the contrary, it does have some effect, this is probably through a [91] chemical change it will have brought about in the germ plasm. This chemical change may, by exception, bring back the original modification in the organism that the germ is about to develop; but there are as many chances, and more, that it will do something else. In that case, the offspring organism will perhaps deviate from the normal type *as much* as the parent organism, but it will deviate *differently*. It will have inherited the deviation and not the character. In general, then, the habits contracted by an individual probably have no repercussion on its offspring. And when they do, the modification occurring in the descend-

ants may bear no visible resemblance to the original modification. Such at least is the hypothesis that seems to us the most likely. In any case, until the contrary is proved, and as long as the decisive experiments called for by an eminent biologist[72] have not been carried out, we must keep to the current results of observation. Now, let us put things in the most favorable light for the thesis of the transmissibility of acquired characters. Let us suppose that the so-called acquired character is not, in most cases, the more or less late development of an innate character. Even so, the facts show us that hereditary transmission is the exception and not the rule. How could it be expected to develop an organ such as the eye? Think of the enormous number of variations, all directed the same way, that must be supposed to have accumulated one on top of another to pass from the pigment spot of the infusorian to the eye of the mollusc and the vertebrate. We then wonder how heredity, as we observe it, could ever have brought about this pile-up of differences, even supposing that [92] individual efforts could have produced each of them singly. In other words, neo-Lamarckism seems to us no more capable than the other forms of evolutionism of solving the problem.

WHAT EACH THEORY GETS RIGHT

Each current theory holds part of the truth; together they point to an inner impetus.

In thus putting the various current forms of evolutionism to a common test, and in showing that they all come up against one and the same insurmountable difficulty, we have no intention whatever of dismissing them all alike. On the contrary, each of them, supported by a considerable number of facts, must be true in its own way. Each of them must correspond to a certain point of view on the process of evolution. Perhaps, indeed, a theory must keep exclusively to one particular point of view in order to remain scientific, that is, in order to give a precise dir-

72 BERGSON'S NOTE. Giard, *Controverses transformistes*, Paris, 1904, p. 147.

ection to detailed research. But the reality of which each of these theories takes a partial view must go beyond them all. And this reality is the proper object of philosophy, which is not bound to the precision of science, since it has no application in view. Let us therefore indicate briefly what positive contribution each of the three great current forms of evolutionism seems to us to make to the solution of the problem, and what each of them leaves aside. Let us also indicate at what point, in our view, this threefold effort should be made to converge, in order to obtain a more comprehensive, though for that very reason vaguer, idea of the evolutionary process.

The neo-Darwinians are probably right, we believe, when they teach that the essential causes of variation are the differences inherent in the germ the individual carries, and not the actions of that [93] individual in the course of its life. Where we find it hard to follow these biologists is when they regard the differences inherent in the germ as purely accidental and individual. We cannot help believing that these differences are the development of an impulse that passes from germ to germ through the individuals. They are consequently not mere accidents, and they might very well appear at the same time, in the same form, in all the members of one species, or at least in a certain number of them. Indeed, the theory of *mutations* already profoundly modifies Darwinism on this point. It says that at a given moment, after a long period has elapsed, the whole species is seized by a tendency to change. So the *tendency to change* is not accidental. The change itself, it is true, would be accidental, since according to De Vries mutation works in different directions in the different members of the species. But, first, it remains to be seen whether the theory is confirmed for many other plant species (De Vries has verified it only on *Œnothera Lamarckiana*[73]). Secondly, as we shall explain later, it is not

73 BERGSON'S NOTE. Some analogous facts have, however, been reported, again in the plant world. See Blaringhem, *La notion d'espèce et la théorie de la mutation* (*Année psychologique*, vol. XII, 1906, pp. 95 ff.), and De Vries, *Species and Varieties*, p. 655.

impossible that the part played by chance is much greater in the variation of plants than in that of animals, because in the plant world function does not depend so closely on form. Be that as it may, the neo-Darwinians are on the way to admitting that periods of mutation are determined. The direction of mutation might therefore be determined too, at [94] least in animals, and to the extent we shall have to indicate.

We would thus arrive at a hypothesis like Eimer's, according to which the variations of the different characters proceed in definite directions from generation to generation. This hypothesis seems plausible to us, within the limits in which Eimer himself confines it. Certainly the evolution of the organic world cannot be predetermined as a whole. We maintain, on the contrary, that the spontaneity of life shows itself in that evolution through a continual creation of forms following upon other forms. But this indeterminacy cannot be complete: it must leave a certain share to determination. An organ such as the eye, for example, would have been built up precisely through a continuous variation in a definite direction. Indeed, we do not see how else the similarity of structure of the eye could be explained in species that do not have the same history at all. Where we part company with Eimer is when he claims that combinations of physical and chemical causes suffice to secure the result. We have tried, on the contrary, to establish on the precise example of the eye that, if there is "orthogenesis" here, a psychological cause intervenes.

It is precisely to a cause of a psychological order that certain neo-Lamarckians have recourse. Therein lies, in our view, one of the strongest points of neo-Lamarckism. But if this cause is only the conscious effort of the individual, it can operate only in a rather limited number of cases. It will come into play in animals at most, and not in the plant world. Even in animals, it will act only on the points directly or indirectly subject to the influence of the will. Even where it [95] does act, we do not see how it could achieve a change as profound as an increase in complexity. At most this would be conceivable if acquired characters were reg-

ularly transmitted, so as to add up with one another; but this transmission seems to be the exception rather than the rule. Consider a hereditary change in a definite direction, which goes on accumulating and compounding with itself so as to build an increasingly complicated machine. It must no doubt be related to some kind of effort—but to an effort far deeper than individual effort and far more independent of circumstances. It must be an effort common to most members of a single species, inherent in the germs they carry rather than merely in their own substance, and thereby assured of being transmitted to their descendants.

THE ORIGINAL VITAL IMPETUS

A single impetus passing from germ to germ is the deep cause of variation.

We thus return, by a long detour, to the idea we started from: that of an *original vital impetus* of life, passing from one generation of germs to the next generation of germs through the developed organisms that form the connecting link between the germs. This impetus, sustaining itself along the lines of evolution among which it is divided, is the deep cause of variations, at least of those that are regularly transmitted, that accumulate, that create new species. In general, when species have begun to diverge from a common stock, they accentuate their divergence as they advance in their evolution. Yet on certain definite points they may, and indeed must, evolve identically, if we accept the hypothesis of a common impetus. This is what remains for us to show more precisely, using the very example we chose: the formation of the eye in molluscs and in [96] vertebrates. The idea of an "original vital impetus" may also become clearer in this way.

A COMPLEX ORGAN, A SIMPLE ACT

The eye is infinitely complex in structure, yet vision is one simple act.

Two things are equally striking in an organ such as the eye: the complexity of its structure and the simplicity of its functioning. The eye is composed of distinct parts, such as the sclera, the cornea, the retina, the lens, and so on. The detail of each of these parts would go on to infinity. To speak only of the retina, it is known to comprise three superposed layers of nervous elements—multipolar cells, bipolar cells, visual cells—each of which has its own individuality and is doubtless a highly complex organism; and even this is only a simplified diagram of the fine structure of this membrane. The machine that is the eye is thus composed of an infinity of machines, all of extreme complexity. Yet vision is a simple fact. As soon as the eye opens, vision takes place. Precisely because the functioning is simple, the slightest lapse of attention on nature's part in building this infinitely complicated machine would have made vision impossible. It is this contrast between the complexity of the organ and the unity of the function that baffles the mind.

A mechanistic theory will be one that has us witness the gradual construction of the machine under the influence of external circumstances, acting either directly on the tissues or indirectly through the selection of the best adapted. But whatever form this thesis takes, even supposing it holds good for the detail of the parts, it throws no light on their correlation.

Then comes the doctrine of finality. It says that the parts were assembled according to a preconceived plan, with a view to an end. In this it likens the work of nature to [97] that of the workman, who likewise proceeds by assembling parts with a view to realizing an idea or imitating a model. Mechanism, then, will rightly reproach finalism for its anthropomorphic character. But it fails to notice that it proceeds by this same method itself—only truncating it. It has, to be sure, swept away the end pursued or the ideal model. But it too insists that nature has worked like

the human workman, by assembling parts. Yet a mere glance at the development of an embryo would have shown it that life goes about things quite differently. *Life proceeds not by the association and addition of elements, but by dissociation and division.*

We must therefore go beyond both points of view, that of mechanism and that of finalism, which are at bottom only points of view to which the human mind has been led by the spectacle of human work. But in what direction are we to go beyond them? We said that when we analyze the structure of an organ, we go from decomposition to decomposition, on to infinity, although the functioning of the whole is a simple thing. This contrast between the infinite complication of the organ and the extreme simplicity of the function is precisely what should open our eyes.

In general, when one and the same object appears simple from one side and endlessly composite from the other, the two aspects are far from having the same importance, or rather the same degree of reality. The simplicity then belongs to the object itself, and the infinity of complication to the views we take of the object as we move around it—to the juxtaposed symbols by which our senses or our intellect represent it to us, and more generally to elements *of a different order* with which we [98] try to imitate it artificially, but with which it also remains incommensurable, being of another nature than they are. An artist of genius has painted a figure on canvas. We could imitate his painting with multicolored mosaic tiles. And we shall reproduce the curves and shades of the model all the better, the smaller, the more numerous and the more varied in tone our tiles are. But it would take an infinity of infinitely small elements, presenting an infinity of shades, to obtain the exact equivalent of this figure, which the artist conceived as a simple thing, which he meant to transfer to the canvas as a whole, and which is all the more finished the more clearly it appears as the projection of an indivisible intuition. Now suppose our eyes were so made that they could not help seeing a mosaic effect in the master's work. Or suppose our intellect were so made that it could

not account for the appearance of the figure on the canvas except as a work of mosaic. We might then speak simply of an assemblage of little tiles, and we should be adopting the mechanistic hypothesis. We might add that, besides the materiality of the assemblage, there must have been a plan on which the mosaicist worked: this time we should be speaking as finalists. But in neither case should we reach the real process, for no tiles were ever assembled. It is the picture—I mean the simple act projected onto the canvas—which, by the mere fact of entering our perception, has broken itself up before our eyes into thousands upon thousands of little tiles which, as recomposed, present an admirable arrangement. So the eye, with its marvelous complexity of structure, might be nothing but the simple act of vision, insofar as it divides itself for us into a mosaic of cells, whose order [99] seems marvelous to us once we have pictured the whole as an assemblage.

If I raise my hand from A to B, this movement appears to me under two aspects at once. Felt from within, it is a simple, indivisible act. Perceived from without, it is the tracing of a certain curve AB. In this line I can distinguish as many positions as I like, and the line itself can be defined as a certain coordination of these positions with one another. But the positions, infinite in number, and the order that links them to one another, have issued automatically from the indivisible act by which my hand went from A to B. Mechanism would here consist in seeing only the positions. Finalism would take their order into account. But mechanism and finalism alike would miss the movement, which is reality itself. In one sense, the movement is *more* than the positions and their order, for we need only give ourselves the movement, in its indivisible simplicity, for the infinity of successive positions and their order to be given at the same stroke—together with something more, which is neither order nor position but is the essential thing: mobility. But in another sense the movement is *less* than the series of positions together with the order linking them. For to arrange points in a certain order, one must first represent the order to oneself and then realize it with

points; it takes a work of assembly, and it takes intellect, whereas the simple movement of the hand contains nothing of all this. It is not intelligent, in the human sense of the word, and it is not an assemblage, for it is not made of elements. The same holds for the relation of the eye to vision. There is *more* in vision than the component cells of the eye and their reciprocal coordination: in this sense neither mechanism nor finalism [100] goes as far as it should. But in another sense mechanism and finalism both go too far, for they ascribe to nature the most formidable of the labors of Hercules, holding that it has raised an infinity of infinitely complicated elements up to the simple act of vision, whereas nature has had no more trouble making an eye than I have raising my hand. Its simple act has divided itself automatically into an infinity of elements which will be found coordinated to a single idea, just as the movement of my hand has let fall outside itself an infinity of points which turn out to satisfy a single equation.

MANUFACTURE AND ORGANIZATION

We make things by assembling parts, but nature organizes from a center outward.

But this is what we find very hard to understand, because we cannot help picturing organization as *manufacture*. Yet to manufacture is one thing, to organize another. The first operation is peculiar to man. It consists in assembling parts of matter that have been cut so that they can be fitted into one another and made to yield a common action. They are arranged, so to speak, around the action, which is already their ideal center. Manufacture thus goes from the periphery to the center, or, as philosophers would say, from the many to the one. The work of organization, on the contrary, goes from the center to the periphery. It begins at a point that is almost a mathematical point, and spreads around this point in concentric waves that keep on widening. The work of manufacture is the more effective the greater the quantity of matter at its disposal. It proceeds by con-

centration and compression. The act of organization, on the contrary, has something explosive about it: at the start it needs the least possible room, a minimum of matter, as if the organizing forces entered space [101] only reluctantly. The spermatozoon, which sets in motion the evolutionary process of embryonic life, is one of the smallest cells of the organism; and even then it is only a small portion of the spermatozoon that really takes part in the operation.

But these are only superficial differences. By digging beneath them we should find, we believe, a deeper difference.

The manufactured product traces the shape of the work of manufacture. By this I mean that the maker finds in his product exactly what he put into it. If he wants to make a machine, he will cut out its parts one by one and then assemble them: the finished machine will display both the parts and their assembly. The whole of the result here represents the whole of the work, and to each part of the work there corresponds a part of the result.

Now, I grant that positive science can and must proceed as if organization were work of the same kind. Only on that condition will it get a hold on organized bodies. Its object, indeed, is not to reveal to us the heart of things, but to furnish us with the best means of acting on them. Now, physics and chemistry are already advanced sciences, and living matter lends itself to our action only insofar as we can treat it by the methods of our physics and our chemistry. Organization will therefore be open to scientific study only if the organized body has first been likened to a machine. The cells will be the parts of the machine, the organism their assemblage. And the elementary labors that organized the parts will be taken to be the real elements of the labor that organized the whole. Such is the point of view of science. That of philosophy, in our opinion, is quite different.

[102] For us, the whole of an organized machine does indeed represent, strictly speaking, the whole of the organizing work (though even this is only approximately true), but the parts of the machine do not correspond to parts of the work, for *the*

materiality of this machine no longer represents a set of means employed, but a set of obstacles circumvented: it is a negation rather than a positive reality. Thus, as we showed in an earlier study, vision is a power that would reach, *in principle*, an infinity of things inaccessible to our gaze. But such a vision would not extend into action; it would suit a ghost, not a living being. The vision of a living being is an effective vision, limited to the objects on which that being can act: it is a *canalized* vision, and the visual apparatus simply symbolizes the work of canalization. Hence the creation of the visual apparatus is no more explained by the assembling of its anatomical elements than the digging of a canal would be explained by a load of earth that had formed its banks. The mechanistic thesis would consist in saying that the earth had been brought cartload by cartload; finalism would add that the earth had not been dumped at random, that the carters had followed a plan. But mechanism and finalism would both be mistaken, for the canal came about in another way.

THE HAND IN THE IRON FILINGS

An organ is like the shape left by a hand pushing through filings.

More precisely, we were comparing the process by which nature constructs an eye to the simple act by which we raise our hand. But we supposed that the hand met with no resistance. Let us imagine that, instead of moving through the air, my hand has to pass through iron filings which are compressed and resist more and more as I advance. At a certain moment my hand will have exhausted its effort, and at that precise moment the grains of filings will [103] have juxtaposed and coordinated themselves into a definite form—the very form of the hand that stops and of part of the arm. Now suppose that the hand and arm have remained invisible. The onlookers will seek the reason for the arrangement in the grains of filings themselves and in forces internal to the mass. Some will relate the position of each grain to the action that the neighboring grains exert on it: these will be

mechanists. Others will hold that an overall plan governed the detail of these elementary actions: they will be finalists. But the truth is that there has simply been one indivisible act, that of the hand passing through the filings: the inexhaustible detail of the movement of the grains, as well as the order of their final arrangement, expresses this undivided movement negatively, in a sense, being the overall form of a resistance and not a synthesis of positive elementary actions. That is why, if we give the name "effect" to the arrangement of the grains and the name "cause" to the movement of the hand, we may say, strictly speaking, that the whole of the effect is explained by the whole of the cause, but parts of the effect will in no way correspond to parts of the cause. In other words, neither mechanism nor finalism will be in place here, and we shall have to resort to a mode of explanation *sui generis*. Now, on the hypothesis we are proposing, the relation of vision to the visual apparatus would be roughly that of the hand to the iron filings, which trace, canalize and limit its movement.

The greater the effort of the hand, the farther it goes into the filings. But wherever it stops, the grains instantly and automatically settle into equilibrium and coordinate themselves with one another. So it is with vision and its organ. According as the [104] undivided act that constitutes vision advances more or less far, the materiality of the organ is made up of a greater or lesser number of elements coordinated with one another, but the order is necessarily complete and perfect. It cannot be partial because, once again, the real process that gives rise to it has no parts. This is what neither mechanism nor finalism takes into account, and it is what we too overlook when we marvel at the wonderful structure of an instrument like the eye. At the bottom of our astonishment there is always the idea that *only a part* of this order *might have been* realized, that its complete realization is a kind of grace. This grace the finalists have dispensed to them all at once by the final cause; the mechanists claim to obtain it little by little through the effect of natural selection; but both see in this order something positive, and consequently

in its cause something that can be broken into fractions, admitting every possible degree of completion. In reality the cause is more or less intense, but it can produce its effect only as a whole, and in finished form. Depending on how far it goes in the direction of vision, it will yield the simple pigment spots of a lower organism, or the rudimentary eye of a Serpula, or the already differentiated eye of Alciope, or the marvelously perfected eye of a bird; but all these organs, of very unequal complexity, will necessarily present an equal coordination. That is why, however far apart two animal species may be, if on both sides the progress toward vision has gone equally far, there will be the same visual organ on both sides, for the form of the organ merely expresses the degree to which the exercise of the function has been achieved.[74]

105 But in speaking of a progress toward vision, are we not returning to the old conception of finality? That would be so, no doubt, if this progress required the representation, conscious or unconscious, of an end to be attained. But the truth is that it is carried out by virtue of the original vital impetus, that it is implied in this very movement, and that this is precisely why it is found on independent lines of evolution. If we are now asked why and how it is implied in that movement, we shall answer that life is, above all, a tendency to act on inert matter. The direction of this action is doubtless not predetermined: hence the unforeseeable variety of forms that life, as it evolves, scatters along its path. But this action always presents, to a greater or lesser degree, the character of contingency; it implies at least a rudiment of choice. Now, a choice presupposes the anticipatory representation of several possible actions. Possibilities of action must therefore be sketched out for the living being before the action itself. Visual perception is nothing else[75]: the visible outlines of bodies are the design of our possible action on them. Vision will therefore be found, in different degrees, in the most

74 Serpula is a genus of tube-dwelling marine worms; Alciope, a genus of free-swimming marine worms with notably well-developed eyes.

75 BERGSON'S NOTE. See, on this subject, *Matière et Mémoire*, ch. I.

diverse animals, and it will manifest itself in the same complexity of structure wherever it has reached the same degree of intensity.

We have dwelt on these similarities of structure in general, and on the example of the eye in particular, because we had to define our attitude toward mechanism on the one hand and finalism on the other. It now remains for us to describe that attitude more precisely in itself. [106] This we shall do by considering the divergent results of evolution, no longer in what they present that is analogous, but in what they have that is mutually complementary.

Chapter II: The Divergent Directions of the Evolution of Life—Torpor, Intelligence, Instinct

Les directions divergentes de l'évolution de la vie. Torpeur, intelligence, instinct
Plants and animals, instinct and intelligence as two diverging solutions; the intellect as a maker of tools.

[107] The evolutionary movement would be a simple thing, and we should soon have determined its direction, if life described a single trajectory, like that of a solid cannonball fired from a cannon. But here we are dealing with a shell that burst at once into fragments, which, being themselves shells of a sort, burst in their turn into fragments destined to burst again, and so on for a very long time. We perceive only what is nearest to us, the scattered movements of the pulverized splinters. It is from them that we must work our way back, stage by stage, to the original movement.

When the shell bursts, its particular fragmentation is explained both by the explosive force of the powder it contains and by the resistance the metal offers to it. So it is with the fragmentation of life into individuals and species. It stems, we believe, from two sets of causes: the resistance that life meets from inert matter, and the explosive force—due to an unstable balance of tendencies—that life bears within itself.

The resistance of inert matter was the obstacle that had to be got round first. Life seems to have succeeded in this through humility, by making itself very small and very insinuating, com-

promising with physical and chemical forces, even consenting to go part of the way with them, like [108] the switch on a railway line when for a few moments it follows the direction of the rail it means to break away from. Of the phenomena observed in the most elementary forms of life, we cannot say whether they are still physical and chemical or already vital. Life had to enter in this way into the habits of inert matter, so as to draw this magnetized matter little by little onto another track. The first animate forms to appear were therefore extremely simple. They were probably tiny masses of scarcely differentiated protoplasm, outwardly comparable to the amoebae we observe today, but with, in addition, the tremendous inner thrust that was to raise them to the higher forms of life. That by virtue of this thrust the first organisms sought to grow as large as possible seems to us probable; but organized matter has a limit of expansion that is very quickly reached. Beyond a certain point it divides in two rather than grow. It doubtless took centuries of effort and prodigies of subtlety for life to get round this new obstacle. It prevailed on a growing number of elements, ready to divide, to remain united. Through the division of labor it tied an indissoluble bond between them. The complex, quasi-discontinuous organism thus functions as a continuous living mass would have done if it had simply grown.

LIFE DIVIDES LIKE A SHEAF

A tendency splits into divergent directions as it grows, and nature keeps them all.

But the true and deep causes of division were those that life bore within itself. For life is tendency, and the essence of a tendency is to develop in the form of a sheaf, creating, by the mere fact of its growth, divergent directions among which its impetus will be divided. This is what we observe in ourselves, in the evolution of that special tendency we call our [109] character. Each of us, glancing back over our own history, will find that our childhood personality, though indivisible, united within it various persons,

who could remain fused together because they were in a nascent state: this indecision so full of promise is even one of the greatest charms of childhood. But personalities that interpenetrate become incompatible as they grow, and since each of us lives only one life, we are forced to make a choice. In reality we are constantly choosing, and constantly, too, we are giving up a great many things. The road we travel in time is strewn with the debris of all that we were beginning to be, of all that we might have become. But nature, which has an incalculable number of lives at its disposal, is in no way bound to make such sacrifices. It preserves the various tendencies that have forked as they grew. With them it creates divergent series of species, which will evolve separately.

These series may, moreover, be of unequal importance. The author who begins a novel puts into his hero a host of things he is obliged to give up as he goes on. Perhaps he will take them up again later in other books, to make new characters out of them, who will appear as extracts from, or rather as complements to, the first; but almost always these will have something cramped about them compared with the original character. So it is with the evolution of life. The forks along the way have been many, but there have been many dead ends beside two or three great highways; and of these highways themselves only one, the one that climbs up through the vertebrates to man, has been wide enough to let the great breath of life pass freely. We [110] have this impression when we compare the societies of bees or ants, for example, with human societies. The former are admirably disciplined and united, but frozen; the latter are open to every kind of progress, but divided, and in ceaseless conflict with themselves. The ideal would be a society always on the move and always in equilibrium, but this ideal is perhaps not attainable: the two characters that would like to complete each other, and do complete each other in the embryonic state, become incompatible as they grow more pronounced. If one could speak, otherwise than metaphorically, of an impulse toward social life, one would have to say that the bulk of the impulse went along

the line of evolution that ends in man, and that the rest was gathered up on the path leading to the Hymenoptera: the societies of ants and bees would thus present the complementary aspect of our own. But this would be only a manner of speaking. There has been no particular impulse toward social life.[1] There is simply the general movement of life, which creates ever new forms along divergent lines. If societies are to appear on two of these lines, they must display the divergence of the paths as well as the impetus they share. They will thus develop two sets of characters, which we shall find vaguely complementary to each other.

NEITHER ADAPTATION NOR PLAN

Circumstances shape the windings of evolution, but not its direction or its movement.

The study of the evolutionary movement will therefore consist in disentangling a certain number of divergent directions, in assessing the importance of what has happened on each of them —in a word, in determining the nature of the dissociated tendencies and gauging their proportions. By then combining these tendencies, we shall obtain an approximation, or rather an imitation, of the indivisible motive principle from which their impetus proceeded. That is to say, we shall see in evolution 111 something quite other than a series of adaptations to circumstances, as mechanism claims, and something quite other, too, than the realization of an overall plan, as the doctrine of finality would have it.

That the necessary condition of evolution is adaptation to the environment, we do not in the least dispute. It is all too obvious that a species disappears when it fails to bend to the conditions of existence imposed on it. But it is one thing to recognize that external circumstances are forces evolution must reckon with, and quite another to maintain that they are the directing causes of evolution. This latter thesis is that of mechanism. It abso-

1 The Hymenoptera are the order of insects that includes ants, bees and wasps.

lutely excludes the hypothesis of an original vital impetus—I mean an inner thrust that would carry life, through ever more complex forms, toward ever higher destinies. Yet this impetus is visible, and a mere glance at fossil species shows us that life could have done without evolving, or could have evolved only within very narrow limits, if it had chosen the far more convenient course of stiffening into its primitive forms. Certain foraminifera have not varied since the Silurian period. Impassive witnesses of the countless upheavals that have convulsed our planet, the lingulae are today what they were in the remotest times of the Paleozoic era.[2]

The truth is that adaptation explains the windings of the evolutionary movement, but not the general directions of the movement, still less the movement itself[3]. The road that leads to the town is obliged to climb the hills and go down the slopes; it *adapts* [112] itself to the unevenness of the ground; but the unevenness of the ground is not the cause of the road, nor has it given the road its direction. At every moment it supplies the road with what is indispensable, the very ground on which it rests; but if we consider the road as a whole, and no longer each of its parts, the unevenness of the ground appears only as so many hindrances or causes of delay, for the road was simply aiming at the town and would have liked to be a straight line. So it is with the evolution of life and the circumstances it passes through—with this difference, however, that evolution does not trace a single road, that it takes directions without aiming at goals, and finally that it remains inventive even in its adaptations.

But if the evolution of life is something other than a series of adaptations to accidental circumstances, neither is it the realization of a plan. A plan is given in advance. It is represented, or at least representable, before the detail of its realization. Its complete execution may be put off to a distant future, even pushed

2 Foraminifera are single-celled marine organisms with shells; Lingula is a genus of brachiopods, a classic "living fossil."

3 BERGSON'S NOTE. This view of adaptation was pointed out by F. Marin in a remarkable article on the *Origine des espèces (Revue scientifique*, Nov. 1901, p. 580).

back indefinitely; the idea of it is nonetheless formulable here and now, in terms already given. If, on the contrary, evolution is a creation ceaselessly renewed, it creates as it goes not only the forms of life, but the ideas that would enable an intellect to understand it and the terms that would serve to express it. That is to say, its future overflows its present and could not be sketched out in it as an idea.

That is the first error of finalism. It leads to another, still more serious.

If life realizes a plan, it ought to display a higher harmony the further it advances. Just so, the house traces ever more clearly the idea of the [113] architect as stone rises upon stone. If, on the contrary, the unity of life lies wholly in the impetus that drives it along the road of time, the harmony is not ahead but behind. The unity comes from a *vis a tergo*: it is given at the start as an impulsion, not set at the end as an attraction. The impetus divides more and more as it communicates itself.[4] Life, as it progresses, scatters itself into manifestations which will doubtless owe to their common origin the fact of being complementary to one another in certain respects, but which will be no less antagonistic and incompatible with one another. Thus the disharmony between species will keep growing. And so far we have pointed out only its essential cause. We have supposed, for simplicity's sake, that each species accepted the impulsion it received in order to pass it on to others, and that, in every direction in which life evolves, the propagation proceeded in a straight line. In fact, there are species that come to a halt, and some that turn back. Evolution is not only a forward movement; in many cases we observe a marking time on the spot, and still more often a deviation or a turning back. It must be so, as we shall show later, and the same causes that split up the evolutionary movement cause life, as it evolves, often to become distracted from itself, hypnotized by the form it has just produced. But the result is a growing disorder. No doubt there is progress, if by progress we mean a continuous advance in the general direction

4 *Vis a tergo*: Latin, "a force from behind."

determined by a first impulsion; but this progress is achieved only on the two or three great lines of evolution along which ever more complex, ever higher forms take shape: between these lines run a host of secondary paths on which, on the contrary, deviations, halts and retreats [114] multiply. The philosopher who had begun by laying it down as a principle that every detail is connected with an overall plan goes from disappointment to disappointment the day he sets about examining the facts; and since he had put everything on the same level, he now comes, for having refused to allow for accident, to believe that everything is accidental. We must, on the contrary, begin by giving accident its share, which is very large. We must recognize that not everything in nature is coherent. We shall thereby be led to determine the centers around which the incoherence crystallizes. And this very crystallization will clarify the rest; the great directions will appear, along which life moves as it develops the original impulsion. We shall not, it is true, witness the detailed fulfillment of a plan. There is more, and better, here than a plan being carried out. A plan is an end point assigned to a piece of work: it closes off the future whose form it traces. Before the evolution of life, on the contrary, the doors of the future remain wide open. It is a creation that goes on without end by virtue of an initial movement. This movement makes the unity of the organized world—a fertile unity, of infinite richness, superior to anything an intellect could dream of, since the intellect is only one of its aspects or products.

But it is easier to define the method than to apply it. The complete interpretation of the evolutionary movement in the past, as we conceive it, would be possible only if the history of the organized world were complete. We are far from any such result. The genealogies proposed for the various species are, more often than not, problematic. They vary with their authors and with the theoretical views that inspire them, and they raise debates that the current state of science does not allow us to [115] settle. But by comparing the various solutions with one another, we shall see that the controversy concerns the details rather

than the main lines. By following the main lines as closely as possible, then, we shall be sure not to go astray. Besides, they alone matter to us, for we do not aim, as the naturalist does, to recover the order of succession of the various species, but only to define the principal directions of their evolution. And even these directions are not all of equal interest to us: it is the path leading to man that must concern us most particularly. In following them all, then, we shall not lose sight of the fact that the chief point is to determine the relation of man to the animal kingdom as a whole, and the place of the animal kingdom itself in the organized world as a whole.

PLANT AND ANIMAL

The two kingdoms differ in tendency: the plant makes its own food, the animal must seek it.

To begin with the second point, let us say that no precise characteristic distinguishes the plant from the animal. Attempts to define the two kingdoms rigorously have always failed. There is not a single property of plant life that has not been found, to some degree, in certain animals, nor a single characteristic trait of the animal that has not been observed in certain species, or at certain moments, in the plant world. It is understandable, then, that biologists enamored of rigor have regarded the distinction between the two kingdoms as artificial. They would be right if definition had to proceed here as in the mathematical and physical sciences, by certain static attributes that the defined object possesses and others do not. Quite different, in our view, is the kind of definition suited to the life sciences. There is scarcely any manifestation of life that does not [116] contain, in a rudimentary, latent or virtual state, the essential characteristics of most other manifestations. The difference lies in the proportions. But this difference of proportion will suffice to define the group in which it is found, if it can be established that it is not accidental and that the group, as it evolved, tended more and more to *put the emphasis* on these particular characteristics. In a word, *the*

group will no longer be defined by the possession of certain characteristics, but by its tendency to accentuate them. If we take up this point of view, if we take account of tendencies rather than states, we find that plants and animals can be defined and distinguished precisely, and that they do indeed correspond to two divergent developments of life.

This divergence shows itself first in the mode of nutrition. We know that the plant takes directly from the air, water and soil the elements it needs to maintain life, in particular carbon and nitrogen: it takes them in their mineral form. The animal, on the contrary, can take hold of these same elements only if they have already been fixed for it in organic substances, either by plants or by animals which owe them, directly or indirectly, to plants. So in the end it is the plant that feeds the animal. It is true that this law admits of many exceptions among plants. Yet no one hesitates to class among plants the Drosera, the Dionaea and the Pinguicula, which are insectivorous plants.[5] On the other hand, fungi, which occupy so considerable a place in the vegetable world, feed like animals. Whether they are ferments, saprophytes or parasites, they take their nourishment from organic substances already formed. So we cannot draw from this difference a static definition that would settle [117] automatically, in any case whatever, the question whether we are dealing with a plant or an animal. But this difference can furnish the beginning of a dynamic definition of the two kingdoms, in that it marks the two divergent directions in which plants and animals have taken flight. It is a remarkable fact that fungi, which are spread through nature in such extraordinary abundance, have not been able to evolve. Organically, they rise no higher than the tissues which, in the higher plants, form in the embryo sac of the ovule and precede the germinative development of the new individual[6]. They are, one might say, the stunted runts of the veget-

5 Drosera, Dionaea and Pinguicula are the sundew, the Venus flytrap and the butterwort.

6 BERGSON'S NOTE. De Saporta and Marion, *L'évolution des Cryptogames* [The Evolution of the Cryptogams], 1881, p. 37.

able world. Their various species are so many dead ends, as if, by renouncing the ordinary mode of nutrition of plants, they had come to a halt on the great highway of plant evolution. As for the Droseras, the Dionaeas and insectivorous plants in general, they feed like other plants through their roots. Through their green parts they also fix the carbon of the carbonic acid contained in the atmosphere.[7] The faculty of capturing insects, absorbing them and digesting them must have arisen in these plants late, and in quite exceptional cases, where the soil was too poor to provide them with sufficient nourishment. Generally speaking, suppose we attend less to the presence of characters than to their tendency to develop. Suppose too that we regard as essential the tendency along which evolution has been able to continue indefinitely. We shall then say that plants are distinguished from animals by the power of creating organic matter out of mineral elements, which they draw directly from the atmosphere, the [118] soil and water. But bound up with this difference is another, already more profound.

The animal cannot directly fix the carbon and nitrogen that are present everywhere. To feed on them, it is obliged to seek out the plants that have already fixed these elements, or the animals that have themselves borrowed them from the vegetable kingdom. The animal is therefore necessarily mobile. Consider the amoeba, which throws out its pseudopodia at random to seize the organic matter scattered in a drop of water. Consider the higher animals, which possess sense organs to recognize their prey, locomotor organs to go and seize it, and a nervous system to coordinate their movements with their sensations. From the one to the other, animal life is characterized, in its general direction, by mobility in space. In its most rudimentary form, the animal presents itself as a small mass of protoplasm. At most it is wrapped in a thin albuminoid film, which leaves it entirely free to change shape and to move. The plant cell, on the contrary, surrounds itself with a membrane of cellulose that condemns it to immobility. And from the bottom to the top of

7 Bergson's "carbonic acid" is what is now called carbon dioxide.

the vegetable kingdom we find the same habits, more and more sedentary. The plant has no need to go anywhere. It finds around it, in the atmosphere, in the water and in the soil where it is placed, the mineral elements that it appropriates directly. Certainly, phenomena of movement are observed in plants too. Darwin wrote a fine book on the movements of climbing plants.[8] He studied the maneuvers by which certain insectivorous plants, such as the Drosera and the Dionaea, seize their prey. The movements of the leaves of the acacia, the sensitive plant and others are well known. Moreover, the to-and-fro of plant protoplasm within its envelope is there to testify to its kinship with [119] the protoplasm of animals. Conversely, in a host of animal species (generally parasites) one could observe phenomena of fixation analogous to those found in plants[9]. Here again we should be mistaken if we claimed that fixity and mobility were two characters that let us decide at a glance whether we are in the presence of a plant or an animal. But in the animal, fixity most often appears as a torpor into which the species has fallen, as a refusal to evolve further in a certain direction. It is a close relative of parasitism, and it is accompanied by characters reminiscent of those of plant life. On the other hand, the movements of plants have neither the frequency nor the variety of those of animals. They usually involve only one part of the organism and almost never extend to the whole of it. In the exceptional cases where a vague spontaneity appears in them, it seems as if we were witnessing the accidental awakening of an activity that is normally asleep. In short, mobility and fixity coexist in the vegetable world as in the animal world. But the balance is clearly tipped in favor of fixity in the one case and of mobility in the other. These two opposed tendencies so evidently direct the two evolutions that we could already define the

8 Charles Darwin, *On the Movements and Habits of Climbing Plants* (1865; expanded 1875).

9 BERGSON'S NOTE. On fixation and parasitism in general, see Houssay's work *La forme et la vie* [Form and Life], Paris, 1900, pp. 721–807.

two kingdoms by them. But fixity and mobility, in their turn, are only the surface signs of tendencies more profound still.

MOBILITY AND CONSCIOUSNESS

Consciousness goes with the power to move; the fixed plant lets it fall asleep.

Between mobility and consciousness there is an evident relation. Certainly, the consciousness of the higher organisms seems bound up with certain cerebral arrangements. The more the nervous system develops, the more numerous and the more
120 precise are the movements among which it can choose, and the more luminous too is the consciousness that accompanies them. But neither this mobility, nor this choice, nor consequently this consciousness, has as its necessary condition the presence of a nervous system. The nervous system has only channeled into definite directions, and raised to a higher degree of intensity, a rudimentary and vague activity diffused throughout the mass of organized substance. The further down the animal series we go, the more the nerve centers simplify and also separate from one another. Finally the nervous elements disappear, submerged in the whole of a less differentiated organism. But the same is true of all the other systems, of all the other anatomical elements. It would be as absurd to deny consciousness to an animal because it has no brain as to declare it incapable of feeding itself because it has no stomach. The truth is that the nervous system was born, like the other systems, of a division of labor. It does not create the function. It only raises it to a higher degree of intensity and precision by giving it the double form of reflex activity and voluntary activity. To perform a true reflex movement, a whole mechanism set up in the spinal cord or the medulla is needed. To choose voluntarily between several definite courses of action, cerebral centers are needed: that is to say, crossroads from which paths lead out to motor mechanisms of diverse configuration and equal precision. But suppose there has not yet been any channeling into nervous ele-

ments, still less any concentration of nervous elements into a system. There is still something from which both the reflex and the voluntary will emerge, by splitting in two. This something has neither the mechanical precision of the first nor the intelligent hesitations of the second. But, [121] partaking in infinitesimal measure of both, it is a reaction that is simply undecided, and therefore already vaguely conscious. That is to say, the humblest organism is conscious to the extent that it moves *freely*. Is consciousness here, in relation to movement, the effect or the cause? In one sense it is the cause, since its role is to direct locomotion. But in another sense it is the effect, for it is motor activity that sustains it; as soon as that activity disappears, consciousness atrophies, or rather falls asleep. Take crustaceans such as the rhizocephalans, which must once have had a more differentiated structure: in them, fixity and parasitism accompany the degeneration and near-disappearance of the nervous system. In such a case, the progress of organization had localized all conscious activity in nerve centers. So we may conjecture that consciousness is even weaker in animals of this kind than in much less differentiated organisms, which have never had nerve centers but have remained mobile.[10]

How, then, could the plant, which has fixed itself to the earth and finds its food on the spot, have developed in the direction of conscious activity? The cellulose membrane in which the protoplasm wraps itself immobilizes the simplest plant organism. At the same time it largely shields it from the external stimuli that act on the animal as irritants of sensibility and keep it from falling asleep[11]. The plant is therefore generally unconscious. Here again we must beware of radical distinctions. Unconsciousness and consciousness are not two labels that can be stuck on mechanically, the one on every plant cell, the other on all [122] animals. If consciousness falls asleep in the animal that has degenerated into an immobile parasite, conversely it doubtless awakens in

10 The rhizocephalans are parasitic barnacles that live inside crabs, reduced in the adult to a root-like mass.

11 BERGSON'S NOTE. Cope, *op. cit.*, p. 76.

the plant that has regained the freedom of its movements. And it awakens in exact proportion to the extent that the plant has regained this freedom. Consciousness and unconsciousness nonetheless mark the directions in which the two kingdoms have developed. To find the best specimens of consciousness in the animal, we must *go up* to the highest representatives of the series. To discover probable cases of plant consciousness, on the other hand, we must *go down* as low as possible on the scale of plants. We must reach the zoospores of algae, for example, and more generally those unicellular organisms of which it may be said that they hesitate between the plant form and animality. From this point of view, and to this extent, we would define the animal by sensibility and awakened consciousness, the plant by consciousness asleep and by insensibility.

To sum up, the plant makes organic substances directly out of mineral substances. This aptitude generally exempts it from moving, and by that very fact from feeling. Animals, obliged to go in search of their food, have evolved in the direction of locomotor activity, and consequently of a consciousness ever wider and ever more distinct.

Now, the animal cell and the plant cell derive from a common stock; the first living organisms oscillated between the plant form and the animal form, partaking of both at once. This seems to us beyond doubt. We have just seen, indeed, that the characteristic tendencies of the evolution of the two kingdoms, though divergent, still coexist [123] today in both the plant and the animal. Only the proportion differs. Ordinarily one of the two tendencies covers or crushes the other. But in exceptional circumstances the second frees itself and regains its lost place. The mobility and consciousness of the plant cell are not so deeply asleep that they cannot awaken when circumstances permit or require it. And on the other hand, the evolution of the animal kingdom has been constantly delayed, or halted, or pulled backward by the tendency it has kept toward vegetative life. However full, however overflowing the activity of an animal species may appear, torpor and unconsciousness lie in wait for it. It

keeps up its role only by an effort, at the cost of fatigue. Along the road on which the animal has evolved, there have been countless failures and lapses, most of them connected with parasitic habits. They are so many switches shunting it onto the track of vegetative life. Thus everything leads us to suppose that plant and animal descend from a common ancestor which united, in a nascent state, the tendencies of both.

But the two tendencies, which implied each other in this rudimentary form, became dissociated as they grew. Hence the world of plants, with its fixity and insensibility; hence the animals, with their mobility and consciousness. There is no need, moreover, to call in a mysterious force to explain this splitting in two. It is enough to observe that the living being naturally leans toward what is most convenient for it. Plants and animals have each opted for a different kind of convenience in the way they procure the carbon and nitrogen they need. The former draw these elements, continuously and mechanically, from a medium that supplies them unceasingly. The [124] latter, by an action that is discontinuous, concentrated into a few moments, and conscious, go and seek these substances in organisms that have already fixed them. These are two different ways of understanding work—or, if you prefer, idleness. So it seems doubtful to us that nervous elements will ever be discovered in the plant, however rudimentary we suppose them to be. What corresponds in the plant to the directing will of the animal is, we believe, the direction in which it bends the energy of solar radiation, when it uses that energy to break the bonds between carbon and oxygen in carbonic acid. What corresponds in the plant to the sensibility of the animal is the quite special sensitivity of its chlorophyll to light. Now, a nervous system is above all a mechanism that serves as an intermediary between sensations and volitions. The true "nervous system" of the plant therefore seems to us to be the mechanism—or rather the *sui generis* chemical process—that serves as an intermediary between the sensitivity of its chlorophyll to light and the production of starch. This amounts to saying that the plant must have no nervous elements, and that *the*

same impetus that led the animal to give itself nerves and nerve centers must have issued, in the plant, in the chlorophyll function[12].

This first glance at the organized world will [125] allow us to determine in more precise terms what unites the two kingdoms, and also what separates them.

STORING AND RELEASING ENERGY

Plants store solar energy; animals spend it in sudden, explosive movements.

Let us suppose, as we suggested in the previous chapter, that at the root of life there is an effort to graft the greatest possible amount of indetermination onto the necessity of physical forces. This effort cannot succeed in creating energy. Or, if it does create any, the quantity created does not belong to the order of magnitude that our senses and our measuring instruments, our experience and our science, can grasp. Everything will therefore happen as if the effort aimed simply at making the best use of a preexisting energy that it finds at its disposal. It has only one way of succeeding. It must obtain from matter such an accumulation of potential energy that, at a given moment, by working a trigger, it can obtain the work it needs in order to act. It possesses in itself only this power of release. But the work of release, though always the same and always smaller than any given quantity, will be the more effective the heavier the weight it lets fall and the greater the height from which it falls; in other words, the greater the sum of potential energy accumulated and available. In fact, the principal source of the energy usable at the surface of our planet is the Sun. The problem, then, was this.

12 BERGSON'S NOTE. Just as the plant in certain cases recovers the faculty of active movement that lies dormant in it, so the animal can, in exceptional circumstances, return to the conditions of vegetative life and develop within itself an equivalent of the chlorophyll function. Indeed, the recent experiments of Maria von Linden seem to show that the chrysalises and caterpillars of various lepidoptera, under the influence of light, fix the carbon of the carbonic acid contained in the atmosphere (M. von Linden, *L'assimilation de l'acide carbonique par les chrysalides de Lépidoptères* [The Assimilation of Carbonic Acid by the Chrysalises of Lepidoptera], *C. R. de la Soc. de biologie*, 1905, pp. 692 ff.).

Here and there on the surface of the earth, the Sun had to be made to suspend, partially and provisionally, its incessant expenditure of usable energy. It had to be made to store up a certain quantity of it, as energy not yet used, in suitable reservoirs, from which it could later flow out at the desired moment, at the desired place, in the desired direction. The substances on which the animal feeds are precisely reservoirs of this kind. They are made up of very complex molecules that contain, in a [126] potential state, a considerable sum of chemical energy. They are a sort of explosive, waiting only for a spark to set free the stored-up force. Now, it is probable that life at first tended to achieve, at a single stroke, both the manufacture of the explosive and the explosion that uses it. In that case the same organism that had directly stored up the energy of solar radiation would have spent it in free movements through space. That is why we must presume that the first living beings sought, on the one hand, to accumulate energy borrowed from the Sun without respite, and on the other, to spend it in a discontinuous and explosive manner through movements of locomotion. The chlorophyll-bearing infusoria, the euglenas, perhaps still symbolize this primordial tendency of life today, though in a cramped form incapable of evolving.[13] Does the divergent development of the two kingdoms correspond to what we might call, metaphorically, each kingdom's forgetting of one of the two halves of the program? Or rather—and this is more likely—did the very nature of the matter that life found before it on our planet prevent the two tendencies from evolving very far together in one and the same organism? What is certain is that the plant has pressed chiefly in the first direction and the animal in the second. But if, from the outset, the manufacture of the explosive had the explosion as its object, then it is the evolution of the animal, far more than that of the plant, that indicates, on the whole, the fundamental direction of life. The "harmony" of the two kingdoms, the complementary characters

13 Euglenas are single-celled freshwater organisms that both photosynthesize like plants and swim like animals.

they present, would thus derive, in the end, from the fact that they develop two tendencies originally fused into one. The more the original and [127] single tendency grows, the harder it finds it to keep united in the same living being the two elements which, in the rudimentary state, are implied in each other. Hence a splitting in two; hence two divergent evolutions. Hence also two series of characters, opposed on certain points and complementary on others, which, whether complementary or opposed, always keep a family resemblance. While the animal was evolving—not without accidents along the way—toward an ever freer expenditure of discontinuous energy, the plant was rather perfecting its system of accumulation on the spot. We shall not dwell on this second point. Suffice it to say that the plant in its turn must have been greatly served by a new splitting, analogous to the one that had occurred between plants and animals. The primitive plant cell may have had to fix both its carbon and its nitrogen by itself. But it could almost give up the second of these functions on the day when microscopic plants pressed exclusively in that direction, specializing, moreover, in various ways in this still complicated work. There are microbes that fix the nitrogen of the atmosphere, and others that convert, in turn, ammonia compounds into nitrous compounds and these into nitrates. Through the same dissociation of an originally single tendency, they have rendered to the whole vegetable world the same kind of service that plants in general render to animals. If we created a special kingdom for these microscopic plants, we could say that the microbes of the soil, the plants and the animals present us with the *analysis* of all that life at first contained in a state of reciprocal implication—an analysis carried out by the matter that life had at its disposal on our planet. Is this, strictly speaking, [128] a "division of labor"? These words would not give an exact idea of evolution as we conceive it. Where there is division of labor, there is *association*, and there is also *convergence* of effort. The evolution we are speaking of, on the contrary, never takes place in the direction of association but of *dissociation*, never toward convergence but toward divergence of efforts. The

harmony between terms that complement each other on certain points is not produced, in our view, along the way, by reciprocal adaptation. On the contrary, it is fully complete only at the start. It derives from an original identity. It comes from the fact that the evolutionary process, which spreads out in the form of a sheaf, draws apart from one another, as they grow simultaneously, terms at first so perfectly complementary that they were merged together.

Moreover, the elements into which a tendency dissociates are far from all having the same importance, and above all the same power to evolve. We have just distinguished three different kingdoms, if one may put it that way, in the organized world. The first comprises only microorganisms that have remained in a rudimentary state, while animals and plants have soared toward very high destinies. Now this is what usually happens when a tendency analyzes itself. Among the divergent developments to which it gives rise, some continue indefinitely; others come more or less quickly to the end of their tether. These latter do not issue directly from the primitive tendency, but from one of the elements into which it has divided. They are residual developments, made and deposited along the way by some truly elementary tendency, which itself goes on evolving. As for these truly [129] elementary tendencies, they bear, we believe, a mark by which they can be recognized.

This mark is like a trace, still visible in each of them, of what was contained in the original tendency whose elementary directions they represent. The elements of a tendency are not comparable, indeed, to objects set side by side in space and mutually exclusive. They are more like psychological states, each of which, though it is first of all itself, nevertheless partakes of the others, and so virtually contains the whole personality to which it belongs. There is no essential manifestation of life, we said, that does not present us, in a rudimentary or virtual state, with the characters of the other manifestations. Conversely, when we meet on one line of evolution the memory, so to speak, of what is developing along the other lines, we must conclude that we

are dealing with the dissociated elements of one and the same original tendency. In this sense, plants and animals do indeed represent the two great divergent developments of life. If the plant is distinguished from the animal by fixity and insensibility, movement and consciousness slumber in it like memories that may awaken. Besides, alongside these normally sleeping memories, there are others that are awake and active. They are those whose activity does not hinder the development of the elementary tendency itself. We might state this law: *When a tendency analyzes itself as it develops, each of the particular tendencies thus born tries to preserve and develop everything in the primitive tendency that is not incompatible with the work in which it has specialized*. This would precisely explain the fact we dwelt on in the previous chapter: the formation of [130] identical complex mechanisms on independent lines of evolution. Certain deep analogies between plant and animal probably have no other cause. Sexual reproduction is perhaps only a luxury for the plant. But the animal had to come to it, and the plant must have been carried toward it by the same impetus that drove the animal there: a primitive, original impetus, prior to the splitting of the two kingdoms. We shall say as much of the plant's tendency toward increasing complexity. This tendency is essential to the animal kingdom, which is driven by the need for ever more extensive, ever more effective action. But plants, which have condemned themselves to insensibility and immobility, show the same tendency only because they received the same impulse at the start. Recent experiments show them varying in any direction whatever when the period of "mutation" arrives, whereas the animal must have evolved, we believe, in much more definite directions. But we shall not dwell further on this original splitting of life. Let us come to the evolution of animals, which concerns us more particularly.

THE NERVOUS SYSTEM AT THE CENTER

The rest of the higher organism serves the sensorimotor system and supplies its energy.

What constitutes animality, we said, is the faculty of using a trigger mechanism to convert as great a sum as possible of accumulated potential energy into "explosive" actions. At the beginning the explosion happens at random, unable to choose its direction: thus the amoeba throws out its pseudopodal extensions in all directions at once. But as we rise in the animal series, we see the very form of the body trace out a certain number of well-defined directions along which the energy will travel. These directions are marked by as many [131] chains of nervous elements placed end to end. Now, the nervous element has gradually emerged from the barely differentiated mass of organized tissue. We may therefore conjecture that, as soon as it appears, it is in the nervous element and its annexes that the faculty of suddenly releasing accumulated energy is concentrated. Strictly speaking, every living cell continually spends energy in keeping itself in equilibrium. The plant cell, drowsy from the start, is wholly absorbed in this work of conservation, as if it took for an end what was at first meant to be only a means. But in the animal everything converges on action, that is, on the use of energy for movements from place to place. No doubt each animal cell spends a good part of the energy at its disposal, often even all of it, simply on living. But the organism as a whole tries to draw as much of it as possible to the points where the movements of locomotion are carried out. So where a nervous system exists, with the sense organs and motor apparatus that serve as its appendages, everything must happen as if the essential function of the rest of the body were to prepare for them the force they will set free by a kind of explosion, and to transmit it to them at the desired moment.

The role of food in the higher animals is indeed extremely complex. It serves first to repair the tissues. Next, it supplies the

animal with the heat it needs to make itself as independent as possible of variations in the outside temperature. In this way it preserves, maintains and sustains the organism in which the nervous system is set and on which the nervous elements must live. But these nervous elements would have no reason for existing if this organism did not pass on to [132] them, and above all to the muscles they set in motion, a certain amount of energy to spend. We may even conjecture that this is, in sum, the essential and ultimate purpose of food. This does not mean that the greater part of the food is employed in this work. A state may have to incur enormous expenses to ensure the collection of taxes. The sum it will have at its disposal, once the costs of collection are deducted, may be minimal. It is nonetheless the reason for the tax and for all that has been spent to collect it. So it is with the energy that the animal demands of its foodstuffs.

Many facts seem to us to indicate that the nervous and muscular elements occupy this place with respect to the rest of the organism. Let us first glance at the distribution of foodstuffs among the various elements of the living body. These substances fall into two categories: the quaternary, or albuminoid, substances, and the ternary ones, which include the carbohydrates and the fats. The former are properly plastic, destined to rebuild the tissues—though, because of the carbon they contain, they can on occasion become energy-producing.[14] But the energy-producing function falls more especially to the latter. These are deposited in the cell rather than incorporated into its substance, and they bring it, in the form of chemical potential, a stored energy that will be converted directly into movement or heat. In short, the chief role of the former is to rebuild the machine; the latter supply it with energy. It is natural that the former should have no privileged place of preference, since every part of the machine needs maintaining. But the same is not true of the latter. The carbohydrates [133] are very unequally

14 Quaternary substances (proteins) contain four elements, including nitrogen; ternary ones (carbohydrates and fats) contain only carbon, hydrogen and oxygen.

distributed, and this inequality of distribution seems to us instructive in the highest degree.

These substances are carried by the arterial blood in the form of glucose, and they are deposited, in the form of glycogen, in the various cells that make up the tissues. We know that one of the principal functions of the liver is to keep the glucose content of the blood constant, thanks to the reserves of glycogen that the liver cell produces. Now, in this circulation of glucose and this accumulation of glycogen, it is easy to see that everything happens as if the whole effort of the organism were devoted to supplying potential energy to the elements of muscular tissue, and also to those of nervous tissue. It proceeds differently in the two cases, but it arrives at the same result. In the first case, it provides the cell with a considerable reserve, deposited in it in advance: the quantity of glycogen contained in the muscles is indeed enormous compared with what is found in the other tissues. In nervous tissue, on the contrary, the reserve is small. (The nervous elements, whose role is simply to release the potential energy stored in the muscle, never need, moreover, to supply much work at once.) But—a remarkable thing—this reserve is replenished by the blood at the very moment it is spent, so that the nerve recharges itself with potential energy instantly. Muscular tissue and nervous tissue are thus indeed two privileged tissues: the one in that it is supplied with a considerable reserve of energy, the other in that it is always served at the instant it needs energy, and in the exact measure in which it needs it.

More particularly, it is from the sensorimotor system that the call for glycogen—that is, for potential [134] energy—comes here, as if the rest of the organism were there to pass force on to the nervous system and to the muscles that the nerves set in motion. Certainly, when we think of the role the nervous system (even the sensorimotor one) plays as regulator of organic life, we may wonder whether, in this exchange of good offices between it and the rest of the body, it is really a master whom the body serves. But we shall already lean toward this hypo-

thesis if we consider the distribution of potential energy among the tissues in its static state, so to speak. And we shall come round to it entirely, we believe, if we reflect on the conditions in which energy is spent and restored. Suppose, indeed, that the sensorimotor system is a system like the others, of the same rank as the others. Borne by the organism as a whole, it will wait until a surplus of chemical potential has been supplied to it before doing work. In other words, it will be the production of glycogen that regulates how much of it the nerves and muscles consume. Suppose, on the contrary, that the sensorimotor system is truly dominant. The duration and extent of its action will be independent, to some extent at least, of the reserve of glycogen it contains, and even of the reserve that the organism as a whole contains. It will supply work, and the other tissues will have to manage as best they can to bring it potential energy. Now, this is precisely how things happen, as is shown in particular by the experiments of Morat and Dufourt[15]. The glycogenic function of the liver depends on the action of the excitatory nerves that govern it. But the action of these nerves is subordinate to that of the nerves that set the [135] locomotor muscles in motion. The latter begin by spending without counting; they thus consume glycogen and deplete the blood of glucose. The liver must then pour part of its reserve of glycogen into the depleted blood, and in the end they drive it to manufacture more. So it is indeed, in sum, from the sensorimotor system that everything starts and upon it that everything converges. We can say, without metaphor, that the rest of the organism is at its service.

Consider further what happens in prolonged fasting. It is a remarkable fact that in animals that have died of starvation the brain is found almost intact, whereas the other organs have lost a more or less large part of their weight and their cells have

15 BERGSON'S NOTE. *Archives de physiologie*, 1892.

undergone profound changes[16]. It seems as if the rest of the body had sustained the nervous system to the very last, treating itself as a mere means of which the nervous system was the end.

In short, let us agree, for brevity's sake, to call "sensorimotor system" the cerebrospinal nervous system together with the sensory apparatus into which it extends and the locomotor muscles it governs. We can then say that a higher organism consists essentially of a sensorimotor system installed on systems of digestion, respiration, circulation, secretion and so on. Their role is to repair it, to cleanse it, to protect it, to create a constant internal environment for it, and finally and above all to pass on to it [136] potential energy to be converted into locomotor movement[17]. It is true that the more the nervous function is perfected, the more the functions meant to support it have to develop, and consequently the more demands they make on their own behalf. As nervous activity emerged from the protoplasmic mass in which it was submerged, it must have called up around it activities of every kind to rest upon. These could develop only upon other activities, which in turn implied still others, indefinitely. That is how the complexity of functioning in the higher organisms goes on to infinity. The study of one of these organ-

16 BERGSON'S NOTE. De Manacéine, *Quelques observations expérimentales sur l'influence de l'insomnie absolue* [Some Experimental Observations on the Influence of Total Sleeplessness] (*Arch. ital. de biologie*, vol. XXI, 1894, pp. 322 ff.). Recently, similar observations were made on a man who died of starvation after a fast of 35 days. See on this subject, in the *Année biologique* for 1898, p. 338, the summary of a work (in Russian) by Tarakevitch and Stchasny.

17 BERGSON'S NOTE. Cuvier already said: "The nervous system is, at bottom, the whole animal; the other systems are there only to serve it" (*Sur un nouveau rapprochement à établir entre les classes qui composent le règne animal* [On a New Comparison to Be Drawn between the Classes that Make Up the Animal Kingdom], *Archives du Museum d'histoire naturelle*, Paris, 1812, pp. 73–84). This formula would of course need a host of qualifications. We would have to take account, for example, of the cases of degradation and regression in which the nervous system passes into the background. And above all we must add to the nervous system the sensory apparatus on the one side and the motor apparatus on the other, between which it serves as intermediary. Cf. Foster, article *Physiology* in the *Encyclopaedia Britannica*, Edinburgh, 1885, p. 17.

TRANSLATOR'S NOTE. Georges Cuvier (1769–1832) was the founder of French comparative anatomy.

isms thus makes us go round in a circle, as if everything in it served as a means to everything else. This circle nonetheless has a center: the system of nervous elements stretched between the sense organs and the apparatus of locomotion.

We will not dwell here on a point we treated at length in an earlier work. Let us simply recall that the progress of the nervous system has taken place in two directions at once: toward a more precise adaptation of movements, and toward a greater latitude left to the living being to choose among them. These two tendencies may seem antagonistic, and indeed they are. Yet a nervous chain, even in its most rudimentary form, manages to [137] reconcile them. On the one hand, it traces a well-defined line between one point of the periphery and another, the first sensory and the second motor. It has thus channeled an activity that was at first diffused through the protoplasmic mass. But on the other hand, the elements that compose it are probably discontinuous. In any case, even supposing that they anastomose with one another, they show a functional discontinuity, for each of them ends in a sort of crossroads where the nervous impulse can no doubt choose its route. From the humblest moneron up to the best-endowed insects and the most intelligent vertebrates, the progress achieved has been above all a progress of the nervous system, together with all the creations and complications of parts that this progress required at each stage. As we suggested from the very beginning of this work, the role of life is to insert indetermination into matter.[18] Indeterminate, I mean unforeseeable, are the forms that life creates as its evolution proceeds. More and more indeterminate too, I mean more and more free, is the activity for which these forms are to serve as vehicle. A nervous system, with neurons placed end to end so that at the tip of each many paths open up, where as many questions arise, is a veritable *reservoir of indetermination.* That the main part of the vital push has gone into creating devices of this kind is what a simple glance at the organized world as a whole

18 Moneron: Haeckel's name for the simplest organisms he supposed to exist, mere specks of protoplasm without a nucleus.

seems to us to show. But some clarifications about this very push of life are indispensable.

A LIMITED FORCE

Life's effort often falls short, distracted by the forms it takes.

We must not forget that the force evolving through the organized world is a limited force, which always [138] seeks to surpass itself and always remains inadequate to the work it tends to produce. From the failure to recognize this point have sprung the errors and puerilities of radical finalism. Radical finalism pictured the whole living world as a construction, and as a construction like our own. All its parts would be arranged for the best possible working of the machine. Each species would have its reason for being, its function, its destination. Together they would perform a great concert, in which apparent dissonances would serve only to bring out the underlying harmony. In short, everything would happen in nature as it does in the works of human genius, where the result obtained may be slight, but where there is at least a perfect fit between the object made and the work of making it.

Nothing of the kind is found in the evolution of life. There the disproportion between the work and the result is striking. From the bottom to the top of the organized world it is always one great effort; but most often this effort falls short. Sometimes it is paralyzed by contrary forces; sometimes it is distracted from what it should do by what it is doing, absorbed in the form it is busy taking, hypnotized by it as by a mirror. Even in its most perfect works, when it seems to have triumphed over external resistances and over its own as well, it is at the mercy of the materiality it has had to give itself. Each of us can experience this in ourselves. Our freedom, in the very movements by which it asserts itself, creates the budding habits that will stifle it unless it renews itself by constant effort: automatism lies in wait for it. The most living thought will freeze in the formula that expresses it. The word turns against the idea. The letter kills the

spirit. And our most ardent enthusiasm, once it is externalized in [139] action, sometimes congeals so naturally into a cold calculation of interest or vanity, and the one so readily takes on the form of the other, that we might confuse them, doubt our own sincerity, and deny goodness and love—if we did not know that the dead keep the features of the living for a while.[19]

The deep cause of these dissonances lies in an irremediable difference of rhythm. Life in general is mobility itself; the particular manifestations of life accept this mobility only reluctantly and constantly lag behind it. The one always moves ahead; the others would rather mark time. Evolution in general would proceed, as far as possible, in a straight line; each special evolution is a circular process. Like eddies of dust raised by the passing wind, living beings turn upon themselves, suspended in the great breath of life. They are therefore relatively stable, and they counterfeit immobility so well that we treat them as *things* rather than as *progressions*, forgetting that the very permanence of their form is only the outline of a movement. Sometimes, however, the invisible breath that carries them takes material shape before our eyes in a fleeting apparition. We have this sudden illumination before certain forms of maternal love, so striking and so touching too in most animals, and observable even in the plant's solicitude for its seed. This love, in which some have seen the great mystery of life, might perhaps give us life's secret. It shows us each generation bending over the one that will follow it. It lets us glimpse that the living being is above all a place of passage, and that the essence of life lies in the movement that transmits it.

This contrast between life in general and the forms in [140] which it manifests itself has the same character everywhere. One might say that life tends to act as much as possible, but that each species prefers to give the smallest possible amount of effort. Considered in what is its very essence, that is, as a transition from species to species, life is an ever-growing action. But

19 "The letter kills the spirit" echoes St. Paul, 2 Corinthians 3:6: "the letter killeth, but the spirit giveth life."

each of the species through which life passes aims only at its own convenience. It goes for whatever demands the least trouble. Absorbed in the form it is about to take, it falls into a half-sleep in which it is almost wholly unaware of the rest of life; it shapes itself for the easiest possible exploitation of its immediate surroundings. Thus the act by which life moves toward the creation of a new form, and the act by which this form takes shape, are two different and often antagonistic movements. The first is prolonged into the second, but it cannot be so prolonged without being distracted from its direction—as would happen to a jumper who, in order to clear an obstacle, had to take his eyes off it and look at himself.

Living forms are, by their very definition, viable forms. However we explain the adaptation of the organism to its conditions of existence, this adaptation is necessarily sufficient as long as the species survives. In this sense each of the successive species described by paleontology and zoology was a *success* won by life. But things take on quite another aspect when we compare each species no longer with the conditions into which it has fitted, but with the movement that set it down along its path. Often this movement has swerved; very often, too, it has been stopped dead, and what was meant to be only a place of passage has become [141] the end point. From this new point of view, failure appears as the rule, and success as exceptional and always imperfect. We shall see that, of the four great directions taken by animal life, two have led into blind alleys, and that along the other two the effort has generally been out of proportion to the result.

ARMOR AND TORPOR

Early animals shut themselves in shells; arthropods and vertebrates escaped by regaining mobility.

We lack the documents needed to reconstruct this history in detail. We can nevertheless make out its main lines. We said that animals and plants must have separated fairly soon from their

common stock, the plant falling asleep in immobility, while the animal, on the contrary, grew more and more awake and advanced toward the conquest of a nervous system. It is probable that the effort of the animal kingdom resulted in organisms that were still simple, but endowed with a certain mobility, and above all indefinite enough in form to lend themselves to every future determination. These animals may have resembled some of our worms—with this difference, however: the worms living today with which one would compare them are the emptied and fixed specimens of those infinitely plastic forms, pregnant with an indefinite future, which were the common stock of echinoderms, molluscs, arthropods and vertebrates.

A danger lay in wait for them, an obstacle that probably came close to halting the upward flight of animal life. There is one peculiarity that cannot fail to strike us when we glance at the fauna of Primary times: the imprisonment of the animal in a more or less hard envelope, which must have hampered and often even paralyzed its movements. Molluscs, to begin with, had shells more universally than those of today. Arthropods in general were provided with a carapace; they were crustaceans. The oldest [142] fish had a bony envelope of extreme hardness[20]. The explanation of this general fact must be sought, we believe, in a tendency of soft-bodied organisms to defend themselves against one another by making themselves, as far as possible, uneatable.[21] Each species, in the act by which it constitutes itself, goes for what is most convenient to it. Among primitive organisms, some had turned toward animality by giving up making organic matter out of inorganic matter, and by borrowing organic substances ready-made from organisms already switched onto the track of plant life. In the same way, among animal species themselves, many managed to live at the expense of other animals. An organism that is animal, that is, mobile,

20 BERGSON'S NOTE. On these various points, see Gaudry's work: *Essai de paléontologie philosophique*, Paris, 1896, pp. 14–16 and 78–79.

21 The Primary era is the older name for the Paleozoic, roughly 540–250 million years ago.

can in fact use its mobility to seek out defenseless animals and feed on them, just as well as on plants. Thus, the more mobile species became, the more voracious and dangerous to one another they no doubt grew. The result must have been a sudden halt of the whole animal world in the progress that was carrying it toward ever higher mobility. For the hard, calcareous skin of the echinoderm, the shell of the mollusc, the carapace of the crustacean and the ganoid armor of the ancient fish probably had a common origin: an effort by animal species to protect themselves against hostile species. But this armor, behind which the animal took shelter, hampered its movements and sometimes immobilized it. If the plant renounced consciousness by wrapping itself in a membrane of cellulose, the animal that shuts itself up in a citadel or in armor condemns itself to a half-sleep.[22] It is in [143] this torpor that echinoderms and even molluscs still live today. Arthropods and vertebrates were no doubt threatened with it as well. They escaped it, and to this fortunate circumstance we owe the present flowering of the highest forms of life.

In two directions, indeed, we see life's push toward movement regain the upper hand. Fish exchange their ganoid armor for scales. Long before, insects had appeared, they too rid of the armor that had protected their ancestors. Both made up for the inadequacy of their protective covering by an agility that allowed them to escape their enemies, and also to take the offensive, to choose the place and the moment of the encounter. We observe a progress of the same kind in the evolution of human armament. The first impulse is to seek shelter; the second, which is the better, is to make oneself as supple as possible for flight and above all for attack—attack being still the most effective means of defense. Thus the heavy hoplite was supplanted by the legionary; the knight clad in iron had to give way to the foot soldier free in his movements; and, generally speaking, in the evolution of life as a whole, as in that of human

22 Ganoid: covered with thick, shiny bony plates or scales, as in many ancient fish.

societies and of individual destinies, the greatest successes have gone to those who accepted the greatest risks.[23]

The animal's well-understood interest, then, was to become more mobile. As we said about adaptation in general, one can always explain the transformation of species by their particular interest. This gives the immediate cause of variation. But often it gives only the most [144] superficial cause. The deep cause is the impulse that launched life into the world, that made it split into plants and animals, that switched animality onto suppleness of form, and that, at a certain moment, in an animal kingdom threatened with drowsiness, secured—at a few points at least—that it should wake up and move forward.

Along the two paths on which vertebrates and arthropods evolved separately, development (leaving aside the regressions linked to parasitism or to any other cause) has consisted above all in a progress of the sensorimotor nervous system. Mobility is sought, suppleness is sought, and—through much trial and error, and not without first falling into an excess of bulk and brute force—variety of movement is sought. But this search itself has proceeded in divergent directions. A glance at the nervous system of the arthropods and at that of the vertebrates alerts us to the differences. In the former, the body is made up of a more or less long series of rings set side by side; motor activity is then distributed among a variable, sometimes considerable, number of appendages, each with its own specialty. In the latter, activity is concentrated in two pairs of limbs only, and these organs perform functions that depend far less closely on their form[24]. This independence becomes complete in man, whose hand can perform any task whatever.

That, at least, is what we see. Behind what we see there is now what we divine: two powers immanent in life and at first merged, which must have come apart as they grew.

23 The hoplite was the heavily armored infantryman of ancient Greece; the legionary, the more lightly equipped Roman foot soldier.

24 BERGSON'S NOTE. On this subject, see Shaler, *The Individual*, New York, 1900, pp. 118–125.

THE TWO SUMMITS: INSECTS AND HUMANS

Evolution peaks in the hymenoptera and in humankind, one line leading to instinct, the other to intellect.

[145] To define these powers, we must consider, in the evolution of the arthropods and in that of the vertebrates, the species that mark the culminating point on either side. How is this point to be determined? Here again we shall go astray if we aim at geometrical precision. There is no single, simple sign by which we can recognize that one species is more advanced than another on the same line of evolution. There are multiple characteristics, which must be compared with one another and weighed in each particular case, in order to know how far they are essential or accidental, and to what extent they should be taken into account.

It is indisputable, for example, that success is the most general criterion of superiority, the two terms being, up to a point, synonymous. Where the living being is concerned, success must be understood as an aptitude to develop in the most varied environments, across the greatest possible variety of obstacles, so as to cover the widest possible extent of the earth. A species that claims the whole earth as its domain is truly a dominant species, and consequently a superior one. Such is the human species, which will represent the culminating point of the evolution of the vertebrates. But such too, in the series of the articulates, are the insects, and in particular certain hymenopterans. It has been said that ants are masters of what lies beneath the earth's surface, as man is master of the surface itself.

On the other hand, a group of species that appeared late may be a group of degenerate species, but for that a special cause of regression must have intervened. By right, such a group would be superior to the group from which it derives, since it would correspond to a more advanced stage of evolution. Now, man is

probably the latest arrival among the [146] vertebrates[25]. And in the series of insects, the only one later than the hymenopteran is the lepidopteran, which is no doubt a kind of degenerate species, a true parasite of flowering plants.

Thus, by different routes, we are led to the same conclusion. The evolution of the arthropods would have reached its culminating point with the insect, and in particular with the hymenopterans, as that of the vertebrates did with man. Now, if we note that nowhere is instinct as developed as in the world of insects, and that in no group of insects is it as marvelous as in the hymenopterans, we can say that the whole evolution of the animal kingdom, apart from regressions toward vegetative life, has taken place along two divergent paths, one leading to instinct and the other to intellect.

THREE DIVERGENT DIRECTIONS

Vegetative torpor, instinct and intellect are different in kind, not steps on one ladder.

Vegetative torpor, instinct and intellect: these, then, are at last the elements that coincided in the vital impulse common to plants and animals, and which, in the course of a development in which they appeared in the most unforeseen forms, came apart by the mere fact of their growth. *The cardinal error, the one that, handed down since Aristotle, has vitiated most philosophies of nature, is to see in vegetative life, instinctive life and rational life three successive degrees of one and the same developing tendency, whereas they are three divergent directions of an activity that split*

25 BERGSON'S NOTE. This point is disputed by René Quinton, who regards carnivorous and ruminant mammals, as well as certain birds, as later than man (R. Quinton, *L'eau de mer milieu organique*, Paris, 1904, p. 435). Let it be said in passing that our general conclusions, though very different from Quinton's, are in no way irreconcilable with them; for if evolution really was as we picture it, the vertebrates must have made an effort to keep themselves in the most favorable conditions for action—the very conditions in which life had first placed itself.

TRANSLATOR'S NOTE. Quinton's title means "Seawater as Organic Medium."

apart as it [147] grew. *The difference between them is not a difference of intensity, nor more generally of degree, but of kind.*

This point needs to be examined more closely. We have seen how plant life and animal life complement each other and how they oppose each other. We must now show that intellect and instinct, too, oppose and complement each other. But let us first say why we are tempted to see in them activities of which the first would be superior to the second and superimposed on it, whereas in reality they are not things of the same order, nor things that followed one upon the other, nor things to which ranks can be assigned.

The reason is that intellect and instinct, having begun by interpenetrating, retain something of their common origin. Neither is ever found in a pure state. We said that in the plant the consciousness and mobility of the animal, which have fallen asleep in it, can reawaken, and that the animal lives under the constant threat of being switched onto the track of vegetative life. The two tendencies, of plant and of animal, interpenetrated so thoroughly at first that there has never been a complete break between them: each continues to haunt the other; everywhere we find them mingled; it is the proportion that differs. So it is with intellect and instinct. There is no intellect in which traces of instinct cannot be found, and above all no instinct that is not surrounded by a fringe of intellect. It is this fringe of intellect that has caused so many misunderstandings. From the fact that instinct is always more or less intelligent, it has been concluded that intellect and instinct are things of the same order, that there is only a difference of complexity or perfection between them, and [148] above all that one of the two can be expressed in terms of the other. In reality they accompany each other only because they complement each other, and they complement each other only because they are different—what is instinctive in instinct running in the opposite direction to what is intelligent in intellect.

No one will be surprised if we insist on this point. We regard it as crucial.

Let us say first that the distinctions we are about to draw will be too clear-cut, precisely because we want to define what is instinctive in instinct and what is intelligent in intellect, whereas every concrete instinct is mixed with intellect, just as every real intellect is shot through with instinct. Moreover, neither intellect nor instinct lends itself to rigid definitions; they are tendencies, not finished things. Finally, we must not forget that in the present chapter we are considering intellect and instinct as they emerge from the life that deposits them along its course. Now, the life manifested by an organism is, in our view, a certain effort to obtain certain things from inert matter. No one will be surprised, then, if what strikes us in instinct and intellect is the diversity of this effort, and if we see in these two forms of psychic activity, above all, two different methods of acting on inert matter. This rather narrow way of looking at them will have the advantage of giving us an objective means of distinguishing them. In return, it will give us, of intellect in general and of instinct in general, only the mean position above and below which both constantly oscillate. That is why what follows should be taken only as a schematic drawing, in which the respective outlines of [149] intellect and instinct will be sharper than they should be, and in which we shall have neglected the shading that comes both from the indecision of each and from their encroachment on each other. On so obscure a subject, one cannot make too great an effort toward light. It will always be easy afterwards to blur the forms, to correct whatever is too geometrical in the drawing, and finally to replace the stiffness of a diagram with the suppleness of life.

HOMO FABER

The intellect is originally the faculty of making tools, and tools for making tools.

To what date do we trace back the appearance of man on earth? To the time when the first weapons, the first tools, were made. No one has forgotten the memorable dispute that arose over

Boucher de Perthes's discovery in the quarry at Moulin-Quignon. The question was whether these were real axes or fragments of flint broken by accident. But that, if they were hand-axes, one was indeed in the presence of an intelligence, and more particularly of human intelligence, no one doubted for a single moment. Now let us open a collection of anecdotes about the intelligence of animals.[26] We shall see that, alongside many acts explicable by imitation or by the automatic association of images, there are some we do not hesitate to call intelligent. Foremost among them are those that show a thought of *manufacture*, whether the animal manages to fashion a crude instrument itself or uses to its own advantage an object made by man. The animals ranked immediately after man in point of intelligence, apes and elephants, are those that can use an artificial instrument on occasion. Below them, but not far below, come those that [150] *recognize* a manufactured object: the fox, for example, which knows perfectly well that a trap is a trap. No doubt there is intelligence wherever there is inference; but inference, which consists in bending past experience in the direction of present experience, is already a beginning of invention. Invention becomes complete when it takes material form in a manufactured instrument. That is the goal toward which animal intelligence tends, as toward an ideal. And if, as a rule, it does not yet manage to fashion artificial objects and use them, it prepares itself for this by the very variations it performs on the instincts supplied by nature. As regards the human intellect, it has not been sufficiently noticed that mechanical invention was from the first its essential activity; that even today our social life gravitates around the manufacture and use of artificial instruments; and that the inventions that mark out the road of progress have also traced its direction. We find this hard to notice, because changes in humanity usually lag behind the transformations of its equipment. Our individual and even social habits survive for

26 Jacques Boucher de Perthes (1788–1868), a pioneer of prehistory; his 1863 finds of a human jaw and flint axes at Moulin-Quignon, near Abbeville, were hotly disputed.

quite a long time the circumstances for which they were made, so that the profound effects of an invention become noticeable only when we have already lost sight of its novelty. A century has passed since the invention of the steam engine, and we are only beginning to feel the profound shock it gave us. The revolution it brought about in industry has nonetheless upset human relations. New ideas are arising. New feelings are about to hatch. In thousands of years, when the distance of the past lets only its broad outlines be seen, our wars and our [151] revolutions will count for little, supposing they are still remembered at all; but the steam engine, with the inventions of every kind that attend it, may be spoken of as we speak of bronze or of chipped stone; it will serve to define an age[27]. If we could strip ourselves of all pride, if, to define our species, we kept strictly to what history and prehistory present as the constant characteristic of man and of the intellect, we should perhaps say not *Homo sapiens* but *Homo faber*.[28] In short, *the intellect, considered in what seems to be its original activity, is the faculty of manufacturing artificial objects, in particular tools for making tools, and of varying their manufacture indefinitely*.

INSTINCT AND ORGANIZED INSTRUMENTS

Instinct uses instruments that are part of the body; intellect makes unorganized ones.

Now, does an unintelligent animal also possess tools or machines? Certainly it does, but here the instrument is part of the body that uses it. And corresponding to this instrument there is an *instinct* that knows how to use it. Not all instincts, of course, consist in a natural faculty of using an innate mechanism—far from it. Such a definition would not apply to the instincts Romanes called "secondary," and more than one

27 BERGSON'S NOTE. Paul Lacombe has brought out the crucial influence that the great inventions have exerted on the evolution of humanity (P. Lacombe, *De l'histoire considérée comme science,* Paris, 1894. See in particular pp. 168–247).
28 *Homo faber*: Latin for "man the maker," set against *Homo sapiens*, "man the knower."

"primary" instinct would escape it. But this definition of instinct, like the one we are provisionally giving of the intellect, at least determines the ideal limit toward which the very numerous forms of the thing defined are moving.[29] It has very often been pointed out that most instincts are the continuation, or rather the completion, of the very work of organization. Where does the activity of instinct begin? [152] Where does that of nature end? No one can say. In the metamorphoses of the larva into nymph and then into perfect insect—metamorphoses that often require appropriate steps and a kind of initiative on the part of the larva—there is no sharp line of demarcation between the animal's instinct and the organizing work of living matter. We may say, as we please, that instinct organizes the instruments it is going to use, or that organization is prolonged into the instinct that is to use the organ. The most marvelous instincts of the insect merely unfold its special structure into movements—so much so that where social life divides labor among individuals and thus imposes different instincts on them, a corresponding difference of structure is observed: the polymorphism of ants, bees, wasps and certain pseudoneuropterans is well known. Thus, if we consider only the limiting cases in which we witness the complete triumph of intellect and of instinct, we find an essential difference between them: *instinct perfected is a faculty of using and even of constructing organized instruments; intellect perfected is the faculty of making and employing unorganized instruments*.[30]

The advantages and drawbacks of these two modes of activity are obvious. Instinct finds the appropriate instrument within its reach. This instrument, which makes and repairs itself, and which presents, like all the works of nature, an infinite complexity of detail and a marvelous simplicity of functioning, does at once, at the required moment, without difficulty and often with admirable perfection, what it is called upon to do. In return, it

29 George John Romanes (1848–1894), British naturalist and friend of Darwin, author of *Animal Intelligence* and *Mental Evolution in Animals*.
30 Pseudoneuroptera: an old grouping of insects that included the termites.

keeps an almost invariable structure, since it cannot be modified without a modification of the species. Instinct is therefore necessarily specialized, [153] being nothing but the use of a specific instrument for a specific object. The intelligently made instrument, by contrast, is an imperfect instrument. It is obtained only at the cost of an effort. It is almost always awkward to handle. But since it is made of unorganized matter, it can take any form, serve any purpose, get the living being out of every new difficulty that arises, and confer on it an unlimited number of powers. Inferior to the natural instrument for satisfying immediate needs, it has all the more advantage over it the less pressing the need. Above all, it reacts on the nature of the being that made it: in calling on that being to exercise a new function, it confers on it, so to speak, a richer organization, being an artificial organ that extends the natural organism. For every need it satisfies, it creates a new one. And so, instead of closing, as instinct does, the circle of action within which the animal will move automatically, it opens up to this activity an unlimited field, into which it pushes it further and further and makes it freer and freer. But this advantage of intellect over instinct appears only late, when intellect, having raised manufacture to its highest degree of power, is already making machines for manufacturing. At the outset, the advantages and drawbacks of the manufactured instrument and of the natural instrument are so evenly balanced that it is hard to say which of the two will secure the living being a greater dominion over nature.

We may conjecture that they began by being implicated in each other; that the original psychic activity partook of both at once; and that, if we went far enough back into the past, we should find instincts closer to intellect than those of our insects, and an [154] intellect nearer to instinct than that of our vertebrates —elementary intellect and instinct, moreover, prisoners of a matter they cannot manage to master. If the force immanent in life were an unlimited force, it might perhaps have developed instinct and intellect indefinitely in the same organisms. But

everything seems to indicate that this force is finite, and that it exhausts itself fairly quickly in manifesting itself. It is hard for it to go far in several directions at once. It must choose. Now, it has the choice between two ways of acting on inert matter. It can provide this action *immediately*, by creating for itself an *organized* instrument with which it will work; or it can give it *mediately*, in an organism which, instead of naturally possessing the required instrument, will make it itself by shaping inorganic matter. Hence intellect and instinct, which diverge more and more as they develop, but which never entirely separate from each other. On the one hand, indeed, the most perfect instinct of the insect is accompanied by some glimmers of intellect, if only in the choice of the place, the moment and the materials of construction: when, exceptionally, bees nest in the open air, they invent new and truly intelligent arrangements to adapt themselves to these new conditions[31]. But on the other hand, intellect needs instinct even more than instinct needs intellect, for shaping inert matter already presupposes in the animal a higher degree of organization, to which it could rise only on the wings of instinct. So, while nature has evolved frankly toward instinct in the arthropods, in almost all vertebrates we witness the [155] quest for intellect rather than its flowering. Instinct still forms the substratum of their psychic activity, but intellect is there, aspiring to supplant it. It does not manage to invent instruments; at least it tries to, by performing as many variations as possible on instinct, which it would like to do without. It takes full possession of itself only in man, and this triumph is attested by the very inadequacy of the natural means at man's disposal for defending himself against his enemies, against cold and hunger. This inadequacy, when we try to decipher its meaning, acquires the value of a prehistoric document: it is the final dismissal that instinct receives from intellect. It is no less true that nature must have hesitated between two modes of psychic activity: one assured of immediate success but limited in its effects,

31 BERGSON'S NOTE. Bouvier, *La nidification des Abeilles à l'air libre* (*C. R. de l'Acad. des sciences*, 7 May 1906).

the other hazardous, but with conquests that might extend indefinitely if it achieved independence. Here again, moreover, the greatest success was won on the side where the greatest risk lay. *Instinct and intellect therefore represent two divergent solutions, equally elegant, to one and the same problem.*

Hence, it is true, profound differences of internal structure between instinct and intellect. We shall dwell only on those that concern our present study. Let us say, then, that intellect and instinct imply two radically different kinds of knowledge. But first some clarifications about consciousness in general are needed.

CONSCIOUSNESS AS A GAP

Consciousness measures the distance between possible action and the action actually performed.

It has been asked how far instinct is conscious. We shall reply that there is a multitude of differences and degrees here: instinct is more or less conscious in some cases, and unconscious in others. The plant, as we shall see, has instincts; it is [156] doubtful whether in the plant these instincts are accompanied by feeling. Even in the animal, we hardly find a complex instinct that is not unconscious in at least part of its steps. But we must point out here a difference, too little noticed, between two kinds of unconsciousness: the one consisting in a *null* consciousness, and the one arising from a *nullified* consciousness. Null consciousness and nullified consciousness are both equal to zero; but the first zero expresses that there is nothing, the second that we are dealing with two equal quantities of opposite sign which offset and neutralize each other. The unconsciousness of a falling stone is a null consciousness: the stone has no feeling of its fall. Is the same true of the unconsciousness of instinct in the extreme cases where instinct is unconscious? When we perform a habitual action mechanically, when the sleepwalker automatically acts out his dream, the unconsciousness may be absolute. But this time it is due to the fact that the representation of the

act is held in check by the performance of the act itself, which is so perfectly like the representation and fits into it so exactly that no consciousness can overflow any longer. *The representation is stopped up by the action.* The proof is that if the performance of the act is halted or hindered by an obstacle, consciousness may arise. It was therefore there, but neutralized by the action that filled the representation. The obstacle has created nothing positive; it has simply made a void, it has unstopped the passage. This inadequacy of the act to the representation is precisely what we here call consciousness.

If we went more deeply into this point, we should find that consciousness is the light immanent in the zone of possible actions, or of virtual activity, that surrounds the action actually performed by the living being. It signifies hesitation or [157] choice. Where many equally possible actions are sketched out without any real action (as in a deliberation that comes to nothing), consciousness is intense. Where the real action is the only possible action (as in activity of the sleepwalking or, more generally, automatic kind), consciousness becomes nil. Representation and knowledge exist nonetheless in this latter case, if it is established that we find in it a set of systematized movements, the last of which is already preformed in the first, and that consciousness can, moreover, spring out of it at the shock of an obstacle. From this point of view, *the consciousness of a living being might be defined as an arithmetical difference between virtual activity and real activity. It measures the gap between representation and action.*

We may therefore presume that the intellect will lean toward consciousness, and instinct toward unconsciousness. For where the instrument to be handled is organized by nature, the point of application furnished by nature, and the result to be obtained willed by nature, little is left to choice. The consciousness inherent in the representation will therefore be counterbalanced, as fast as it tends to break free, by the performance of the act, which is identical with the representation and acts as its counterweight. Where consciousness does appear, it lights up not so

much the instinct itself as the thwartings to which instinct is subject: it is the *deficit* of instinct, the distance from the act to the idea, that will become consciousness; and consciousness will then be no more than an accident. Essentially, it underlines only the initial step of instinct, the one that sets off the whole series of automatic movements. The deficit, on the contrary, is the normal state of the intellect. To suffer thwarting is its very essence. Since its original function is to make unorganized instruments, it must, through a thousand difficulties, [158] choose for this work the place and the moment, the form and the material. And it can never be entirely satisfied, because every new satisfaction creates new needs. In short, if instinct and intellect both involve knowledge, the knowledge is rather *acted* and unconscious in the case of instinct, rather *thought* and conscious in the case of the intellect. But this is a difference of degree rather than of kind. As long as we attend only to consciousness, we close our eyes to what is, from the psychological point of view, the chief difference between intellect and instinct.

THINGS AND RELATIONS

Instinct knows particular things innately; intellect knows only forms and relations.

To reach the essential difference, we must not stop at the more or less vivid light that illuminates these two forms of inner activity; we must go straight to the two objects, profoundly distinct from each other, which are their points of application.

When the horse botfly lays its eggs on the legs or shoulders of the horse, it acts as if it knew that its larva must develop in the horse's stomach, and that the horse, by licking itself, will carry the newborn larva into its digestive tract. When a paralyzing hymenopteran strikes its victim at the precise points where the nerve centers lie, so as to immobilize it without killing it, it proceeds as a learned entomologist would who was also a skillful surgeon. But what must the little beetle whose story has so often been told, the Sitaris, not know? This beetle lays its eggs at the

entrance of the underground galleries dug by a species of bee, the Anthophora.[32] The larva of the Sitaris, after a long wait, watches for the male Anthophora as it leaves the gallery, clings to it, and stays attached to it until the "nuptial flight." There it seizes the opportunity to pass from the male to the female, and waits quietly until she [159] lays her eggs. It then jumps onto the egg, which will serve as its support in the honey, devours the egg in a few days and, settled on the shell, undergoes its first metamorphosis. Now organized to float on the honey, it consumes this store of food and becomes a pupa, then an adult insect. Everything happens *as if* the larva of the Sitaris, from the moment it hatched, knew several things. The male Anthophora will be the first to leave the gallery. The nuptial flight will give it the means of transferring itself to the female. She will lead it to a store of honey able to feed it once it has transformed. And until this transformation, it will have gradually devoured the Anthophora's egg, so as to feed itself, to keep itself up on the surface of the honey, and also to do away with the rival that would have emerged from the egg. And everything happens equally *as if* the Sitaris itself knew that its larva will know all these things. The knowledge, if knowledge there is, is only implicit. It is externalized in precise actions instead of being internalized in consciousness. It is nonetheless true that the insect's behavior sketches out the representation of definite things, existing or occurring at precise points in space and time, which the insect knows without having learned them.

Now, if we consider the intellect from the same point of view, we find that it too knows certain things without having learned them. But this knowledge is of a very different order. We do not wish to revive here the old quarrel among philosophers about innateness. Let us confine ourselves, then, to recording the point on which everyone agrees: a young child immediately understands things that an animal will never understand, and

32 The horse botfly is *Gasterophilus intestinalis*. *Sitaris* is a blister-beetle genus whose larvae live off *Anthophora* bees, a life history made famous by the French entomologist Jean-Henri Fabre (1823–1915).

in this sense the intellect, like instinct, is a hereditary function, [160] and hence innate. But this innate intellect, although it is a faculty of knowing, knows no object in particular. When the newborn seeks its nurse's breast for the first time, thereby showing that it has knowledge (unconscious, no doubt) of a thing it has never seen, we shall say—precisely because the innate knowledge here is knowledge of a definite object—that this is instinct and not intellect. The intellect, then, brings innate knowledge of no object. And yet, if it knew nothing by nature, it would have nothing innate. What, then, can it know, when it is ignorant of all things?—Besides *things*, there are *relations*. The newborn child, insofar as it is intelligent, knows neither definite objects nor a definite property of any object. But on the day an adjective is applied to a noun in its presence, it will understand at once what this means. The relation of predicate to subject is therefore grasped by it naturally. And the same might be said of the general relation expressed by the verb, a relation so immediately conceived by the mind that language can leave it unexpressed, as happens in rudimentary languages that have no verb. The intellect, then, naturally makes use of the relations of equivalent to equivalent, of content to container, of cause to effect, and so on, which are implied in every sentence containing a subject, a predicate and a verb, whether expressed or understood. Can it be said that it has *innate* knowledge of each of these relations in particular? It is for logicians to determine whether these are so many irreducible relations, or whether they could be resolved into still more general ones. But however we carry out the analysis of thought, we shall always arrive at one or more general frameworks, [161] of which the mind has innate knowledge, since it makes natural use of them. Let us say, then, that *if we consider what innate knowledge instinct and intellect contain, we find that this innate knowledge bears in the first case on* things *and in the second on* relations.

Philosophers distinguish between the matter of our knowledge and its form. The matter is what is given by the faculties of perception, taken in their raw state. The form is the set of rela-

tions established among these materials so as to constitute systematic knowledge. Can form without matter already be an object of knowledge? Yes, no doubt, provided that this knowledge resembles a habit acquired more than a thing possessed, a direction more than a state; it will be, if you like, a certain natural bent of attention. The schoolchild who knows that a fraction is about to be dictated draws a line before knowing what the numerator and the denominator will be. The child thus has the general relation between the two terms present in mind, though knowing neither of them; it knows the form without the matter. So it is with the frameworks, prior to all experience, into which our experience comes to fit. Let us therefore adopt here the terms established by usage. We shall give the distinction between intellect and instinct this more precise formula: *the intellect, in what it has that is innate, is the knowledge of a* form, *instinct implies the knowledge of a* matter.

From this second point of view, which is that of knowledge and no longer of action, the force immanent in life in general again appears to us as a limited principle. In this principle, at the outset, two different and [162] even divergent ways of knowing coexist and interpenetrate. The first reaches definite objects immediately, in their very materiality. It says: "This is what is." The second reaches no object in particular. It is only a natural power of relating object to object, or part to part, or aspect to aspect, and finally of drawing conclusions when one has premises, and of going from what one has learned to what one does not know. It no longer says "this is"; it says only that if the conditions are such and such, the conditioned will be such and such. In short, the first kind of knowledge, instinctive in nature, would be formulated in what philosophers call *categorical* propositions, whereas the second, intellectual in nature, is always expressed *hypothetically*. Of these two faculties, the first seems at first far preferable to the other. And so it would indeed be, if it extended to an indefinite number of objects. But in fact it only ever applies to one special object, and even to a restricted part of that object. At least it has an inward and full knowledge of it—

not explicit, but implied in the action performed. The second, on the contrary, naturally possesses only an external and empty knowledge. But by that very fact it has the advantage of supplying a framework in which an infinity of objects can find a place in turn. Everything happens as if the force evolving through living forms, being a limited force, had the choice, in the domain of natural or innate knowledge, between two kinds of limitation: one bearing on the *extension* of knowledge, the other on *its comprehension*. In the first case, knowledge can be rich and full, but it will then be confined to a definite object. In the second, it no longer limits its object, but that is because it no longer contains anything, [163] being only a form without matter.[33] The two tendencies, at first implied in each other, had to separate in order to grow. Each went its own way to seek its fortune in the world. They ended in instinct and intellect.

Such, then, are the two divergent modes of knowledge by which intellect and instinct must be defined, if we take the point of view of knowledge rather than that of action. But knowledge and action are here only two aspects of one and the same faculty. It is easy to see, in fact, that the second definition is only a new form of the first.

If instinct is, above all, the faculty of using a natural organized instrument, it must involve innate knowledge (virtual or unconscious, it is true) both of this instrument and of the object to which it is applied. Instinct is therefore the innate knowledge of a *thing*. But the intellect is the faculty of making unorganized, that is to say artificial, instruments. If, through the intellect, nature gives up endowing the living being with the instrument that will serve it, this is so that the living being may vary what it makes according to circumstances. The essential function of the intellect will therefore be to work out, in any circumstances whatever, the means of getting out of difficulty. It will look for what can best serve, that is, what can fit into the framework proposed. It will bear essentially on the relations between the given

33 In traditional logic, a concept's extension is the range of things it applies to, and its comprehension (or intension) is the content of its defining characteristics.

situation and the means of turning it to account. What it has that is innate, then, is the tendency to establish relations. This tendency implies natural knowledge of certain very general relations, a genuine fabric that the activity proper to each intellect will cut into more particular relations. Where activity is directed toward making, knowledge therefore necessarily bears on [164] relations. But this wholly *formal* knowledge of the intellect has an incalculable advantage over the *material* knowledge of instinct. A form, just because it is empty, can be filled in turn, at will, by an indefinite number of things, even by those that are of no use. Hence formal knowledge is not limited to what is practically useful, even though it was with a view to practical utility that it made its appearance in the world. An intelligent being carries within itself the means of surpassing itself.

It will surpass itself, however, less than it would like, and less, too, than it imagines it does. The purely formal character of the intellect deprives it of the ballast it would need in order to settle on the objects that would be of the most powerful interest to speculation. Instinct, on the contrary, would have the requisite materiality, but it is incapable of going so far in search of its object: it does not speculate. We have reached the point that matters most to our present inquiry. The difference we are about to point out between instinct and intellect is the one our whole analysis has been tending to bring out. We would formulate it thus: There are things that the intellect alone is able to seek, but which, by itself, it will never find. These things instinct alone would find; but it will never seek them.

We must go here into a few provisional details about the mechanism of the intellect. We have said that the function of the intellect is to establish relations. Let us determine more precisely the nature of the relations the intellect establishes. On this point, one remains vague or arbitrary as long as one sees in the intellect a faculty meant for pure speculation. One is then reduced to taking the general frameworks of [165] the understanding for something or other absolute, irreducible and inexplicable. The understanding would have dropped from heaven with

its form, just as each of us is born with a face. This form can be defined, no doubt, but that is all one can do, and there is no point in asking why it is what it is rather than something else entirely. Thus it will be taught that the intellect is essentially unification, that all its operations have the common aim of introducing a certain unity into the diversity of phenomena, and so on. But, first of all, "unification" is a vague term, less clear than "relation" or even "thought," and it says no more than they do. Moreover, one might ask whether the function of the intellect is not to divide, even more than to unite. Finally, if the intellect proceeds as it does because it wants to unite, and if it seeks unification simply because it needs it, then our knowledge becomes relative to certain demands of the mind which could, no doubt, have been quite different from what they are. For an intellect differently constituted, knowledge would have been different. Since the intellect no longer depends on anything, everything then depends on it. And so, by placing the understanding too high, we end by placing too low the knowledge it gives us. This knowledge becomes relative the moment the intellect is a kind of absolute. We, on the contrary, regard the human intellect as relative to the necessities of action. Posit action, and the very form of the intellect follows from it. This form, then, is neither irreducible nor inexplicable. And precisely because it is not independent, we can no longer say that knowledge depends on it. Knowledge ceases to be a product of the intellect and becomes, in a certain sense, an integral part of reality.

[166] Philosophers will reply that action takes place in an *ordered* world, that this order is already thought, and that we are begging the question in explaining the intellect by action, which presupposes it. In this they would be right, if the point of view we adopt in the present chapter were to be our final one. We should then be taken in by an illusion like that of Spencer, who believed that the intellect was sufficiently explained once it was traced back to the imprint left in us by the general characteristics of matter—as if the order inherent in matter were not the intellect itself!

THE INTELLECT AND THE SOLID

Made for action on inert matter, the intellect grasps clearly only the discontinuous and the immobile.

But we reserve for the next chapter the question of how far, and by what method, philosophy might attempt a true genesis of the intellect together with that of matter. For the moment, the problem that concerns us is psychological. We are asking which portion of the material world our intellect is specially adapted to. Now, to answer this question, there is no need to opt for a system of philosophy. It is enough to take the standpoint of common sense.

Let us start, then, from action, and lay it down as a principle that the intellect aims first of all at making. Making works exclusively on inert matter, in the sense that, even when it uses organized materials, it treats them as inert objects, without concerning itself with the life that gave them form. Of inert matter itself it retains hardly anything but the solid: the rest escapes by its very fluidity. If, then, the intellect tends to make, we can foresee that what is fluid in the real will partly escape it, and that what is properly vital in the living being will escape it altogether. *Our intellect, as it* [167] *leaves the hands of nature, has as its principal object the unorganized solid.*

If we reviewed the intellectual faculties, we should see that the intellect feels at ease, is truly at home, only when it is working on inert matter, and in particular on solids. What is the most general property of inert matter? It is extended: it presents us with objects external to other objects and, within these objects, parts external to parts. No doubt it is useful to us, with a view to our later manipulations, to regard each object as divisible into arbitrarily cut parts, each part being further divisible as we please, and so on to infinity. But for the manipulation at hand, it is above all necessary for us to take the real object we are dealing with, or the real elements into which we have resolved it, as *provisionally final*, and to treat them as so many *units*. It is to this

possibility of decomposing matter as much as we please, and in whatever way we please, that we allude when we speak of the *continuity* of material extension. But this continuity, as we see, comes down for us to the latitude that matter leaves us to choose the mode of discontinuity we shall find in it. In the end, it is always the mode of discontinuity, once chosen, that appears to us as actually real and holds our attention, because it is by this that our present action is regulated. Thus discontinuity is thought for its own sake; it is thinkable in itself; we represent it to ourselves by a positive act of the mind. The intellectual representation of continuity, by contrast, is rather negative: at bottom it is nothing but our mind's refusal, faced with any system of decomposition currently given, to regard that system [168] as the only one possible. *The intellect has a clear representation only of the discontinuous.*

On the other hand, the objects on which our action is exercised are undoubtedly moving objects. But what matters to us is to know *where* the moving thing is going, and *where* it is at any given moment of its path. In other words, we attend above all to its present or future positions, and not to the *progress* by which it passes from one position to another, a progress which is movement itself. In the actions we perform, which are systematized movements, it is on the aim or meaning of the movement, on its overall design—in a word, on the motionless plan of execution—that we fix our mind. What is moving in the action interests us only insofar as the whole might be advanced, delayed or prevented by some incident or other along the way. Our intellect turns away from mobility itself, because it has no interest in dealing with it. If it were meant for pure theory, it would settle itself within movement, for movement is no doubt reality itself, and immobility is only ever apparent or relative. But the intellect is meant for something quite different. Unless it does violence to itself, it follows the opposite course. It always starts from immobility, as if this were the ultimate reality or element; when it wants to represent movement to itself, it reconstructs it out of immobilities placed side by side. We shall show the illegitimacy

and danger of this operation in the speculative order (it leads to dead ends and artificially creates insoluble philosophical problems). Yet it is easily justified when we consider what it is meant for. The intellect, in its natural state, aims at a practically [169] useful end. When it substitutes juxtaposed immobilities for movement, it does not claim to reconstitute movement as it is; it simply replaces it with a practical equivalent. It is the philosophers who are mistaken when they carry over into the domain of speculation a method of thinking made for action. But we intend to return to this point. Let us simply say that the stable and the unchanging are what our intellect clings to by virtue of its natural disposition. *Our intellect has a clear representation only of immobility.*

Now, to make something is to cut the form of an object out of some material. What matters above all is the form to be obtained. As for the material, we choose the one that suits best. But to choose it—that is, to go and find it among many others—we must have tried, at least in imagination, to give every kind of material the form of the object conceived. In other words, an intellect that aims at making is an intellect that never stops at the present form of things and does not regard it as final, but on the contrary holds all matter to be cuttable at will. Plato compares the good dialectician to the skillful cook who carves the animal without breaking its bones, following the joints marked out by nature[34]. An intellect that always proceeded in this way would indeed be an intellect turned toward speculation. But action, and in particular making, requires the opposite turn of mind. It requires us to regard every present form of things, even of natural things, as artificial and provisional. It requires our thought to erase from the object [170] perceived, even if it is organized and living, the lines that outwardly mark its inner structure. In short, it requires us to regard its matter as indifferent to its form. The whole of matter, then, must appear to our thought as an immense fabric from which we can cut whatever we like, to sew it back together as we please. Let us note in passing that it

34 BERGSON'S NOTE. Plato, *Phaedrus,* 265 E.

is this power we affirm when we say that there is a *space*—that is, a homogeneous and empty medium, infinite and infinitely divisible, lending itself indifferently to any mode of decomposition whatever. A medium of this kind is never perceived; it is only conceived. What is perceived is extension that is colored and resistant, divided along the lines traced by the outlines of real bodies or of their real elementary parts. But when we represent to ourselves our power over this matter—that is, our faculty of decomposing and recomposing it as we please—we project all these possible decompositions and recompositions, all at once, behind real extension, in the form of a homogeneous, empty and indifferent space that supposedly underlies it. This space is therefore, above all, the schema of our possible action on things, even though things have a natural tendency, as we shall explain later, to enter into a schema of this kind: it is a construction of the mind. The animal probably has no idea of it, even when it perceives extended things as we do. It is a representation that symbolizes the manufacturing tendency of the human intellect. But we shall not dwell on this point for the moment. Suffice it to say that *the intellect is characterized by the unlimited power of decomposing according to any law whatever and of recomposing into any system whatever.*

LANGUAGE AND THE MOBILE SIGN

Human signs can move from thing to thing, and so free the intellect to reflect.

We have listed some of the essential features [171] of the human intellect. But we have taken the individual in isolation, without taking social life into account. In reality, the human being is a being that lives in society. If it is true that the human intellect aims at making, we must add that, for this and for everything else, it joins with other intellects. Now it is difficult to imagine a society whose members do not communicate with one another by signs. Insect societies no doubt have a language, and this language must be adapted, like human language, to the necessities

of life in common. It makes *common action* possible. But these necessities of common action are not at all the same for an anthill and for a human society. In insect societies there is generally polymorphism; the division of labor is natural, and each individual is riveted by its structure to the function it performs. In any case, these societies rest on instinct, and consequently on certain actions or kinds of making that are more or less bound up with the form of the organs. If, then, ants, for example, have a language, the signs composing it must be strictly fixed in number, and each of them must remain invariably attached, once the species is constituted, to a certain object or a certain operation. The sign adheres to the thing signified.[35] In a human society, on the contrary, making and action vary in form; moreover, each individual must learn its role, not being predestined to it by its structure. What is needed, then, is a language that makes it possible at every moment to pass from what one knows to what one does not know. What is needed is a language whose signs—which cannot be infinite in number—can be extended to an infinity of things. This tendency of the sign to move from one object to another is characteristic of human language. It can be observed in the little [172] child from the day it begins to speak. Immediately, and naturally, the child extends the meaning of the words it learns, taking advantage of the most accidental connection or the remotest analogy to detach the sign that had been attached to an object in its presence and carry it elsewhere. "Anything can designate anything": such is the latent principle of children's language. This tendency has wrongly been confused with the faculty of generalizing. Animals themselves generalize, and besides, a sign, even an instinctive one, always represents a genus to some extent. What characterizes the signs of human language is not so much their generality as their mobility. *The instinctive sign is a sign that is* adherent*; the intelligent sign is a sign that is* mobile.

Now this mobility of words, designed so that they can pass from one thing to another, has allowed them to extend from

things to ideas. Certainly, language would not have given the faculty of reflection to an intellect wholly externalized and incapable of turning back on itself. An intellect that reflects is an intellect that had, beyond the practically useful effort, a surplus of energy to spend. It is a consciousness that has already, virtually, won itself back. But the virtual must still pass into act. It may be presumed that, without language, the intellect would have been riveted to the material objects it had an interest in considering. It would have lived in a sleepwalking state, outside itself, hypnotized by its work. Language did much to set it free. The word, made to pass from one thing to another, is in fact essentially movable and free. It can therefore extend not only from one perceived thing to another perceived thing, but also from the perceived thing to the memory of that thing, from the precise [173] memory to a more fleeting image, and from a fleeting but still represented image to the representation of the act by which one represents it—that is, to the idea. Thus a whole inner world will open before the eyes of the intellect, which had been looking outward: the spectacle of its own operations. It had, moreover, only been waiting for this opportunity. It takes advantage of the fact that the word is itself a thing to penetrate, carried by it, into the interior of its own work. Its first business may well have been to make instruments; but this making is possible only through the use of certain means that are not cut to the exact measure of their object, that go beyond it, and that thus allow the intellect a supplementary—that is, disinterested—work. From the day the intellect, reflecting on its own proceedings, perceives itself as a creator of ideas, as a faculty of representation in general, there is no object of which it does not wish to have the idea, even one with no direct bearing on practical action. That is why we said that there are things that the intellect alone can seek. It alone, indeed, is concerned with theory. And its theory would like to embrace everything: not only inert

35 Polymorphism here means the existence, within a single insect species, of structurally distinct castes such as workers, soldiers and queens.

matter, on which it naturally has a hold, but also life and thought.

With what means, what instruments—in short, what method—it will approach these problems, we can guess. Originally it is adapted to the form of inert matter. Language itself, which enabled it to extend its field of operations, is made to designate things and nothing but things. It is only because the word is mobile, because it travels from one thing to another, that the intellect was bound sooner or later to catch it *on the way,* while it was resting on nothing, and apply it to an object that is not a thing—an object which, hidden [174] until then, was waiting for the help of the word to pass from shadow into light. But the word, in covering this object, converts it once again into a thing. Thus the intellect, even when it no longer works on inert matter, follows the habits it acquired in that work: it applies forms that are the very forms of unorganized matter. It is made for this kind of work. This kind of work alone fully satisfies it. And that is what it expresses when it says that only in this way does it arrive at *distinctness* and *clarity.*

To think itself clearly and distinctly, then, it will have to perceive itself in the form of discontinuity. Concepts are indeed external to one another, like objects in space. And they have the same stability as objects, on whose model they were created. Taken together, they make up an "intelligible world" that resembles the world of solids in its essential characteristics, but whose elements are lighter, more transparent, and easier for the intellect to handle than the pure and simple image of concrete things. They are no longer, in fact, the perception of things itself, but the representation of the act by which the intellect fixes itself on them. They are therefore no longer images, but symbols. Our logic is the set of rules to be followed in manipulating symbols. These symbols derive from the consideration of solids, and the rules for combining them with one another do little more than translate the most general relations among solids. Our logic therefore triumphs in the science that takes the solidity of bodies as its object, that is, in geometry. Logic and

geometry engender each other, as we shall see a little further on. It is from the extension of a [175] certain natural geometry, suggested by the general and immediately perceived properties of solids, that natural logic emerged. It is from this natural logic, in turn, that scientific geometry emerged, which extends indefinitely our knowledge of the external properties of solids[36]. Geometry and logic are rigorously applicable to matter. There they are at home; there they can walk on their own. But outside this domain, pure reasoning needs to be supervised by good sense, which is something quite different.

THE INTELLECT CANNOT THINK LIFE

Because it resolves the living into the inert, the intellect misses continuity and novelty.

Thus all the elementary forces of the intellect tend to transform matter into an instrument of action—that is, in the etymological sense of the word, into an *organ.* Life, not content with producing organisms, would like to give them inorganic matter itself as an appendage, converted into an immense organ by the industry of the living being. Such is the task it first assigns to the intellect. That is why the intellect still invariably behaves as if it were fascinated by the contemplation of inert matter. It is life looking outward, externalizing itself in relation to itself, adopting in principle the ways of unorganized nature in order to direct them in fact. Hence its astonishment when it turns to the living being and finds itself face to face with organization.[37] Whatever it does then, it resolves the organized into the unorganized. For it cannot, without reversing its natural direction and twisting back upon itself, think true continuity, real mobility, reciprocal interpenetration—in a word, that creative evolution which is life.

Is it a question of continuity? The aspect of life that is [176] accessible to our intellect, as indeed to the senses that our intel-

36 BERGSON'S NOTE. We shall return to all these points in the next chapter.
37 The Greek *organon* means "tool" or "instrument."

lect extends, is the one that gives our action a hold. For us to be able to modify an object, we must perceive it as divisible and discontinuous. From the point of view of positive science, incomparable progress was made on the day organized tissues were resolved into cells. The study of the cell, in turn, has revealed in it an organism whose complexity seems to increase the more deeply it is examined. The further science advances, the more it sees the number of heterogeneous elements grow—elements set side by side, external to one another, that together make up a living being. Does it thereby come any closer to life? Or, on the contrary, does not what is properly vital in the living being seem to recede as the detail of juxtaposed parts is pushed further? Already a tendency is appearing among scientists to regard the substance of the organism as continuous, and the cell as an artificial entity[38]. But even supposing this view eventually prevails, it can only lead, as it deepens, to another mode of analysis of the living being, and therefore to a new discontinuity—though one less remote, perhaps, from the real continuity of life. The truth is that this continuity cannot be thought by an intellect that yields to its natural movement. It implies at once the multiplicity of elements and the reciprocal penetration of all by all—two properties that can hardly be reconciled on the ground where our industry, and consequently our intellect too, is exercised.

Just as we separate in space, we fix [177] in time. The intellect is not made to think *evolution* in the proper sense of the word, that is, the continuity of a change that would be pure mobility. We will not dwell on this point here, since we intend to go into it more deeply in a special chapter. Let us say only that the intellect represents becoming to itself as a series of *states*, each of which is homogeneous with itself and therefore does not change. Is our attention drawn to the internal change of one of these states? At once we break it down into another series of states which, taken together, will make up its inner modification. Each of these new states, in its turn, will be invariable. Or

38 BERGSON'S NOTE. We shall return to this point in Chapter III, p. 281.

else their internal change, if it strikes us, at once resolves itself into a new series of invariable states, and so on indefinitely. Here again, to think is to reconstitute, and naturally it is with given elements, and therefore with stable elements, that we reconstitute. So, try as we may, we can imitate the mobility of becoming through the indefinite progress of our addition, but becoming itself will slip through our fingers just when we think we are holding it.

Precisely because it always seeks to reconstitute, and to reconstitute with what is given, the intellect lets slip what is *new* at each moment of a history. It does not admit the unforeseeable. It rejects all creation. That determinate antecedents should bring about a determinate consequent, calculable as a function of them: this is what satisfies our intellect. That a determinate end should call forth determinate means to attain it: this too we understand. In both cases we are dealing with the known combining with the known and, in short, with the old repeating itself. Here our intellect is at ease. And whatever the object, it will abstract, [178] separate and eliminate, so as to substitute for the object itself, if need be, an approximate equivalent in which things will happen in this way. But suppose that each instant is a fresh contribution, that the new springs forth unceasingly, and that a form is born of which we shall doubtless say, once it is produced, that it is an effect determined by its causes. Yet it was impossible to suppose that what it would be could have been foreseen, since here the causes, unique of their kind, are part of the effect, have taken shape along with it, and are determined by it as much as they determine it. This is something we can feel within ourselves and divine by sympathy outside ourselves, but cannot express in terms of pure understanding, nor, in the narrow sense of the word, think. This will not surprise us if we consider what our understanding is meant for. The causality it seeks and finds everywhere expresses the very mechanism of our industry, in which we indefinitely recompose the same whole out of the same elements and repeat the same movements to obtain the same result. Finality par excellence, for our under-

standing, is the finality of our industry, in which one works on a model given in advance, that is, a model that is old or made up of known elements. As for invention properly so called, which is nevertheless the starting point of industry itself, our intellect fails to grasp it in its *upsurge*, that is, in what is indivisible about it, or in its *genius*, that is, in what is creative about it. To explain it is always to resolve it, unforeseeable and new as it is, into known or old elements arranged in a different order. The intellect no more admits complete novelty than it admits radical becoming. That is to say, here again it lets slip an essential aspect of life, as if it were not made to think such an object.

[179] All our analyses bring us back to this conclusion. But there was no need to go into such lengthy detail about the mechanism of intellectual work: it would be enough to consider its results. We should see that the intellect, so skillful in handling the inert, displays its clumsiness as soon as it touches the living. Whether it is dealing with the life of the body or with that of the mind, it proceeds with the rigor, the stiffness and the brutality of an instrument never meant for such a use. The history of hygiene and of education would have much to tell us on this score. Consider the paramount interest, pressing and constant, that we have in preserving our bodies and educating our souls. Consider the special opportunities each of us has here to experiment ceaselessly on ourselves and on others, and the palpable harm by which any flaw in a medical or educational practice shows itself and is paid for. When we think of all this, we are astounded at the crudeness, and above all at the persistence, of the errors. Their origin could easily be traced to our stubbornness in treating the living as inert and in thinking all reality, however fluid, in the form of a solid fixed once and for all. We are at ease only in the discontinuous, in the immobile, in the dead. *The intellect is characterized by a natural inability to understand life.*

INSTINCT MOLDED ON LIFE

Instinct continues the work of organization, like the cells of a body or the bees of a hive.

Instinct, on the contrary, is molded on the very form of life. While the intellect treats all things mechanically, instinct proceeds, if one may put it so, organically. Suppose the consciousness that slumbers in it were to awaken, and it turned inward into knowledge instead of outward into action. If we knew how to question it and it could answer, it would yield up to us the most intimate secrets of life. For it merely carries on the work by which life organizes matter, to such a [180] degree that we cannot say, as has very often been shown, where organization ends and instinct begins. When the chick breaks its shell with a peck of its beak, it acts by instinct, and yet it is merely following the movement that has carried it through embryonic life. Conversely, in the course of embryonic life itself (especially when the embryo lives freely in the form of a larva), many steps are taken that must be put down to instinct. The most essential of the primary instincts are therefore really vital processes. The virtual consciousness that accompanies them is usually actualized only in the initial phase of the act, and it leaves the rest of the process to accomplish itself. It would only have to expand more widely, and then to deepen completely, to coincide with the generative force of life.

In a living body we see thousands of cells working together toward a common goal and dividing up the task. Each lives for itself and at the same time for the others; they preserve themselves, feed, reproduce, and respond to threats of danger with appropriate defensive reactions. How can we help thinking of so many instincts? And yet these are natural functions of the cell, the constituent elements of its vitality. Conversely, the bees of a hive form a system so tightly organized that no individual can live in isolation beyond a certain time, even if it is supplied with shelter and food. How can we fail to recognize that the hive is

really, and not metaphorically, a single organism, of which each bee is a cell united to the others by invisible bonds? The instinct that animates the bee is therefore one with the force that animates the cell, or merely [181] extends it. In extreme cases like this one, it coincides with the work of organization.

Certainly, there are many degrees of perfection within the same instinct. Between the bumblebee and the honeybee, for example, the distance is great, and one would pass from one to the other through a host of intermediate forms, corresponding to so many complications of social life. But the same diversity would be found in the functioning of histological elements belonging to different tissues, more or less related to one another. In both cases there are multiple variations played on a single theme. The constancy of the theme is no less evident for that, and the variations merely adapt it to the diversity of circumstances.

Now in both cases, whether we are dealing with the instincts of the animal or with the vital properties of the cell, the same knowledge and the same ignorance appear. Things happen as if the cell knew of the other cells what concerns it, and the animal of other animals what it can use, all the rest remaining in shadow. It seems that life, as soon as it has contracted into a particular species, loses contact with the rest of itself, except at one or two points that concern the species just born. How can we fail to see that life proceeds here like consciousness in general, like memory? We drag behind us, without noticing it, the whole of our past; but our memory pours into the present only the two or three recollections that will complete our current situation in some respect. The instinctive knowledge that one species possesses of another on some particular point therefore has its root in the very unity of life. To use the expression of an ancient philosopher, life is a [182] whole sympathetic to itself. It is impossible to consider certain special instincts of animals and plants, clearly born in extraordinary circumstances, without comparing them to those apparently forgotten recollections

which suddenly spring up under the pressure of an urgent need.[39]

No doubt a host of secondary instincts, and many modes of primary instinct, admit of a scientific explanation. Yet it is doubtful that science, with its present methods of explanation, will ever manage to analyze instinct completely. The reason is that instinct and intellect are two divergent developments of one and the same principle. In the one case this principle remains within itself; in the other it turns outward and is absorbed in the use of inert matter. This continuous divergence testifies to a radical incompatibility, and to the impossibility of the intellect's reabsorbing instinct. What is essential in instinct cannot be expressed in intellectual terms, nor, consequently, be analyzed.

Someone born blind who had lived among others born blind would not admit that it was possible to perceive a distant object without first perceiving all the objects in between. Yet vision performs this miracle. One may, it is true, side with the person born blind and say that vision originates in the stimulation of the retina by the vibrations of light, and so is nothing else, after all, than a retinal touch. That, I grant, is the scientific explanation, for the role of science is precisely to translate every perception into terms of touch. But we have shown elsewhere that the philosophical explanation of perception must be of another nature, assuming one can still speak [183] of explanation here[40]. Now instinct, too, is a knowledge at a distance. It is to intellect what vision is to touch. Science can do no other than translate it into terms of intellect; but in so doing it will construct an imitation of instinct rather than penetrate into instinct itself.

We shall be convinced of this by examining here the ingenious theories of evolutionary biology. They come down to two types, which, moreover, often overlap. Sometimes, following the principles of neo-Darwinism, instinct is seen as a sum of acci-

39 Probably Plotinus, who calls the universe "sympathetic to itself" (*Enneads* IV.4.32), drawing on the Stoic idea of cosmic sympathy.

40 BERGSON'S NOTE. *Matière et Mémoire*, ch. I.

dental differences preserved by selection. Some useful step, naturally performed by the individual by virtue of an accidental predisposition of the germ, would have been passed on from germ to germ, until chance added new improvements to it by the same process. At other times instinct is made into a degraded intellect. The action judged useful by the species, or by some of its members, would have given rise to a habit, and the habit, transmitted by heredity, would have become instinct. Of these two systems, the first has the advantage of being able to speak of hereditary transmission without raising serious objection. The accidental modification it places at the origin of instinct would not be acquired by the individual, but would be inherent in the germ. On the other hand, it is wholly incapable of explaining instincts as expert as those of most insects. No doubt these instincts did not reach their present degree of complexity all at once; they probably evolved. But on a hypothesis like that of the neo-Darwinians, the evolution of instinct could [184] come about only through the progressive addition of what are, in a sense, new parts, which lucky accidents would mesh with the old ones. Now it is evident that in most cases instinct could not have been perfected by simple accretion. Each new part required, on pain of spoiling everything, a complete reworking of the whole. How can we expect chance to produce such a reworking? I grant that an accidental modification of the germ will be transmitted by heredity and may wait, in a sense, for new accidental modifications to come and complicate it. I grant, too, that natural selection will eliminate all those more complicated forms that are not viable. Still, for the life of instinct to evolve, viable complications must be produced. Now they will be produced only if, in certain cases, the addition of a new element brings about the correlative change of all the old elements. No one will maintain that chance can accomplish such a miracle. In one form or another, appeal will be made to intellect. It will be supposed that the living being develops a higher instinct within itself through a more or less conscious effort. But then one will have to admit that an acquired habit

can become hereditary, and that it does so regularly enough to ensure an evolution. That is doubtful, to say the least. Even if the instincts of animals could be traced to a habit intelligently acquired and transmitted by heredity, it is hard to see how this mode of explanation could be extended to the plant world. There effort is never intelligent, even supposing it is sometimes conscious. And yet, consider with what sureness and precision climbing plants use their tendrils, and [185] what marvelously coordinated maneuvers orchids carry out to get themselves fertilized by insects[41]. How can we help thinking of so many instincts?

This does not mean that we must entirely give up the thesis of the neo-Darwinists, any more than that of the neo-Lamarckians. The former are no doubt right when they hold that evolution takes place from germ to germ rather than from individual to individual. The latter are right when they happen to say that at the origin of instinct there is an effort (though this is something quite different, we believe, from an *intelligent* effort). But the former are probably wrong when they make the evolution of instinct an accidental evolution, and the latter when they see the effort from which instinct proceeds as an individual effort. The effort by which a species modifies its instincts, and modifies itself as well, must be something much deeper, something that does not depend solely on circumstances or on individuals. It does not depend solely on the initiative of individuals, though individuals collaborate in it. Nor is it purely accidental, though accident plays a large part in it.

41 BERGSON'S NOTE. See Darwin's two works: *Les plantes grimpantes*, trans. Gordon, Paris, 1890, and *La fécondation des Orchidées par les Insectes*, trans. Rérolle, Paris, 1892.

TRANSLATOR'S NOTE. French translations of *The Movements and Habits of Climbing Plants* (1865) and *On the Various Contrivances by which British and Foreign Orchids are Fertilised by Insects* (1862).

THE PARALYZING WASPS

The varied instincts of wasps are variations on one theme, not additions.

Let us compare, in fact, the various forms of the same instinct in various species of Hymenoptera. The impression we get is not always that of an increasing complexity achieved through elements added one after another. Nor is it that of an ascending series of arrangements ranged, so to speak, along a ladder. Rather, in many cases at least, we think of a circle, from whose various points these various varieties would have set out. All are
186 facing the same center and all are striving in that direction, but each approaches it only as far as its means allow, and as far, too, as the central point has become lit up for it. In other words, instinct is everywhere complete, but it is more or less simplified, and above all it is simplified *differently*. On the other hand, we sometimes observe a regular gradation, with instinct growing more complex in one and the same direction, as if it were climbing the rungs of a ladder. Yet the species that their instinct thus ranks in a linear series are far from always being related to one another. Thus the comparative study of the social instinct among the various Apidae made in recent years has established a notable finding. The instinct of the Meliponinae is intermediate in complexity between the still rudimentary tendency of the Bombinae and the consummate expertise of our honeybees. Yet between the honeybees and the Meliponinae there can be no relation of descent[42]. In all likelihood, the greater or lesser complexity of these various societies does not depend on a greater or lesser number of elements added together.[43] We are much more in the presence of a certain *musical theme*. It would first have transposed itself, as a whole, into a number of keys, and

42 BERGSON'S NOTE. Buttel-Reepen, *Die phylogenetische Entstehung des Bienenstaates* (*Biol. Centralblatt*, XXIII, 1903), p. 108 in particular.

TRANSLATOR'S NOTE. The title means "The Phylogenetic Origin of the Bee State."

43 The Apidae are the bee family; the Meliponinae are stingless bees and the Bombinae bumblebees.

then various variations would have been played on it, again as a whole, some very simple, others infinitely elaborate. As for the original theme, it is everywhere and nowhere. It is in vain that we would try to write it down in terms of representation: at the outset it was doubtless something *felt* rather than something *thought*. We have the same impression before the paralyzing instinct of certain wasps. It is well known that the various species [187] of paralyzing Hymenoptera lay their eggs in spiders, beetles or caterpillars. These go on living, motionless, for a certain number of days, and thus serve as fresh food for the larvae, having first been subjected by the wasp to an expert surgical operation. The wasp stings its victim's nerve centers to immobilize it without killing it. In doing so, these various species of Hymenoptera adjust themselves to the various species of prey they each have to deal with. The Scolia, which attacks the larva of the rose chafer, stings it at only one point. But at that point the motor ganglia are concentrated, and those ganglia alone: stinging certain other ganglia might bring on death and decay, which must be avoided[44]. The yellow-winged Sphex has chosen the cricket as its victim. It knows that the cricket has three nerve centers animating its three pairs of legs, or at least it acts as if it knew. It stings the insect first under the neck, then behind the prothorax, and finally near the base of the abdomen[45]. The hairy Ammophila gives nine successive stings to nine nerve centers of its caterpillar. Finally it seizes the caterpillar's head and chews it, just enough to cause paralysis without death[46]. The general theme is "the need to paralyze without killing": the variations are subordinated to the structure of the subject being operated on. No doubt the operation is far from always being performed perfectly. It has been shown recently that the Ammophila sphex sometimes kills the caterpillar

44 BERGSON'S NOTE. Fabre, *Souvenirs entomologiques*, 3rd series, Paris, 1890, pp. 1–69.

45 BERGSON'S NOTE. Fabre, *Souvenirs entomologiques*, 1st series, 3rd ed., Paris, 1894, pp. 93 ff.

46 BERGSON'S NOTE. Fabre, *Nouveaux souvenirs entomologiques*, Paris, 1882, pp. 14 ff.

instead of paralyzing it, and that at times, too, it [188] only half paralyzes it[47]. Instinct is fallible like intellect, and it too is liable to show individual deviations. But it by no means follows that the Sphex's instinct was acquired, as has been claimed, through intelligent trial and error. Suppose that, over the course of time, the Sphex managed to identify by trial and error, one by one, the points on its victim that must be stung to immobilize it. Suppose it also learned the special treatment that must be inflicted on the brain for paralysis to ensue without bringing on death. How can we suppose that the highly specialized elements of such precise knowledge were then transmitted regularly by heredity, one by one? If there were, in the whole of our present experience, a single indisputable example of a transmission of this kind, no one would contest the inheritance of acquired characters. In reality, the hereditary transmission of acquired habit takes place imprecisely and irregularly, supposing it ever truly takes place at all.

INSTINCT AS SYMPATHY

The wasp may know its prey from within, by a sympathy science cannot express.

But the whole difficulty comes from our wanting to translate the hymenopteran's expertise into terms of intellect. We are then forced to liken the Sphex to the entomologist. The entomologist knows the caterpillar as he knows everything else, that is, from outside, without having any special, vital interest in it. The Sphex would then have to learn one by one, like the entomologist, the positions of the caterpillar's nerve centers. At the very least, it would have to acquire a practical knowledge of these positions by testing the effects of its sting. But it would be quite otherwise if we supposed between the Sphex and its victim a

47 BERGSON'S NOTE. Peckham, *Wasps, solitary and social*, Westminster, 1905, pp. 28 ff.

TRANSLATOR'S NOTE. George and Elizabeth Peckham, American naturalists who studied wasp behavior.

sympathy (in the etymological sense of the word) that informed it from within, so to speak, of the vulnerability of the [189] caterpillar. This feeling of vulnerability might owe nothing to external perception. It might result simply from the Sphex and the caterpillar being brought together, considered no longer as two organisms but as two activities. It would express, in concrete form, the relation of the one to the other. Certainly, a scientific theory cannot appeal to considerations of this kind. It must not put action before organization, or sympathy before perception and knowledge.[48] But, once again, either philosophy has nothing to do here, or its role begins where that of science ends.

Science may make instinct a "compound reflex," or a habit intelligently acquired that has become automatic, or a sum of small accidental advantages accumulated and fixed by selection. In every case it claims to resolve instinct completely, either into intelligent steps or into mechanisms built up piece by piece, like those our intellect puts together. I grant that science is here within its role. In place of a real analysis of the object, it will give us a translation of that object into terms of intellect. But how can we fail to notice that science itself invites philosophy to approach things from another angle? Suppose our biology were still where Aristotle left it. Suppose it regarded the series of living beings as unilinear, and showed us all of life evolving toward intellect and passing, to get there, through sensibility and instinct. Then we, as intelligent beings, would have the right to turn back toward the earlier, and therefore lower, manifestations of life. We could claim to fit them, without distorting them, into the frameworks of our intellect. But one of the clearest results of biology has been to show that evolution has proceeded along [190] divergent lines. It is at the end of two of these lines, the two principal ones, that we find intellect and instinct in their more or less pure forms.[49] Why, then, should instinct be resolvable into intelligent elements? Why even into

48 From the Greek *sympatheia*, "feeling with."

49 Aristotle arranged living beings on a single graded scale, from plants through animals to human beings.

wholly intelligible terms? Is it not clear that to think here of something intelligent, or of something absolutely intelligible, is to return to the Aristotelian theory of nature? No doubt it would still be better to return to it than to stop short before instinct as before an unfathomable mystery. But though instinct does not belong to the domain of intellect, it does not lie outside the bounds of mind. In phenomena of feeling, and in unreflecting sympathies and antipathies, we experience in ourselves something of what must go on in the consciousness of an insect acting by instinct. We experience it in a much vaguer form, and in one too thoroughly permeated with intellect. Evolution has only drawn apart, in order to develop them to the full, elements that at the outset interpenetrated. More precisely, the intellect is above all the faculty of relating one point of space to another point of space, one material object to another material object. It applies to all things, but remains outside them, and of a deep cause it never perceives anything but its diffusion into juxtaposed effects. Whatever the force that expresses itself in the genesis of the caterpillar's nervous system, we reach it, with our eyes and our intellect, only as a juxtaposition of nerves and nerve centers. It is true that in this way we reach its entire external effect. The Sphex, for its part, doubtless grasps little of it, just what concerns it; but at least it grasps it from within. It does so quite otherwise than by a process of knowledge, through an intuition (*lived* [191] rather than *represented*) which no doubt resembles what in us is called divining sympathy.

It is a remarkable fact that scientific theories of instinct swing back and forth between the *intelligent* and the merely *intelligible*. I mean between assimilating instinct to a "lapsed" intellect and reducing instinct to a pure mechanism[50]. Each of these two systems of explanation triumphs in its critique of the other. The

50 BERGSON'S NOTE. See in particular, among recent works: Bethe, *Dürfen wir den Ameisen und Bienen psychische Qualitäten zuschreiben?* (*Arch. f. d. ges. Physiologie*, 1898), and Forel, *Un aperçu de psychologie comparée* (*Année psychologique*, 1895).

TRANSLATOR'S NOTE. Bethe's title means "May we ascribe psychic qualities to ants and bees?"; Forel's, "A sketch of comparative psychology."

first triumphs when it shows us that instinct cannot be a mere reflex; the second when it says that instinct is something other than intellect, even intellect lapsed into unconsciousness. What does this mean, if not that these are two symbolisms, equally acceptable in some respects and, in others, equally inadequate to their object? The concrete explanation, no longer scientific but metaphysical, must be sought along quite another path: no longer in the direction of intellect, but in that of "sympathy."

Instinct is sympathy. If this sympathy could extend its object and also reflect upon itself, it would give us the key to vital operations, just as the intellect, developed and disciplined, leads us into matter. For, we cannot repeat it too often, intellect and instinct are turned in two opposite directions, the former toward inert matter, the latter toward life. The intellect, through the science that is its work, will reveal to us ever more completely the secret of physical operations. Of life, however, it brings us [192] only a translation into terms of inertia, and indeed claims to bring us nothing more.

INTUITION

Instinct become self-conscious and disinterested could lead us to the inside of life.

It goes all around life, taking from outside the greatest possible number of views of this object, which it draws onto its own ground instead of entering into the object's. But it is to the very inside of life that *intuition* would lead us. By intuition I mean instinct that has become disinterested, conscious of itself, capable of reflecting upon its object and of enlarging it indefinitely.

That an effort of this kind is not impossible is already shown by the existence in human beings of an aesthetic faculty alongside normal perception. Our eye perceives the features of the living being, but as juxtaposed with one another, not as organized together. The intention of life escapes it: the simple movement that runs through the lines, binds them together and gives them meaning. It is this intention that the artist seeks to recap-

ture. He places himself back within the object by a kind of sympathy, and lowers, by an effort of intuition, the barrier that space interposes between him and the model. It is true that this aesthetic intuition, like external perception for that matter, reaches only the individual. But we can conceive of an inquiry oriented in the same direction as art, which would take life in general as its object. In the same way, physical science follows to the end the direction marked out by external perception and extends individual facts into general laws. No doubt this philosophy will never obtain a knowledge of its object comparable to that which science has of its own. The intellect remains the luminous nucleus around which instinct, even enlarged and purified into intuition, forms only a vague nebulosity. But knowledge properly so called is reserved for pure intellect. Lacking it, intuition will be able to make us grasp what is insufficient here in the [193] data of the intellect, and let us glimpse the means of completing them. On the one hand, indeed, it will use the very mechanism of the intellect to show how intellectual frameworks no longer find their exact application here. On the other, by its own work, it will suggest to us at least a vague feeling of what must be put in place of intellectual frameworks. Thus it will be able to bring the intellect to recognize that life fits entirely into neither the category of the many nor that of the one. Neither mechanical causality nor finality gives a sufficient translation of the vital process. Then intuition will establish a sympathetic communication between us and the rest of the living, and bring about an expansion of our consciousness. In this way it will lead us into the proper domain of life, which is reciprocal interpenetration, creation endlessly continued. But if in this way it goes beyond the intellect, it is from the intellect that the jolt will have come that raised it to the point where it is. Without the intellect it would have remained, in the form of instinct, riveted to the special object of practical interest to it, and turned outward by that object into movements of locomotion.

The theory of knowledge must take account of these two faculties, intellect and intuition. For want of drawing a sharp

enough distinction between intuition and intellect, it becomes entangled in inextricable difficulties, creating phantoms of ideas to which phantoms of problems will cling. How all this comes about is what we shall try to show a little further on. It will be seen that the problem of knowledge, approached from this angle, is one with the metaphysical problem, and that both then fall within the province of experience. On the one hand, [194] indeed, if intellect is attuned to matter and intuition to life, we shall have to press them both to extract from them the quintessence of their object; metaphysics will thus hang on the theory of knowledge. But on the other hand, if consciousness has split in this way into intuition and intellect, it is because it had to apply itself to matter while at the same time following the current of life. The splitting of consciousness would thus stem from the twofold form of the real, and the theory of knowledge would have to hang on metaphysics. In truth, each of these two inquiries leads to the other. They form a circle, and the circle can have for its center only the empirical study of evolution. Only by watching consciousness run through matter, lose itself there and find itself again, divide and reconstitute itself, shall we form an idea of the opposition between the two terms, and also, perhaps, of their common origin. But on the other hand, by dwelling on this opposition of the two elements and on their common origin, we shall no doubt bring out more clearly the meaning of evolution itself.

This will be the subject of our next chapter. But the facts we have just reviewed would already suggest to us the idea of linking life either to consciousness itself or to something resembling it.

CONSCIOUSNESS AND THE BRAIN

Consciousness overflows the brain, which frees it by setting actions against one another.

Throughout the whole extent of the animal kingdom, we said, consciousness appears proportional to the power of choice at

the living being's disposal. It lights up the zone of virtualities surrounding the act. It measures the gap between what is done and what could be done. Viewed from outside, then, it might be taken for a mere auxiliary of action. It would be a light that action kindles, a fleeting spark struck from the friction of real action [195] against possible actions. But it must be noted that things would happen in exactly the same way if consciousness, instead of being effect, were cause. One could suppose that, even in the most rudimentary animal, consciousness covers by right an enormous field, but is in fact squeezed in a kind of vice. Each advance in the nerve centers gives the organism a choice among a greater number of actions. It would thereby call forth the virtualities capable of surrounding the real, loosen the vice, and let consciousness pass through more freely. On this second hypothesis, as on the first, consciousness would indeed be the instrument of action; but it would be still truer to say that action is the instrument of consciousness. For the complication of action with itself, and the pitting of action against action, would be the only possible means for imprisoned consciousness to set itself free. How are we to choose between the two hypotheses? If the first were true, consciousness would trace exactly, at every instant, the state of the brain. The parallelism between the psychological state and the cerebral state (to the extent that it is intelligible) would be rigorous. On the second hypothesis, by contrast, there would indeed be solidarity and interdependence between brain and consciousness, but not parallelism. The more complex the brain becomes, increasing the number of possible actions among which the organism has a choice, the more consciousness must overflow its physical concomitant. Take the memory of one and the same scene witnessed by a dog and by a human being. It will probably modify the dog's brain and the human brain in the same way, if the perception was the same. Yet the memory must be something quite different in a human consciousness from what it is in a dog's consciousness. [196] In the dog, the memory will remain the captive of perception. It will awaken only when an analogous perception recalls it by

reproducing the same scene. It will then show itself through the recognition, *acted* rather than *thought*, of the present perception, much more than through a genuine revival of the memory itself. Human beings, on the contrary, are capable of calling up the memory at will, at any moment, independently of present perception. They do not merely act out their past life; they represent it to themselves and dream it. The local modification of the brain to which the memory is attached is the same in both cases. So the psychological difference between the two memories cannot have its reason in some difference of detail between the two cerebral mechanisms. It must lie in the difference between the two brains taken as wholes. The more complex of the two, by pitting a greater number of mechanisms against one another, will have allowed consciousness to break free from the grip of each and all, and to attain independence. That this is indeed how things happen, and that the second of the two hypotheses is the one to choose, is what we tried to prove in an earlier work. We did so by studying the facts that best bring out the relation of the conscious state to the cerebral state: the facts of normal and pathological recognition, in particular the aphasias[51]. But reasoning would have led us to expect it just as well. We have shown on what self-contradictory postulate the hypothesis of an equivalence between the cerebral state and the psychological state rests, and on what confusion of two mutually incompatible symbolisms[52].

[197] Seen from this side, the evolution of life takes on a clearer meaning, even though it cannot be subsumed under a true idea. Everything happens as if a broad current of consciousness had penetrated matter. Like all consciousness, it was laden with an enormous multiplicity of potentialities that interpenetrated one another. It has drawn matter into organization, but its move-

51 BERGSON'S NOTE. *Matière et Mémoire*, chs. II and III.

52 BERGSON'S NOTE. *Le paralogisme psycho-physiologique* (*Revue de métaphysique*, November 1904).

TRANSLATOR'S NOTE. "The Psycho-physiological Paralogism," Bergson's article in the *Revue de métaphysique et de morale*, later reprinted as "Le cerveau et la pensée" in *L'Énergie spirituelle* (1919).

ment has been at once infinitely slowed down and infinitely divided. On the one hand, consciousness has had to fall into a doze, like the chrysalis in the envelope where it is preparing its wings. On the other, the manifold tendencies it contained have been distributed among divergent series of organisms, which, moreover, externalized these tendencies in movements rather than internalizing them in representations. In the course of this evolution, while some fell more and more deeply asleep, others awoke more and more completely, and the torpor of the one served the activity of the other. But the awakening could take place in two different ways. Life, that is to say consciousness launched through matter, fixed its attention either on its own movement or on the matter it was passing through. It thus turned either in the direction of intuition or in that of intellect. At first sight, intuition seems far preferable to intellect, since in it life and consciousness remain internal to themselves. But the spectacle of the evolution of living beings shows us that it could not go very far. On the side of intuition, consciousness found itself so compressed by its envelope that it had to narrow intuition down into instinct, that is, to embrace only the very small portion of life that concerned it—and even this it embraces in the dark, touching it while hardly seeing it. On this side the horizon closed [198] at once. Consciousness, by contrast, in determining itself as intellect, that is, in concentrating first on matter, thus seems to externalize itself in relation to itself. But precisely because it adapts itself to external objects, it manages to move about among them, to get around the barriers they set against it, and to widen its domain indefinitely. Once freed, moreover, it can turn back inward and awaken the potentialities of intuition that still slumber within it.

WHAT INVENTION DOES FOR MAN

Invention, language and the human brain let consciousness break free of the mechanisms it builds.

From this point of view, not only does consciousness appear as the motive principle of evolution, but also, among conscious beings themselves, man comes to occupy a privileged place. Between the animals and him there is no longer a difference of degree, but of kind. Until this conclusion emerges from our next chapter, let us show how our preceding analyses suggest it.

It is a remarkable fact how extraordinarily disproportionate the consequences of an invention are to the invention itself. We said that the intellect is modeled on matter and that it aims first of all at manufacture. But does it manufacture for the sake of manufacturing, or might it not be pursuing, involuntarily and even unconsciously, something quite different? To manufacture is to give form to matter, to make it supple and bend it, to convert it into an instrument in order to become its master. It is this *mastery* that benefits humanity, far more even than the material result of the invention itself. We may derive an immediate advantage from the manufactured object, as an intelligent animal might; that advantage may even be all the inventor was seeking. Yet it is a slight thing compared with the new ideas and new feelings that the invention can call up on every side, as if [199] its essential effect were to raise us above ourselves and thereby widen our horizon. Here the disproportion between effect and cause is so great that it is hard to regard the cause as *productive* of its effect. It *releases* it, while assigning it, it is true, its direction. Everything happens, in short, as if the intellect's hold on matter had as its main object *to let something through* that matter holds back.

The same impression emerges from a comparison between the brain of man and that of animals. At first the difference appears to be only one of size and complexity. But there must be much more to it, judging by how they function. In the animal,

the motor mechanisms that the brain manages to set up—in other words, the habits its will contracts—have no other object and no other effect than to carry out the movements outlined in those habits and stored in those mechanisms. But in man, motor habit can have a second result, incommensurable with the first. It can hold other motor habits in check and thereby, by mastering automatism, set consciousness free. We know what vast territories language occupies in the human brain. The cerebral mechanisms that correspond to words have this peculiarity: they can be pitted against other mechanisms, for example those corresponding to things themselves, or else pitted against one another. Meanwhile consciousness, which would have been carried away and drowned in the performance of the act, recovers itself and breaks free[53].

THE BOY AND THE STEAM ENGINE

Like a machine that runs itself, the human brain frees attention that the animal brain keeps captive.

200 The difference must therefore be more radical than a superficial examination would suggest. It is the difference one would find between a mechanism that absorbs the attention and a mechanism from which one can turn one's attention away. The primitive steam engine, as Newcomen had conceived it, required a person charged solely with working the taps, either to let steam into the cylinder or to throw into it the cold shower needed for condensation. It is said that a boy employed at this work, and thoroughly bored with having to do it, had the idea of tying the handles of the taps to the beam of the engine with cords. From then on the engine opened and closed its own taps;

53 BERGSON'S NOTE. A geologist whom we have already had occasion to quote, N. S. Shaler, puts it admirably: "When we come to man, it seems as though the ancient subjection of mind to body were abolished, and the intellectual parts develop with extraordinary rapidity, while the structure of the body remains identical in all that is essential to it." (Shaler, *The interpretation of nature,* Boston, 1899, p. 187).

it worked all by itself.[54] Now suppose an observer had compared the structure of this second engine with that of the first without paying attention to the two boys in charge of them. He would have found between them only a slight difference in complexity. That, indeed, is all one can see when one looks only at the machines. But if one glances at the boys, one sees that one is absorbed in his watching, while the other is free to amuse himself as he likes. From this angle, the difference between the two machines is radical: the first held attention captive, the second gave it leave. It is a difference of the same kind, we believe, that would be found between the brain of the animal and the human brain.

To sum up, if we wished to express ourselves in terms of finality, we should have to say the following. In order to free itself, consciousness was first obliged to split organization into two complementary parts, plants on the [201] one hand and animals on the other. It then sought a way out in the double direction of instinct and intellect: it did not find it with instinct, and on the side of intellect it obtained it only by a sudden leap from the animal to man. So that, in the last analysis, man would be the reason for the existence of the entire organization of life on our planet. But this would be only a manner of speaking. In reality there is only a certain current of existence and the antagonistic current; from this comes the whole evolution of life. We must now examine the opposition of these two currents more closely. Perhaps we shall thus discover a common source for them. In doing so we shall no doubt also penetrate into the most obscure regions of metaphysics. But the two directions we have to follow are marked out in the intellect on the one hand, and in instinct and intuition on the other, so we are not afraid of losing our way. The spectacle of the evolution of life suggests to us a certain conception of knowledge and also a certain metaphysics, which imply each other. Once brought out, this metaphysics and this

54 Thomas Newcomen (1664–1729), English inventor of the first practical steam engine (1712), used to pump water from mines.

critique may in their turn throw some light on evolution as a whole.

Chapter III: On the Meaning of Life—The Order of Nature and the Form of Intelligence

De la signification de la vie. L'ordre de la nature et la forme de l'intelligence
Intellect and matter arise together; the two kinds of order; life as an effort climbing the slope that matter descends.

[203] In the course of our first chapter we drew a line of demarcation between the inorganic and the organized. But we pointed out that the division of matter into unorganized bodies is relative to our senses and our intellect, and that matter, considered as an undivided whole, must be a flux rather than a thing. In this way we were preparing the ground for bringing the inert and the living closer together.

On the other hand, we showed in our second chapter that the same opposition reappears between intellect and instinct, the latter attuned to certain determinations of life, the former modeled on the configuration of inert matter. But instinct and intellect, we added, both stand out against a single background, which might be called, for want of a better word, Consciousness in general, and which must be coextensive with universal life. In this way we gave a glimpse of the possibility of generating the intellect, starting from the consciousness that envelops it.

The moment would therefore seem to have come to attempt a genesis of the intellect along with a genesis of bodies—two undertakings obviously correlative with each other, [204] if it is true that the main lines of our intellect trace the general form of

our action on matter, and that the detail of matter conforms to the requirements of our action. Intellectuality and materiality would then have been constituted, in their detail, by reciprocal adaptation. Both would derive from a wider and higher form of existence. It is there that we should have to place them back, in order to see them emerge from it.

At first sight such an attempt will seem to exceed in rashness the boldest speculations of the metaphysicians. It would claim to go further than psychology, further than cosmogonies, further than traditional metaphysics. For psychology, cosmology and metaphysics begin by taking the intellect for granted in its essentials, whereas here the aim is to generate it, in its form and in its matter. In reality the undertaking is much more modest, as we shall show. But let us first say how it differs from the others.

To begin with psychology, we must not think that it *generates* intelligence when it follows its progressive development through the animal series. Comparative psychology teaches us that the more intelligent an animal is, the more it tends to reflect on the actions by which it makes use of things, and thus to approach man. But its actions already adopted, of themselves, the main lines of human action. They picked out in the material world the same general directions that we pick out there, and they relied on the same objects linked together by the same relations. So animal intelligence, although it does not form concepts properly so called, already moves in a conceptual atmosphere. At every moment it is absorbed by the [205] acts and attitudes that issue from it, drawn outward by them, and so externalized in relation to itself. It no doubt plays out its representations rather than thinking them; but at least this play already roughly sketches the scheme of human intelligence[1]. To explain the intelligence of man by that of the animal thus consists simply in developing an embryo of humanity into the human. One shows how a certain direction has been followed further and further

1 BERGSON'S NOTE. We have developed this point in *Matière et Mémoire,* chs. II and III, especially pp. 78–80 and 169–186.

by more and more intelligent beings. But as soon as one posits the direction, one takes intelligence for granted.

SPENCER AND FICHTE TAKE THE INTELLECT FOR GRANTED

Evolutionist cosmogony and a priori metaphysics both presuppose the intellect they claim to generate.

It is likewise taken for granted, and matter along with it, in a cosmogony such as Spencer's. We are shown matter obeying laws, objects linked with objects and facts with facts by constant relations. Consciousness receives the imprint of these relations and laws, thus adopting the general configuration of nature and determining itself as intellect. But how can we fail to see that the intellect is presupposed as soon as objects and facts are posited? *A priori,* apart from any hypothesis about the essence of matter, it is evident that the materiality of a body does not stop at the point where we touch it. It is present wherever its influence is felt. Now its attractive force, to mention only that, acts on the sun, on the planets, perhaps on the whole universe. Moreover, the further physics advances, the more it effaces the individuality of bodies, and even of the particles into which scientific imagination began by breaking them down; bodies and corpuscles tend to melt into a universal [206] interaction. Our perceptions give us the outline of our possible action on things far more than the outline of the things themselves. The contours we find in objects simply mark what we can reach and modify in them. The lines we see traced through matter are the very ones along which we are called to move. Contours and roads have become more marked as consciousness prepared its action on matter—that is to say, in short, as the intellect was being constituted. It is doubtful whether animals built on a different plan from ours, a mollusc or an insect for example, carve matter up along the same joints. It is not even necessary that they should break it up into bodies. To follow the indications of instinct there is no need to perceive *objects*; it is enough to distinguish *properties*. The intellect, on the contrary, even in its humblest

form, already aspires to make matter act on matter. If in some respect matter lends itself to division into agents and patients, or more simply into coexisting and distinct fragments, it is to that side of it that the intellect will look. And the more it busies itself with dividing, the more it will spread out in space, as extension juxtaposed to extension, a matter which no doubt tends toward spatiality, but whose parts are nevertheless still in a state of reciprocal implication and interpenetration. Thus the same movement that leads the mind to determine itself as intellect, that is, into distinct concepts, brings matter to break up into objects clearly external to one another. The more *consciousness is intellectualized, the more matter is spatialized*. That is to say, when evolutionist philosophy pictures in space a matter carved up along the very lines that [207] our action will follow, it gives itself in advance, ready-made, the intellect it claimed to generate.

Metaphysics engages in work of the same kind, but more subtle and more conscious of itself, when it deduces the categories of thought *a priori*. The intellect is compressed, reduced to its quintessence, made to fit into a principle so simple that one might think it empty; from this principle one then draws out what one has put into it potentially. In this way one no doubt shows the intellect's coherence with itself; one defines the intellect and gives its formula, but one does not in the least retrace its genesis. An undertaking like Fichte's is more philosophical than Spencer's, in that it pays more respect to the true order of things, but it hardly takes us any further.[2] Fichte takes thought in a state of concentration and expands it into reality. Spencer starts from external reality and condenses it back into intellect. But in either case one must begin by taking the intellect for granted, whether contracted or expanded, grasped in itself by direct vision or perceived by reflection in nature, as in a mirror.

Most philosophers agree on this point because they concur in affirming the unity of nature and in picturing this unity in an

2 Johann Gottlieb Fichte (1762–1814), German idealist philosopher who sought to derive the whole of experience from the self-positing activity of the I.

abstract and geometrical form. Between the organized and the unorganized they do not see—they do not want to see—the break. Some start from the inorganic and claim to reconstitute the living by compounding it with itself. Others posit life first and make their way toward inert matter by a skillfully managed *decrescendo*. But for both there are in nature only differences of degree—degrees of complexity in the first hypothesis, degrees [208] of intensity in the second. Once this principle is granted, the intellect becomes as vast as the real. For it is incontestable that whatever is geometrical in things is entirely accessible to the human intellect; and if continuity between geometry and the rest is perfect, all the rest becomes equally intelligible, equally intelligent. Such is the postulate of most systems. One will easily be convinced of this by comparing doctrines that seem to have no point of contact, no common measure, such as those of a Fichte and a Spencer—two names that chance has just led us to bring together.

At the bottom of these speculations, then, lie two convictions (correlative and complementary): that nature is one, and that the function of the intellect is to embrace it entirely. Since the faculty of knowing is supposed to be coextensive with the whole of experience, there can no longer be any question of generating it. It is taken for granted and used, as sight is used to take in the horizon. Opinions will differ, it is true, as to the value of the result: for some it is reality itself that the intellect grasps, for others only its phantom. But phantom or reality, what the intellect grasps is supposed to be the totality of the graspable.

A COLLECTIVE PHILOSOPHY

Philosophy should be a progressive, shared effort to merge the intellect back into the whole of life.

This explains philosophy's exaggerated confidence in the powers of the individual mind. Whether dogmatic or critical, whether it consents to the relativity of our knowledge or claims to settle itself in the absolute, a philosophy is generally the work

of one philosopher, a single, global vision of the whole. One must take it or leave it.

More modest, and also the only one capable of completing and [209] perfecting itself, is the philosophy we are calling for. The human intellect, as we picture it, is not at all the one Plato showed us in the allegory of the cave. Its function is no more to watch vain shadows pass by than to turn around and contemplate the dazzling sun behind it. It has something else to do.[3] Harnessed, like oxen at the plow, to a heavy task, we feel the play of our muscles and joints, the weight of the plow and the resistance of the soil. To act and to know that we are acting, to come into contact with reality and even to live it, but only insofar as it concerns the work being done and the furrow being dug —that is the function of the human intellect. Yet a beneficent fluid bathes us, from which we draw the very strength to work and to live. From this ocean of life, in which we are immersed, we are constantly drawing something in. And we feel that our being, or at least the intellect that guides it, was formed in it by a kind of local solidification. Philosophy can only be an effort to merge once again into the whole. The intellect, reabsorbed into its principle, will live its own genesis over again in reverse. But the undertaking can no longer be completed all at once; it will necessarily be collective and progressive. It will consist in an exchange of impressions which, correcting one another and also being superimposed on one another, will end by expanding the humanity within us and bringing it to transcend itself.

LEARNING TO SWIM

The charge of a vicious circle fails, as action breaks the circle that reasoning draws around us.

But this method has against it the most inveterate habits of the mind. It immediately suggests the idea of a vicious circle. In vain, we shall be told, do you claim to go beyond the intellect:

3 In Plato's *Republic* (Book VII), prisoners chained in a cave see only shadows cast on a wall; the one who is freed turns around and at last beholds the sun.

how will you do so except with the intellect itself? Everything that is [210] lit up in your consciousness is intellect. You are inside your thought; you will not get out of it. Say, if you like, that the intellect is capable of progress, that it will see more and more clearly into a greater and greater number of things. But do not speak of generating it, for it is still with your intellect that you would be tracing its genesis.

The objection comes naturally to mind. But with such reasoning one could just as well prove that it is impossible to acquire any new habit whatever. It is of the essence of reasoning to shut us up in the circle of the given. But action breaks the circle. If you had never seen anyone swim, you might tell me that swimming is impossible, since to learn to swim one would have to begin by staying afloat, and therefore already know how to swim. Reasoning, in fact, will always nail me to dry land. But if I simply throw myself into the water without fear, I shall at first keep myself up somehow or other by struggling against it, and little by little I shall adapt myself to this new medium: I shall learn to swim. So, in theory, there is a kind of absurdity in wanting to know otherwise than through the intellect. But if the risk is frankly accepted, action will perhaps cut the knot that reasoning has tied and will never untie.

The risk, moreover, will seem smaller the more fully one adopts the point of view we take. We have shown that the intellect has detached itself from a vaster reality, but that there has never been a clean break between the two: around conceptual thought there remains an indistinct fringe that recalls its origin. More than that, we compared the intellect to a solid nucleus formed by condensation. [211] This nucleus does not differ radically from the fluid that envelops it. It can be reabsorbed into it only because it is made of the same substance. Someone who throws himself into the water, having known only the resistance of dry land, would drown at once if he did not struggle against the fluidity of the new medium. He is forced to cling to whatever solidity, so to speak, the water still offers him. Only on this condition does one end by adapting to the fluid in its lack of consist-

ency. So it is with our thought, once it has resolved to make the leap.

But it must leap, that is, leave its own medium. Reason, reasoning about its powers, will never manage to extend them, even though this extension does not seem at all unreasonable once it has been accomplished. You may perform thousands upon thousands of variations on the theme of walking; you will not derive from them a rule for swimming. Go into the water, and when you know how to swim you will understand that the mechanism of swimming is connected with that of walking. The first extends the second, but the second would not have led you into the first. In the same way, you may speculate as intelligently as you like on the mechanism of the intellect; by this method you will never succeed in going beyond it. You will obtain something more complicated, but not something higher, or even simply something different. Things must be forced: by an act of will, the intellect must be pushed out of its home.

The vicious circle, then, is only apparent. On the contrary, it is real, we believe, with every other way of philosophizing. This is what we should like to show in a few words, if only to prove that philosophy cannot and must not accept the relation that pure intellectualism establishes between the theory of [212] knowledge and the theory of the known, between metaphysics and science.

PHILOSOPHY CANNOT LEAVE THE FACTS TO SCIENCE

Handing all experience to science smuggles in a mechanistic metaphysics and ends in dogmatism or skepticism.

At first sight it may seem prudent to leave the consideration of facts to positive science. Physics and chemistry will deal with inert matter; the biological and psychological sciences will study the manifestations of life. The philosopher's task is then clearly circumscribed. He receives facts and laws from the scientist's hands. He may try to go beyond them to reach their deep causes, or he may believe it impossible to go further and prove

this by the very analysis of scientific knowledge. In both cases he shows the facts and relations, as science hands them down to him, the respect owed to a case already judged. On top of this knowledge he will superimpose a critique of the faculty of knowing and also, should the occasion arise, a metaphysics. As for knowledge itself, in its material content, he regards it as the business of science and not of philosophy.

But how can we fail to see that this so-called division of labor amounts to muddling and confusing everything? The metaphysics or the critique that the philosopher reserves for himself he will receive ready-made from positive science, already contained in the descriptions and analyses whose whole charge he has left to the scientist. Because he refused to intervene from the start in questions of fact, he finds himself reduced, in questions of principle, to formulating purely and simply, in more precise terms, the unconscious and therefore inconsistent metaphysics and critique outlined by the very attitude of science toward reality. Let us not be deceived by an apparent analogy between the things of nature and human affairs. We [213] are not here in the judicial sphere, where the description of the fact and the judgment on the fact are two distinct things, for the very simple reason that in that case there is, above the fact and independent of it, a law enacted by a legislator. Here the laws are internal to the facts, and relative to the lines one has followed in carving up the real into distinct facts. One cannot describe the appearance of the object without prejudging its inner nature and its organization. Form is no longer quite separable from matter. Whoever has begun by reserving questions of principle for philosophy, and has thereby sought to place philosophy above the sciences like a Court of Cassation above the assize courts and courts of appeal, will be led step by step to make of it no more than a mere court of registration. Its task will at most be to word in more precise terms sentences that reach it already irrevocably passed.[4]

4 The Court of Cassation is France's highest court; it rules only on points of law, leaving findings of fact to the lower courts.

Positive science, indeed, is the work of pure intellect. Now whether our conception of the intellect is accepted or rejected, there is one point that everyone will grant us: the intellect feels most at ease in the presence of unorganized matter. It makes better and better use of this matter through mechanical inventions, and mechanical inventions come the more easily to it the more mechanically it thinks of matter. It carries within it, in the form of natural logic, a latent geometrism that emerges as it penetrates further into the inner nature of inert matter. It is attuned to this matter, and that is why the physics and the metaphysics of inert matter are so close to each other. Now, when the intellect undertakes the study of life, it necessarily treats the living like the inert. It applies the same forms to this new [214] object and carries over into this new domain the same habits that served it so well in the old. And it is right to do so, for only on this condition will the living offer our action the same hold as inert matter. But the truth reached in this way becomes wholly relative to our faculty of acting. It is no longer anything but a symbolic truth. It cannot have the same value as physical truth, since it is only an extension of physics to an object of which we agree *a priori* to consider only the external aspect. The duty of philosophy, then, would be to intervene actively here: to examine the living without any ulterior thought of practical use, freeing itself from forms and habits that are strictly intellectual. Its own object is to speculate, that is, to see. Its attitude toward the living cannot be that of science, which aims only at acting, and which, being able to act only through the medium of inert matter, considers the rest of reality under this single aspect. What, then, will happen if philosophy leaves biological and psychological facts to positive science alone, as it has rightly left it physical facts? *A priori*, it will accept a mechanistic conception of the whole of nature, an unreflecting and even unconscious conception, born of material need. *A priori*, it will accept the doctrine of the simple unity of knowledge and of the abstract unity of nature.

From then on philosophy is ready-made. The philosopher has no choice left except between a metaphysical dogmatism and a metaphysical skepticism, which rest at bottom on the same postulate and add nothing to positive science. He may hypostatize the unity of nature—or, what comes to the same thing, the unity of science—in a being that will be nothing [215] since it will do nothing, in an ineffectual God who will simply sum up in himself the whole of the given. Or he may place it in an eternal Matter, from whose depths the properties of things and the laws of nature would pour forth. Or again, he may place it in a pure Form that would seek to grasp an ungraspable multiplicity, and which will be, as one pleases, the form of nature or the form of thought. All these philosophies will say, in various languages, that science is right to treat the living like the inert. They will say there is no difference in value, no distinction to be made, between the results the intellect arrives at in applying its categories, whether it is resting in inert matter or tackling life.

Yet in many cases one feels the frame cracking. But one did not begin by distinguishing between the inert and the living—the one adapted in advance to the frame into which it is inserted, the other unable to stay in it except by a convention that eliminates what is essential to it. So one is reduced to casting equal suspicion on everything the frame contains. A metaphysical dogmatism, which set up the artificial unity of science as an absolute, will now be succeeded by a skepticism or a relativism. This will universalize the artificial character of some of the results of science, extending it to all of them. Thus philosophy will henceforth oscillate between the doctrine that holds absolute reality to be unknowable and the doctrine which, in the idea it gives us of that reality, says nothing more than science said. For having tried to prevent all conflict between science and philosophy, we shall have sacrificed philosophy without science having gained much by it. And for having claimed to avoid the apparent vicious circle of using the intellect to go beyond the intellect, we shall go around in a very real circle. That circle [216] consists in laboriously rediscovering, in metaphysics, a unity

that was posited *a priori* at the outset—a unity accepted blindly, unconsciously, by the mere fact that all experience was handed over to science and all reality to the pure understanding.

SCIENCE TOUCHES THE ABSOLUTE IN MATTER

Separating the inert from the living lets physics reach the absolute while biology stays symbolic.

Let us begin, on the contrary, by drawing a line of demarcation between the inert and the living. We shall find that the first falls naturally within the frames of the intellect, while the second lends itself to them only artificially. We must therefore adopt a special attitude toward the latter and examine it with eyes other than those of positive science. Philosophy thus invades the domain of experience. It meddles in many things that until now were none of its business. Science, the theory of knowledge and metaphysics will find themselves brought onto the same ground. At first this will cause a certain confusion among them. All three will at first think they have lost something by it. But all three will end by profiting from the encounter.

Scientific knowledge, indeed, could pride itself on the uniform value attributed to its assertions throughout the whole domain of experience. But precisely because all of them were placed on the same level, all of them ended up tainted with the same relativity. This will no longer be so once we have begun by making the distinction which, in our view, is required. The understanding is at home in the domain of inert matter. It is essentially on this matter that human action is exercised, and action, as we said above, cannot move in the unreal. Thus, provided we consider only the general form of physics and not the detail of its realization, we may say that it touches the absolute. On the contrary, it is by [217] accident—chance or convention, as you please—that science obtains a hold on the living analogous to the one it has on inert matter. Here the application of the frames of the understanding is no longer natural. We do not mean that it is no longer legitimate, in the scientific sense of the

word. If science is to extend our action on things, and if we can act only with inert matter as our instrument, science can and must go on treating the living as it treated the inert. But it will be understood that the deeper it penetrates into life, the more symbolic the knowledge it provides becomes, the more relative to the contingencies of action. On this new ground, then, philosophy will have to follow science, in order to superimpose on scientific truth a knowledge of another kind, which may be called metaphysical. From then on all our knowledge, scientific or metaphysical, recovers its standing. In the absolute we are, we move, and we live. The knowledge we have of it is incomplete, no doubt, but not external or relative. It is being itself, in its depths, that we reach through the combined and progressive development of science and philosophy.[5]

By thus renouncing the artificial unity that the understanding imposes on nature from outside, we shall perhaps recover its true unity, inner and living. For the effort we make to go beyond the pure understanding brings us into something vaster, out of which our understanding is cut and from which it must have detached itself. And since matter conforms to the intellect, since there is an evident agreement between them, we cannot generate the one without tracing the genesis of the other. An identical process must have cut matter and intellect, at the same time, out of a fabric that contained them both. [218] We shall place ourselves back in this reality more and more completely, the harder we strive to transcend pure intellect.

TENSION AND RELAXATION

Pure duration strains the will; relaxing it scatters the self toward extension, the direction of matter.

Let us concentrate, then, on what in us is at once most detached from the external and least penetrated with intellectuality. Let us seek, in the depths of ourselves, the point where we feel most

5 An echo of St Paul's words in Acts 17:28: "in him we live, and move, and have our being."

inside our own life. It is into pure duration that we then plunge back, a duration in which the past, always on the move, is ceaselessly swelled by a present that is absolutely new. But at the same time we feel the spring of our will stretched to its utmost limit. By a violent contraction of our personality upon itself, we must gather up our past as it slips away, in order to thrust it, compact and undivided, into a present that it will create by entering it. Very rare are the moments when we take hold of ourselves to this degree: they are one with our truly free actions. And even then we never hold ourselves entirely. Our feeling of duration—I mean the coincidence of our self with itself—admits of degrees. But the deeper the feeling and the more complete the coincidence, the more the life into which they put us back absorbs intellectuality by going beyond it. For the essential function of the intellect is to link the same with the same, and the only facts entirely adaptable to the frame of the intellect are those that repeat themselves. Now, the intellect no doubt gets a hold on the real moments of real duration after the event. It does so by reconstituting the new state out of a series of views taken of it from outside, views that resemble as closely as possible what is already known. In this sense the state contains intellectuality "potentially," so to speak. It overflows [219] it, however, and even remains incommensurable with it, being indivisible and new.

Let us now relax, and interrupt the effort that pushes as much of the past as possible into the present. If the relaxation were complete, there would be neither memory nor will any longer. That is to say, we never fall into this absolute passivity, any more than we can make ourselves absolutely free. But at the limit we glimpse an existence made up of a present that would keep beginning over again—no more real duration, nothing but the instantaneous, dying and being reborn endlessly. Is this the existence of matter? Not quite, no doubt. Analysis resolves matter into elementary vibrations, and the shortest of these have a very slight duration, almost vanishing, but not zero. We may

nevertheless presume that physical existence inclines in this second direction, as psychical existence does in the first.

At the root of "spirituality" on the one hand, and of "materiality" together with intellectuality on the other, there would thus be two processes running in opposite directions. We would pass from the first to the second by way of inversion, perhaps even of mere interruption—if it is true that inversion and interruption are two terms that must here be taken as synonymous, as we shall show in detail a little further on. This presumption will be confirmed if we consider things from the standpoint of extension, and no longer only from that of duration.

The more we become conscious of our progress in pure duration, the more we feel the various parts of our being enter into one another, and our whole personality concentrate itself into a point, or better into a tip, which thrusts into the future, cutting into it [220] unceasingly. This is what free life and free action consist in. Let us, on the contrary, let ourselves go; instead of acting, let us dream. At once our self scatters. Our past, which until then was gathered in upon itself in the indivisible impulse it imparted to us, breaks up into thousands upon thousands of memories that become external to one another. They give up interpenetrating in proportion as they become more fixed. Our personality thus descends again in the direction of space. Indeed, it constantly borders on space in sensation. We shall not dwell here on a point we have gone into thoroughly elsewhere. Let us simply recall that extension admits of degrees, that every sensation is extensive to some extent, and that the idea of unextended sensations, artificially localized in space, is a mere mental construct, suggested by an unconscious metaphysics far more than by psychological observation.

No doubt we take only the first steps in the direction of extension, even when we let ourselves go as far as we can. But let us suppose for a moment that matter consists in this same movement pushed further, and that the physical is simply the psychical inverted. We would then understand why mind feels so thoroughly at ease and moves about so naturally in space, as

soon as matter suggests to it a more distinct representation of space. Mind already had an implicit representation of this space in the very feeling it had of its possible *relaxation*, that is, of its possible *extension*.[6] Mind finds space again in things, but it would have obtained it without them had its imagination been powerful enough to carry the inversion of its natural movement all the way through. On the other hand, this would explain why matter accentuates its materiality still further under the gaze [221] of mind. Matter began by helping mind to go down matter's own slope; it gave mind the impulse. But once launched, mind keeps going. The representation it forms of pure space is only the *schema* of the end-point this movement would reach. Once in possession of the form of space, mind uses it like a net whose meshes can be made and unmade at will, and which, cast over matter, divides it as the needs of our action require. Thus the space of our geometry and the spatiality of things generate each other through the mutual action and reaction of two terms that are of the same essence but move in opposite directions. Space is not as foreign to our nature as we imagine, nor is matter as completely extended in space as our intellect and our senses represent it.

MATTER EXTENDS WITHOUT BEING EXTENDED

Every material point acts on every other, so matter only tends toward the pure space of geometry.

We have dealt with the first point elsewhere. As for the second, we shall confine ourselves to observing that perfect spatiality would consist in a perfect externality of the parts in relation to one another, that is, in complete mutual independence. Now, there is no material point that does not act on every other material point. If we observe that a thing truly is where it acts,

6 The French pairs *détente* (relaxation, slackening of tension) with *extension*, a play Bergson develops throughout the chapter.

we shall be led to say (as Faraday did[7]) that all atoms interpenetrate and that each of them fills the world.[8] On such a hypothesis, the atom, or more generally the material point, becomes a mere mental construct: the one we arrive at by carrying far enough the work (wholly relative to our capacity to act) by which we subdivide matter into bodies. Yet it is undeniable that [222] matter lends itself to this subdivision, and that by supposing it divisible into parts external to one another we build a science that represents the real adequately. It is undeniable that, although there is no completely isolated system, science nevertheless finds a way to carve the universe into systems relatively independent of one another, and that in doing so it commits no appreciable error. What does this mean, if not that matter *extends* into space without being absolutely *extended* there? And that in treating it as decomposable into isolated systems, in attributing to it quite distinct elements which change in relation to one another without changing themselves (which "are displaced," as we say, without being altered), in short, in conferring on it the properties of pure space, we transport ourselves to the end-point of the movement whose direction matter merely sketches?

KANT AND THE ORIGIN OF SPACE

Kant rightly saw that space is unlike other attributes but wrongly took it as a ready-made form.

What Kant's *Transcendental Aesthetic* seems to us to have established definitively is that extension is not a material attribute comparable to the others. On the notion of heat, or on that of color or weight, reasoning will not work indefinitely: to know the modes of weight or of heat, we shall have to renew contact with experience. It is not so with the notion of space.[9] Even sup-

7 BERGSON'S NOTE. Faraday, *A speculation concerning electric conduction* (*Philos. Magazine,* 3rd series, vol. XXIV).

8 Michael Faraday (1791–1867), English physicist and pioneer of electromagnetism, who suggested that atoms are centers of force extending throughout space.

9 The opening part of Kant's *Critique of Pure Reason* (1781), which treats space and time as a priori forms of sensibility.

posing it is supplied to us empirically by sight and touch (and Kant never denied this), it has this remarkable feature: the mind, speculating on it with its own unaided powers, carves out in it *a priori* figures whose properties it will determine *a priori*. Experience, with which the mind has not kept in contact, nevertheless follows it through the endless complications of its reasoning and invariably proves it right. That is the fact. Kant brought it fully to light. But the explanation of the fact must be sought, [223] we believe, along a quite different path from the one Kant takes.

The intellect, as Kant presents it to us, is immersed in an atmosphere of spatiality to which it is as inseparably bound as the living body is to the air it breathes. Our perceptions reach us only after passing through this atmosphere. They have been steeped in advance in our geometry, so that our faculty of thinking merely rediscovers in matter the mathematical properties that our faculty of perceiving deposited there beforehand. Thus we are assured of seeing matter yield docilely to our reasoning; but this matter, insofar as it is intelligible, is our own work. Of reality "in itself" we know nothing and shall never know anything, since we grasp only its refraction through the forms of our faculty of perceiving. If we claim to affirm anything about it, the contrary affirmation at once springs up, equally demonstrable, equally plausible: the ideality of space, proved directly by the analysis of knowledge, is proved indirectly by the antinomies to which the opposite thesis leads. Such is the guiding idea of the Kantian critique. It inspired Kant to a decisive refutation of the so-called "empiricist" theories of knowledge. That refutation is, in our view, definitive in what it denies. But does the Kantian critique, in what it affirms, give us the solution of the problem?

It takes space as given, as a ready-made form of our faculty of perceiving—a veritable *deus ex machina*, of which we see neither how it arises nor why it is what it is rather than anything else. It takes as given "things in themselves" of which it claims we can know nothing: by what right, then, does it affirm [224] their exist-

ence, even as "problematic"? If the unknowable reality projects into our faculty of perceiving a sensible manifold capable of fitting exactly into it, is it not, by that very fact, partly known? And in examining this fitting more closely, shall we not be led, on one point at least, to suppose a pre-established agreement between things and our mind—a lazy hypothesis, which Kant was right to want to do without? At bottom, it is because he did not distinguish degrees of spatiality that Kant had to take space as given ready-made—hence the question of how the "sensible manifold" adapts itself to it. It is for the same reason that he believed matter to be entirely unfolded into parts absolutely external to one another. Hence the antinomies: it could easily be shown that their thesis and antithesis presuppose the perfect coincidence of matter with geometrical space, and that they vanish as soon as we stop extending to matter what is true of pure space. Hence, finally, the conclusion that there are three alternatives, and only three, among which a theory of knowledge must choose: either the mind conforms to things, or things conform to the mind, or we must suppose a mysterious concordance between things and the mind.

But the truth is that there is a fourth, which Kant does not seem to have thought of—first because he did not think that the mind overflowed the intellect, and second (which at bottom is the same thing) because he did not attribute absolute existence to duration, having placed time *a priori* on the same footing as space. This solution would consist, first, in regarding the intellect as a special function of the mind, essentially directed toward inert matter. It would then consist in saying that matter does not determine the form of the intellect, nor [225] does the intellect impose its form on matter, nor have matter and intellect been regulated to each other by some pre-established harmony or other; rather, the intellect and matter have gradually adapted to each other, finally settling on a common form. *This adaptation, moreover, would have come about quite naturally,*

because it is the same inversion of the same movement that creates at once the intellectuality of mind and the materiality of things.[10]

KNOWLEDGE APPROXIMATE BUT NOT RELATIVE

Perception and science divide matter too sharply, yet they bear on reality itself.

From this point of view, the knowledge of matter that our perception gives us on the one hand, and science on the other, appears approximate, no doubt, but not relative. Our perception, whose role is to light up our actions, divides matter into sections that will always be too sharp, always subordinate to practical needs, and therefore always in need of revision. Our science, which aspires to mathematical form, emphasizes the spatiality of matter more than it should; its schemas will therefore, in general, be too precise, and moreover always in need of being remade. For a scientific theory to be final, the mind would have to embrace the totality of things all at once and place them exactly in relation to one another. In reality, however, we are obliged to pose problems one by one, in terms which are by that very fact provisional. So the solution of each problem will have to be corrected indefinitely by the solutions given to the problems that follow, and science as a whole is relative to the contingent order in which the problems were posed one after another. It is in this sense, and to this extent, that science must be considered conventional. But its conventionality is a matter of fact, so to speak, and not of right. In principle, positive science bears on [226] reality itself, provided it does not step outside its own domain, which is inert matter.

Scientific knowledge, seen in this way, is raised in standing. On the other hand, the theory of knowledge becomes an infinitely difficult undertaking, one that exceeds the powers of pure intellect. For it is no longer enough to determine the categories of thought by a carefully conducted analysis; they must be gen-

10 "Pre-established harmony" is Leibniz's term for the correspondence between mind and body ordained in advance by God.

erated. As regards space, we would have to follow, by an effort of the mind *sui generis*, the progression, or rather the regression, of the extra-spatial as it degrades into spatiality. By first placing ourselves as high as possible in our own consciousness and then gradually letting ourselves fall, we do indeed feel that our self extends into inert memories external to one another, instead of tensing itself into an indivisible and active willing. But this is only a beginning. Our consciousness, in sketching the movement, shows us its direction and lets us glimpse the possibility of its continuing to the end; it does not itself go that far. On the other hand, if we consider matter, which at first seems to us to coincide with space, we find that the more our attention fixes on it, the more the parts we called juxtaposed enter into one another. Each of them undergoes the action of the whole, which is therefore in some way present in it. Thus, although matter unfolds in the direction of space, it does not quite arrive there. From this we may conclude that it merely continues much further the movement that consciousness could sketch in us in its nascent state. We thus hold both ends of the chain, even though we cannot manage to grasp the other links. Will they always escape us?

ORDER THAT COMES OF LETTING GO

As a poem falls apart into letters when attention slackens, mathematical order arises from an interruption.

We must bear in mind that philosophy, [227] as we define it, has not yet become fully conscious of itself. Physics understands its role when it pushes matter in the direction of spatiality. But did metaphysics understand its own role when it simply fell into step with physics, in the chimerical hope of going further in the same direction? Would its proper task not be, on the contrary, to climb back up the slope that physics descends, to bring matter back to its origins, and gradually to build up a cosmology that would be, if one may put it so, an inverted psychology? Everything that appears *positive* to the physicist and the geo-

meter would become, from this new point of view, an interruption or inversion of true positivity, which would have to be defined in psychological terms.

Certainly, consider the admirable order of mathematics, the perfect agreement of the objects it deals with, the logic immanent in numbers and figures, and our certainty of always arriving back at the same conclusion, however diverse and complex our reasonings on the same subject. We shall then hesitate to see in properties so positive in appearance a system of negations, the absence rather than the presence of a true reality. But we must not forget that our intellect, which observes and admires this order, is directed in the very direction of the movement that ends in the materiality and spatiality of its object. The more complication it puts into its object by analyzing it, the more complicated is the order it finds there. And this order and this complication necessarily strike it as a positive reality, since they run in the same direction as the intellect itself.

When a poet reads me his verses, I can take enough interest in him to enter into his thought, to insert myself into his [228] feelings, to live again the simple state he has scattered into sentences and words. I then sympathize with his inspiration; I follow it with a continuous movement which, like the inspiration itself, is an undivided act. Now, I need only relax my attention, slacken what was taut in me, and the sounds, until then drowned in the meaning, appear to me distinctly, one by one, in their materiality. I have nothing to add for this to happen; it is enough for me to take something away. The more I let myself go, the more the successive sounds will become individualized: just as the sentences broke up into words, so the words will be scanned into syllables that I shall perceive one after another. Let us go further still in the direction of dream: now it is the letters that will stand out from one another, and I shall see them file past, interlaced, on an imaginary sheet of paper. I shall then admire the precision of the interlacings, the marvelous order of the procession, the exact insertion of letters into syllables, of syllables into words, and of words into sentences. The further I

advance in the wholly negative direction of relaxation, the more extension and complication I shall have created; and the more the complication in turn increases, the more admirable will seem to me the order that continues to reign, unshaken, among the elements. Yet this complication and this extension represent nothing positive: they express a deficiency of will. On the other hand, order must indeed grow with complication, since it is only an aspect of it. The more parts we perceive symbolically in an indivisible whole, the more the number of relations among the parts necessarily increases, since the same undividedness of the real whole continues to hover over the growing multiplicity of symbolic elements into which the scattering of attention has broken it down. A [229] comparison of this kind will help us understand, to some extent, how the same suppression of positive reality, the same inversion of a certain original movement, can create at once extension in space and the admirable order that our mathematics discovers there. There is, of course, this difference between the two cases: words and letters were invented by a positive effort of humanity, whereas space arises automatically, just as the remainder of a subtraction arises once the two

terms are set down[11]. But in either case the infinite complication of the parts and their perfect coordination with one another are created at a single stroke by an inversion which is, at bottom, an interruption, that is, a diminution of positive reality.

NATURAL GEOMETRY AND DEDUCTION

Deduction is modeled on space: it triumphs in physics and falters quickly in moral matters.

All the operations of our intellect tend toward geometry, as the goal in which they find their perfect completion. But geometry is necessarily prior to them, since these operations will never succeed in reconstructing space and can do nothing but take it as given. It is evident, then, that it is a [230] latent geometry, immanent in our representation of space, that is the mainspring of our intellect and makes it go. We shall be convinced of this by considering the two essential functions of the intellect, the faculty of deduction and the faculty of induction.

Let us begin with deduction. The same movement by which I trace a figure in space generates its properties: they are visible

11 BERGSON'S NOTE. Our comparison merely develops the content of the term λόγος as Plotinus understands it. For on the one hand the λόγος of this philosopher is a generative and form-giving power, an aspect or fragment of the ψυχή, and on the other hand Plotinus sometimes speaks of it as a *discourse*. More generally, the relation we establish in the present chapter between "extension" and "distension" resembles in some respects the one Plotinus assumes (in discussions that were to inspire Ravaisson) when he makes extension not, indeed, an inversion of original Being, but a weakening of its essence, one of the last stages of the procession (see in particular *Enn.,* IV, III, 9–11 and III, VI, 17–18). Ancient philosophy, however, did not see what consequences followed from this for mathematics, for Plotinus, like Plato, set up mathematical essences as absolute realities. Above all, it let itself be deceived by the purely external analogy between duration and extension. It treated the former as it had treated the latter, regarding change as a degradation of immutability, and the sensible as a fall from the intelligible. Hence, as we shall show in the next chapter, a philosophy that misjudges the real function and scope of the intellect.

TRANSLATOR'S NOTE. Plotinus (c. AD 204–270), Neoplatonist philosopher of the *Enneads*; *logos* means both formative reason and discourse, *psychē* soul, and "procession" is the outflow of all things from the One. Félix Ravaisson (1813–1900) was a French philosopher who greatly influenced Bergson.

and tangible in that very movement; I feel, I live in space the relation of the definition to its consequences, of the premises to the conclusion. All the other concepts that experience suggests to me can be only partly reconstructed *a priori*. Their definition will therefore be imperfect, and the deductions into which these concepts enter, however rigorously the conclusion is linked to the premises, will share in this imperfection. But when I roughly trace the base of a triangle in the sand and begin to form the two base angles, I know for certain and understand absolutely that if these two angles are equal, the sides will be equal too, since the figure can then be turned over onto itself without anything in it being changed. I know this long before I have learned geometry. Thus, prior to learned geometry, there is a natural geometry whose clearness and evidence surpass those of other deductions. These other deductions bear on qualities, no longer on magnitudes. They are therefore no doubt formed on the model of the first kind, and must borrow their force from the fact that, beneath quality, we dimly see magnitude showing through. Let us note that questions of position and magnitude are the first our activity faces, the ones that the intellect externalized in action solves even before the reflective intellect has appeared. Someone from a people without cities [231] is better than a city-dweller at estimating distances, determining a direction, retracing from memory the often complex outline of the route traveled, and so returning in a straight line to the starting point[12]. If the animal does not deduce explicitly, and does not explicitly form concepts, neither does it represent to itself a homogeneous space. You cannot give yourself this space without introducing, at the same stroke, a virtual geometry that will of itself degrade into logic. All the reluctance of philosophers to look at things from this angle comes from the fact that, in their eyes, the logical work of the intellect represents a positive effort of the mind. But if by spirituality we mean a forward

12 BERGSON'S NOTE. Bastian, *Le cerveau*, Paris, 1882, vol. I, pp. 166–170.

TRANSLATOR'S NOTE. Henry Charlton Bastian (1837–1915), British neurologist; this is the French translation of his *The Brain as an Organ of Mind* (1880).

march toward ever new creations, toward conclusions incommensurable with the premises and indeterminable in relation to them, then we shall have to say that a representation moving among relations of necessary determination, through premises that contain their conclusion in advance, follows the opposite direction, that of materiality. What appears, from the intellect's point of view, as an effort is in itself a letting-go. From the intellect's point of view, it is begging the question to make geometry issue automatically from space, and logic from geometry itself. On the contrary, if space is the ultimate end of the mind's movement of relaxation, we cannot take space as given without thereby positing logic and geometry, which lie along the path whose end is pure spatial intuition.

It has not been sufficiently noticed how limited the reach of deduction is in the psychological and [232] moral sciences. Here, from a proposition verified by the facts, we can draw verifiable consequences only up to a point, only to a certain extent. Very soon we must appeal to common sense, that is, to continuous experience of the real, in order to bend the deduced consequences and curve them along the windings of life. Deduction succeeds in moral matters only metaphorically, so to speak, and in exact proportion as the moral can be transposed into the physical, I mean translated into spatial symbols. The metaphor never goes very far, any more than a curve can long be confused with its tangent. How can we fail to be struck by what is strange, and even paradoxical, in this weakness of deduction? Here is a pure operation of the mind, carried out by the mind's own force alone. It would seem that if it ought to feel at home and move at ease anywhere, it would be among the things of the mind, in the domain of the mind. Not at all: that is exactly where it is at once at the end of its tether. On the contrary, in geometry, in astronomy, in physics, where we are dealing with things external to us, deduction is all-powerful! Observation and experiment are no doubt necessary here to arrive at the principle, that is, to discover the aspect under which things had to be viewed. But strictly speaking, with a great deal of luck, one could have found

it at once; and as soon as we have this principle, we can draw from it consequences, a long way, that experience will always verify. What are we to conclude from this, if not that deduction is an operation modeled on the workings of matter, traced on matter's mobile articulations, and implicitly given, in short, along with the space that underlies matter? As long as it rolls along in space or in spatialized time, it [233] need only let itself go. It is *duration* that jams the wheels.

INDUCTION AND THE BOILING WATER

Expecting water to boil again assumes that time does not count and qualities superpose like magnitudes.

Deduction, then, does not work without spatial intuition lurking at the back of the mind. But the same could be said of induction. Certainly, we need not think like a geometer, or even think at all, to expect the same fact to be repeated under the same conditions. Animal consciousness already does this work, and, independently of all consciousness, the living body itself is already built to extract from the successive situations it finds itself in the similarities that concern it, and so to respond to stimuli with appropriate reactions. But it is a long way from a mechanical expectation and reaction of the body to induction properly so called, which is an intellectual operation. Induction rests on the belief that there are causes and effects, and that the same effects follow the same causes. Now, if we look more deeply into this double belief, here is what we find. It implies, first, that reality can be broken down into groups which, for practical purposes, can be regarded as isolated and independent. If I boil water in a saucepan placed on a stove, the operation and the objects that support it are in reality bound up with a host of other objects and a host of other operations: step by step, we would find that our entire solar system is involved in what is taking place at this point in space. But to a certain extent, and for the particular purpose I have in view, I may assume that things happen as if the group *water–saucepan–lighted stove* were an independent

microcosm. That is what I affirm first. Now, when I say that this microcosm will always behave in the same way, that the heat will necessarily, after a certain time, make the water boil, [234] I am assuming that if I am given a certain number of elements of the system, this is enough for the system to be complete. It completes itself automatically; I am not free to complete it in thought as I please. Given the lighted stove, the saucepan and the water, as well as a certain interval of duration, the boiling—which experience showed me yesterday to be what the system lacked to be complete—will complete it tomorrow, at any time, always. What lies at the bottom of this belief? We must note that it is more or less assured, depending on the case, and that it takes on the character of absolute certainty when the microcosm in question contains only magnitudes. If I posit two numbers, indeed, I am no longer free to choose their difference. If I am given two sides of a triangle and the included angle, the third side springs up of itself: the triangle completes itself automatically. Anywhere and at any time, I can draw the same two sides enclosing the same angle. It is evident that the new triangles thus formed can be superposed on the first, and that consequently the same third side will have come to complete the system. Now, if my certainty is perfect when I reason about pure spatial determinations, must I not suppose that in the other cases it is the more perfect the nearer it comes to this limiting case? Indeed, might it not be the limiting case that shows through all the others[13] and tinges them, according to their greater or lesser transparency, with a more or less marked shade of geometrical necessity? In fact, when I say that my water placed on my stove is going to boil today as it did yesterday, and that this is [235] absolutely necessary, I dimly feel that my imagination is transporting today's stove onto yesterday's, the saucepan onto the saucepan, the water onto the water, the dura-

13 BERGSON'S NOTE. We have developed this point in an earlier work. See the *Essai sur les données immédiates de la conscience*, Paris, 1889, pp. 155–160.

TRANSLATOR'S NOTE. Bergson's first book (literally "Essay on the Immediate Data of Consciousness"), known in English as *Time and Free Will*.

tion that is flowing onto the duration that is flowing. The rest, therefore, seems bound to coincide too, for the same reason that the third sides of two superposed triangles coincide if the first two sides already coincide. But my imagination proceeds in this way only because it shuts its eyes to two essential points. For today's system to be superposed on yesterday's, yesterday's would have had to wait for today's, time would have had to stand still, and everything would have had to become simultaneous with everything else. This is what happens in geometry, but in geometry alone. Induction therefore implies, first, that in the world of the physicist, as in that of the geometer, time does not count. But it also implies that qualities can be superposed on one another like magnitudes. If in thought I transport today's lighted stove onto yesterday's, I no doubt find that the form has remained the same; for this it is enough that the surfaces and edges coincide. But what is the coincidence of two qualities, and how are they to be superposed on each other to make sure they are identical? Yet I extend to the second order of reality everything that applies to the first. The physicist will later legitimize this operation by reducing, as far as possible, differences of quality to differences of magnitude; but before any science, I am inclined to assimilate qualities to quantities, as if I perceived behind the former, by transparency, a geometrical mechanism[14]. The more complete this transparency, the more necessary the repetition of the same fact under the same [236] conditions appears to me. Our inductions are certain, in our eyes, in exact proportion as we dissolve qualitative differences into the homogeneity of the space that underlies them, so that geometry is the ideal limit of our inductions as well as of our deductions. The movement that ends in spatiality deposits along its path the faculty of induction as well as that of deduction—intellectuality in its entirety.

14 BERGSON'S NOTE. *Op. cit.*, chs. I and III, *passim*.

WHY MATHEMATICS FITS MATTER

Physical laws are artificial, yet physics succeeds because matter is weighted with geometry, like a cork doll.

This movement creates them in the mind. But it also creates, in things, the "order" that our induction, aided by deduction, rediscovers. This order, on which our action leans and in which our intellect recognizes itself, seems marvelous to us. Not only do the same gross causes always produce the same overall effects; beneath the visible causes and effects, our science discovers an infinity of infinitesimal changes that fit ever more exactly into one another the further the analysis is pushed. So much so that at the end of this analysis matter would be, it seems to us, geometry itself. Certainly the intellect is right to admire here the growing order within growing complexity: both have a positive reality for it, since they run in the same direction as itself. But things change their aspect when we consider the whole of reality as an undivided forward march toward successive creations. We then divine that the complication of the material elements, and the mathematical order that binds them together, must arise automatically as soon as a partial interruption or inversion occurs within the whole. Since, moreover, the intellect is carved out of mind by a process of the same kind, it is attuned to this order and this complication, and admires them [237] because it recognizes itself in them. But what is admirable *in itself*, what would deserve to arouse wonder, is the ever-renewed creation that the undivided whole of the real accomplishes as it advances. For no complication of mathematical order with itself, however elaborate we suppose it, will introduce one atom of novelty into the world. Whereas once this power of creation is posited (and it exists, since we become conscious of it in ourselves, at least, when we act freely), it has only to turn aside from itself to relax, to relax to extend, and to extend for the mathematical order governing the arrangement of the elements thus distinguished, and the inflexible determinism binding

them, to manifest the interruption of the creative act. They are, moreover, one with that very interruption.

It is this wholly negative tendency that the particular laws of the physical world express. None of them, taken separately, has objective reality: each is the work of a scientist who has looked at things from a certain angle, isolated certain variables, and applied certain conventional units of measurement. And yet there is an approximately mathematical order immanent in matter, an objective order that our science approaches as it progresses. For if matter is a slackening of the unextended into the extended, and thereby of freedom into necessity, then even though it does not quite coincide with pure homogeneous space, it has been constituted by the movement that leads there, and so it is on the road to geometry. It is true that laws of mathematical form will never apply to it completely. For that, matter would have to be pure space, and step outside duration.

We can never insist enough on what is artificial [238] in the mathematical form of a physical law, and consequently in our scientific knowledge of things[15]. Our units of measurement are conventional and, if one may put it so, foreign to nature's intentions: how could we suppose that nature has related all the modes of heat to the expansions of one and the same mass of mercury, or to the changes of pressure of one and the same mass of air kept at constant volume? But that is not saying enough. In general, *to measure* is a wholly human operation, which implies superposing two objects on each other, really or ideally, a certain number of times. Nature never thought of this superposition. Nature does not measure, nor does it count. Yet physics counts, measures, and relates "quantitative" variations to one another to obtain laws, and it succeeds. Its success would be inexplicable if the movement that constitutes materiality were not the very movement which, prolonged by us to its end—

15 BERGSON'S NOTE. We are alluding here above all to the profound studies by Ed. Le Roy published in the *Revue de métaphysique et de morale*.

TRANSLATOR'S NOTE. Édouard Le Roy (1870–1954), French philosopher and mathematician, a follower of Bergson who later succeeded him at the Collège de France.

that is, to homogeneous space—leads us to count, to measure, and to follow in their respective variations terms that are functions of one another. To effect this prolongation, moreover, our intellect need only prolong itself, for it goes naturally toward space and mathematics, intellectuality and materiality being of the same nature and coming into being in the same way.

If mathematical order were something positive, if there were laws immanent in matter comparable to those of our legal codes, the success of our science would border on the miraculous. What chance would we have, indeed, of finding nature's standard of measure and of isolating precisely, in order [239] to determine their mutual relations, the very variables that nature had chosen? But the success of a science in mathematical form would be no less incomprehensible if matter did not have everything needed to fit into our frames. Only one hypothesis therefore remains plausible. Mathematical order has nothing positive about it. It is the form toward which a certain *interruption* tends of its own accord, and materiality consists precisely in an interruption of this kind. We shall thus understand how our science can be contingent, relative to the variables it has chosen and to the order in which it has successively posed its problems, and yet succeed. Taken as a whole, it could have been entirely different and still have succeeded. This is precisely because no definite system of mathematical laws lies at the basis of nature, and because mathematics in general simply represents the direction in which matter falls back. Put one of those little cork dolls with lead feet in any posture you like: lay it on its back, turn it upside down, throw it into the air. It will always stand itself up again, automatically. So it is with matter. We can take hold of it by any end and handle it any way we like, and it will always fall back into one or another of our mathematical frames, because it is weighted with geometry.

THE IDEA OF DISORDER

Like finding "no verse" in a book of prose, disorder is only the order we were not seeking.

But the philosopher may refuse to base a theory of knowledge on considerations of this kind. He will be reluctant to do so because mathematical order, being order, will seem to him to contain something positive. In vain do we say that this order arises automatically from the interruption of the inverse order, that it is that very interruption. The idea persists nonetheless that *there might be no order at all*, and that [240] the mathematical order of things, being a conquest over disorder, possesses a positive reality. By going more deeply into this point, one would see what a crucial role the idea of *disorder* plays in the problems of the theory of knowledge. It does not appear there explicitly, and that is why no one has paid attention to it. Yet it is with a critique of this idea that a theory of knowledge ought to begin. If the great problem is to know why and how reality submits to an order, that is because the absence of any kind of order seems possible or conceivable. The realist and the idealist both believe they are thinking of this absence of order. The realist does so when he speaks of the regulation that "objective" laws actually impose on a possible disorder of nature. The idealist does so when he supposes a "sensible manifold" that would become coordinated (being, therefore, without order) under the organizing influence of our understanding. The idea of disorder, taken in the sense of an *absence of order*, is thus the one that should be analyzed first. Philosophy borrows it from everyday life. And there is no denying that, in ordinary usage, when we speak of disorder we are thinking of something. But what are we thinking of?

We shall see in the next chapter how hard it is to determine the content of a negative idea. We shall also see to what illusions one is exposed, and into what inextricable difficulties philosophy falls, for not having undertaken this task. The difficulties

and illusions usually stem from accepting as definitive a way of expressing oneself that is essentially provisional. They stem from carrying over into the domain of speculation a procedure made for practice. If I pick a volume at random from my library, I may, after casting [241] a glance at it, put it back on the shelf, saying: "This isn't verse." Is that really what I perceived while leafing through the book? Obviously not. I did not see, and I never shall see, an absence of verse. I saw prose. But since it is poetry I want, I express what I find in terms of what I am looking for, and instead of saying "Here is prose," I say "This isn't verse." Conversely, if I take a fancy to read prose and happen upon a volume of verse, I shall exclaim: "This isn't prose." I thus translate the data of my perception, which shows me verse, into the language of my expectation and my attention, which are fixed on the idea of prose and will hear of nothing else. Now, if Monsieur Jourdain were listening to me, he would no doubt infer from my twofold exclamation that prose and poetry are two forms of language reserved for books. He would infer that these learned forms have been superimposed on a raw language that was neither prose nor verse. Speaking of this thing that is neither verse nor prose, he would, moreover, believe he was thinking of it; yet this would be only a pseudo-representation. Let us go further: the pseudo-representation could give rise to a pseudo-problem, if Monsieur[16] Jourdain were to ask his philosophy teacher how the form of prose and the form of poetry came to be added on to what possessed neither the one nor the other. Suppose he also wanted to be given a theory, in a sense, of how these two forms were imposed on this simple matter. His question would be absurd. The absurdity would come from his having hypostatized the simultaneous negation of both into a common substratum of prose and poetry, forgetting that the negation of the one consists in the positing of the other.

Now let us suppose that there are two kinds of order, and that these two orders are two contraries within one [242] and the same

genus. Let us suppose, too, that the idea of disorder arises in our mind whenever, looking for one of the two kinds of order, we come upon the other. The idea of disorder would then have a clear meaning in the everyday practice of life. For convenience of speech, it would objectify the disappointment of a mind that finds before it an order different from the one it needs. This is an order the mind has no use for at the moment and which, in that sense, does not exist for it. But the idea would admit of no theoretical use. If, in spite of everything, we insist on introducing it into philosophy, we shall infallibly lose sight of its true meaning. It denoted the absence of a certain order, but *to the advantage of another* (which we had no need to concern ourselves with). Only, since it applies to each of the two in turn, and indeed goes back and forth between them ceaselessly, we shall catch it on the way, or rather in mid-air, like the shuttlecock between the two rackets. We shall then treat it as if it represented, no longer the absence of either order indifferently, but the absence of both together—a thing neither perceived nor conceived, a mere verbal entity. Thus would arise the problem of how order imposes itself on disorder, form on matter. By analyzing the idea of disorder thus rarefied, one would see that it represents nothing at all, and at the same stroke the problems that had been raised around it would vanish.

It is true that we should first have to distinguish two kinds of order that are usually confused, and even to set them in opposition to each other. Since this confusion has created the main difficulties of the problem of knowledge, it will not be useless to dwell once more on the features by which the two orders differ.

16 Monsieur Jourdain is the hero of Molière's comedy *Le Bourgeois gentilhomme* (1670), who is delighted to learn from his philosophy teacher that he has been speaking prose all his life.

THE TWO KINDS OF ORDER

Order is either vital and willed, like a symphony, or inert and automatic, like astronomy.

[243] Generally speaking, reality is *ordered* in exact proportion as it satisfies our thought. Order is thus a certain agreement between subject and object. It is mind finding itself again in things. But mind, as we were saying, can move in two opposite directions. Sometimes it follows its natural direction: then there is progress in the form of tension, continuous creation, free activity. Sometimes it inverts that direction. This inversion, carried to the end, would lead to extension, to the necessary reciprocal determination of elements externalized in relation to one another, and finally to geometrical mechanism. Now, whether experience seems to us to adopt the first direction or turns toward the second, in both cases we say that there is order, for in both processes mind finds itself again. The confusion between them is therefore natural. To escape it, we should have to give the two kinds of order different names, and that is not easy, owing to the variety and variability of the forms they take. The order of the second kind might be defined by geometry, which is its extreme limit. More generally, it is this order that is at issue whenever a relation of necessary determination is found between causes and effects. It evokes ideas of inertia, passivity, automatism. As for the order of the first kind, it no doubt oscillates around finality. Yet it cannot be defined by finality, for sometimes it is above it, sometimes below. In its highest forms it is more than finality. A free action or a work of art may be said to display a perfect order, and yet they can be expressed in terms of ideas only after the fact and approximately. Life as a whole, regarded as a creative evolution, is something analogous; [244] it transcends finality, if by finality we mean the realization of an idea conceived or conceivable in advance. The frame of finality is therefore too narrow for life in its entirety. On the other hand, it is often too wide for this or that manifestation of life taken by itself. Be that as it

may, it is always the *vital* that we are dealing with here, and the whole of the present study tends to establish that the vital lies in the direction of the voluntary. We might therefore say that this first kind of order is that of the *vital* or the *willed*, as opposed to the second, which is that of the *inert* and the *automatic*. Common sense, for that matter, instinctively distinguishes between the two kinds of order, at least in extreme cases; and just as instinctively, it brings them together. We say of astronomical phenomena that they display an admirable order, meaning that they can be predicted mathematically. And we find an order no less admirable in a symphony by Beethoven, which is genius, originality and therefore unforeseeability itself.

But only exceptionally does the order of the first kind take so distinct a form. As a rule, it presents itself with characteristics that we have every interest in confusing with those of the opposite order. It is quite certain, for example, that if we considered the evolution of life as a whole, the spontaneity of its movement and the unforeseeability of its steps would force themselves on our attention. But what we meet in our everyday experience is this or that particular living being, these or those special manifestations of life, which repeat *more or less* forms and facts already known. Indeed, we observe everywhere a similarity of structure between what begets and what is begotten. This similarity allows us to enclose an indefinite number of living [245] individuals in the same group, and it is in our eyes the very type of the *generic*: the inorganic genera seem to us to take living genera as their model. It thus turns out that vital order, as it offers itself to us in the experience that breaks it into fragments, presents the same character and performs the same function as physical order. Both cause our experience to *repeat itself*; both allow our mind to *generalize*. In reality, this character has quite different origins in the two cases, and even opposite meanings. In the second case, its type, its ideal limit and also its foundation is the geometrical necessity by virtue of which the same components give an identical resultant. In the first case, on the contrary, it implies the intervention of something that arranges itself so as

to obtain the same effect, even when the elementary causes, infinitely complex, may be entirely different. We insisted on this last point in our first chapter, when we showed how identical structures are met with on independent lines of evolution. But without looking so far afield, we may presume that the mere reproduction of the ancestor's type by its descendants is already something quite other than the repetition of one and the same composition of forces summing up in an identical resultant. Think of the infinity of infinitesimal elements and infinitesimal causes that combine in the genesis of a living being. Reflect that the absence or deviation of any one of them would be enough for nothing to work any longer. The first impulse of the mind is then to have this army of little workers supervised by a shrewd foreman, the "vital principle," who would at every moment repair the mistakes made, correct the effect of lapses of attention, and put things back in place. [246] In this way we try to translate the difference between physical order and vital order: the former makes the same combination of causes give the same overall effect, while the latter ensures the stability of the effect even when there is some wavering in the causes. But this is only a translation. On reflection, we find that there can be no foreman, for the very simple reason that there are no workers. The causes and elements that physicochemical analysis discovers are no doubt real causes and elements for the facts of organic destruction; they are then limited in number. But vital phenomena properly so called, or facts of organic creation, open up before us, when we analyze them, the prospect of an infinite progression. From this we may infer that multiple causes and elements are here merely views taken by the mind as it attempts an ever closer imitation of nature's operation, whereas the operation imitated is an indivisible act. The resemblance between individuals of the same species would thus have an altogether different meaning, and an altogether different origin, from the resemblance between complex effects obtained by the same composition of the same causes. But in either case there is resemblance, and therefore generalization is possible. And that

is all that interests us in practice, since our daily life is necessarily an expectation of the same things and the same situations. It was therefore natural that this common character, essential from the point of view of our action, should bring the two orders together, in spite of a wholly internal diversity that interests only speculation.

GENERA AND LAWS, ANCIENTS AND MODERNS

The ancients reduced laws to genera, as with Aristotle's falling stone; the moderns reduce genera to laws.

Hence the idea of a *general order of nature*, the same everywhere, hovering over life and matter alike. Hence our habit of designating by the same word, and picturing in the [247] same way, the existence of *laws* in the domain of inert matter and that of *genera* in the domain of life.

That this confusion lies at the origin of most of the difficulties raised by the problem of knowledge, among the ancients as among the moderns, seems to us beyond doubt. Indeed, since the generality of laws and that of genera were designated by the same word and subsumed under the same idea, geometrical order and vital order were thereby confused. Depending on the point of view one adopted, the generality of laws was explained by that of genera, or the generality of genera by that of laws. Of the two theses thus defined, the first is characteristic of ancient thought; the second belongs to modern philosophy. But in both philosophies the idea of "generality" is an equivocal idea, which unites in its extension and its comprehension objects and elements that are incompatible with one another. In both, two kinds of order are grouped under the same concept, although they resemble each other only in the ease they give to our action on things. Two terms are brought together on the strength of a wholly external similarity. This similarity no doubt justifies their designation by the same word in practice, but it in no way authorizes us, in the speculative domain, to merge them in the same definition.

The ancients, in fact, did not ask why nature submits to laws, but why it is ordered according to genera. The idea of genus corresponds above all to an objective reality in the domain of life, where it expresses an undeniable fact: heredity. Moreover, there can be genera only where there are individual objects. Now, the organized being is cut out of [248] the whole of matter by its very organization, that is to say, by nature. Inert matter, by contrast, is divided into distinct bodies by our perception. Perception is guided by the interests of action, guided by the nascent reactions that our body sketches out, that is to say, as has been shown elsewhere[17], by the virtual genera that are striving to become constituted. Here, then, genera and individuals determine each other by a semi-artificial operation, entirely relative to our future action on things. Nevertheless, the ancients did not hesitate to put all genera on the same footing and to attribute to them all the same absolute existence. Reality thus becoming a system of genera, it was to the generality of genera (that is, in short, to the generality expressive of vital order) that the generality of laws had to be reduced. It would be interesting in this respect to compare Aristotle's theory of falling bodies with the explanation given by Galileo. Aristotle is concerned solely with the concepts of "high" and "low," of "proper place" and borrowed place, of "natural motion" and "forced motion"[18]. For him, the physical law by virtue of which the stone falls expresses the fact that the stone is returning to the "natural place" of all stones, namely the earth. In his eyes, the stone is not quite a stone so long as it is not in its normal place. In falling back to that place it aims at completing itself, like a living being that grows, and thus at fully realizing the essence of the genus stone[19]. If this conception of physical law were correct, law would no longer be a mere relation established by [249] the mind,

17 BERGSON'S NOTE. *Matière et mémoire*, chs. III and IV.

18 BERGSON'S NOTE. See in particular: *Phys.*, IV, 215 *a* 2; V, 230 *b* 12; VIII, 255 *a* 2; and *De Cælo*, IV, 1–5; II, 296 *b* 27; IV, 308 *a* 34.

19 BERGSON'S NOTE. *De Cælo*, IV, 310 *a* 34: τὸ δ'εἰς τὸν αὑτοῦ τόπον φέρεσθαι ἕκαστον τὸ εἰς τὸ αὑτοῦ εἶδός ἐστι φέρεσθαι ("for each thing, to move to its own place is to move to its own form").

and the subdivision of matter into bodies would no longer be relative to our faculty of perception. All bodies would have the same individuality as living bodies, and the laws of the physical universe would express relations of real kinship between real genera. We know what kind of physics came out of this. The ancients believed in the possibility of a single, definitive science, embracing the totality of the real and coinciding with the absolute; and for that reason they had in fact to content themselves with a more or less crude translation of the physical into the vital.

But the same confusion is found among the moderns, with this difference: the relation between the two terms is inverted. Laws are no longer reduced to genera, but genera to laws. And science, once again supposed to be one, becomes wholly relative, instead of being wholly in coincidence with the absolute, as the ancients would have it. The eclipse of the problem of genera in modern philosophy is a remarkable fact. Our theory of knowledge turns almost exclusively on the question of laws: genera will have to find some way of accommodating themselves to laws, no matter how. The reason is that our philosophy has its starting point in the great astronomical and physical discoveries of modern times. For it, the laws of Kepler and Galileo have remained the ideal and sole type of all knowledge. Now, a law is a relation between things or between facts. More precisely, a law in mathematical form expresses the fact that a certain magnitude is a function of one or several other variables, suitably chosen. Now, the choice of variable magnitudes, the division of nature into objects and facts, already has something contingent and conventional about it. But let us grant that the choice is plainly indicated, even imposed [250] by experience. The law will nonetheless remain a relation, and a relation consists essentially in a comparison. It has objective reality only for an intellect that represents several terms to itself at the same time. This intellect may be neither mine nor yours. A science dealing with laws can therefore be an objective science, which experience contained in advance and which we merely make it disgorge. It

is no less true that the comparison, if it is the work of no one in particular, is at least carried out impersonally. An experience made up of laws, that is, of terms *related* to other terms, is an experience made up of comparisons; by the time we gather it, it must already have passed through an atmosphere of intellectuality. The idea of a science and an experience wholly relative to the human understanding is therefore implicitly contained in the conception of a single and integral science composed of laws. Kant merely brought it out. But this conception results from an arbitrary confusion between the generality of laws and that of genera. Although an intellect is needed to condition terms in relation to one another, it is conceivable that in certain cases the terms themselves may exist independently. Suppose that, alongside relations between one term and another, experience also presented us with independent terms, living genera being something quite different from systems of laws. Then at least half of our knowledge would bear on the "thing in itself," on reality itself. This knowledge would be very difficult, precisely because it would no longer construct its object and would be obliged, on the contrary, to submit to it. But however little it cut into that object, it would have bitten into the absolute itself. Let us go further. The other half of knowledge would no longer be so [251] radically, so definitively relative as certain philosophers say, if it could be established that it bears on a reality of the inverse order. We always express this reality in mathematical laws, that is, in relations that imply comparisons; but it lends itself to this work only because it is weighted with spatiality, and therefore with geometry. Be that as it may, it is the confusion of the two kinds of order that lies behind the relativism of the moderns, just as it already lay beneath the dogmatism of the ancients.

HEREDITY AND THE VITAL ORDER

Repetition is essential to physical order but accidental to vital order, which only imitates it.

We have said enough to indicate the origin of this confusion. It stems from the fact that the "vital" order, which is essentially creation, is manifested to us less in its essence than in some of its accidents. These *imitate* physical and geometrical order. Like it, they present us with repetitions that make generalization possible, and that is all that matters to us. There is no doubt that life as a whole is an evolution, that is, an unceasing transformation. But life can advance only through the medium of living beings, which are its trustees. Thousands upon thousands of them, roughly alike, must repeat one another in space and in time for the novelty they are elaborating to grow and ripen. So it is with a book that makes its way toward a complete recasting by passing through thousands of printings, each of thousands of copies. There is this difference, however, between the two cases. The successive printings are identical, and so are the simultaneous copies of the same printing, whereas the representatives of one and the same species are never quite alike, either at different points in space or at different moments of time. Heredity transmits not only characters; it also transmits the impetus by virtue of which the [252] characters are modified, and this impetus is vitality itself. That is why we say that the repetition which serves as the basis of our generalizations is essential in the physical order and accidental in the vital order. The former is an "automatic" order; the latter is, I will not say voluntary, but analogous to the "willed" order.

Now, as soon as we have clearly grasped the distinction between the "willed" order and the "automatic" order, the equivocation on which the idea of *disorder* thrives dissipates. With it goes one of the principal difficulties of the problem of knowledge.

The capital problem of the theory of knowledge is, in fact, to know how science is possible, that is, in short, why there is order, and not disorder, in things. Order exists; that is a fact. But on the other hand disorder, *which seems to us to be less than order*, would seem to exist by right. The existence of order would thus be a mystery to be cleared up, or at any rate a problem to be posed. More simply, as soon as we undertake to ground order, we regard it as contingent, if not in things, at least in the eyes of the mind. We would ask no explanation of a thing we did not judge contingent. Suppose order did not appear to us as a conquest over something, or as an addition to something (which would be the "absence of order"). Then ancient realism would not have spoken of a "matter" to which the Idea was added, nor would modern idealism have posited a "sensible manifold" that the understanding organized into nature. And it is indeed undeniable that all order is contingent and conceived as such. But contingent in relation to what?

The answer, in our view, is not in doubt. An order is contingent, and appears to us contingent, in relation to [253] the inverse order, as verse is contingent in relation to prose and prose in relation to verse. All speech that is not prose is verse and is necessarily conceived as verse; all speech that is not verse is prose and is necessarily conceived as prose. In just the same way, every mode of being that is not one of the two orders is the other, and is necessarily conceived as the other. But we may fail to realize what we are conceiving, and may perceive the idea really present to our mind only through a mist of affective states.

THE UNTIDY ROOM AND CHANCE

Disorder and chance each express finding one kind of order where we expected the other.

We shall be convinced of this if we consider the use we make of the idea of disorder in everyday life. When I enter a room and judge it to be "in disorder," what do I mean by that? The position

of each object is explained by the automatic movements of the person who sleeps in the room, or by the efficient causes, whatever they may be, that have put each piece of furniture, each item of clothing, and so on, where it is. Order, in the second sense of the word, is perfect. But it is order of the first kind that I expect: the order that an orderly person consciously puts into their life, the willed order, in short, and not the automatic. I then call the absence of this order disorder. At bottom, all that is real, perceived and even conceived in this absence of one of the two orders is the presence of the other. But the second is a matter of indifference to me here, *I am interested only in the first*. So I express the presence of the second in terms of the first, instead of expressing it, so to speak, in terms of itself, and I say that it is disorder. Conversely, when we claim to be picturing a chaos, that is, a state of things in which the physical world no longer obeys laws, what are we thinking of? We imagine facts that would appear and [254] disappear *capriciously*. We begin by thinking of the physical universe as we know it, with effects and causes well proportioned to one another. Then, by a series of arbitrary decrees, we increase, diminish, suppress, so as to obtain what we call disorder. In reality, we have substituted willing for the mechanism of nature. We have replaced the "automatic order" with a multitude of elementary wills, as many as the appearances and disappearances of phenomena we imagine. No doubt, for all these little wills to constitute a "willed order," they would have had to accept the direction of a higher will. But on looking closely, we shall see that this is indeed what they do. Our own will is there, objectifying itself in turn in each of these capricious wills. It takes good care not to link like with like and not to let the effect remain proportional to the cause; in short, it makes a single intention hover over the whole set of elementary volitions. Thus here again the absence of one of the two orders does indeed consist in the presence of the other.—By analyzing the idea of chance, a close relative of the idea of disorder, we should find the same elements in it. Suppose the wholly mechanical play of causes that stops the roulette wheel at a number

makes me win, and so acts as a benevolent spirit mindful of my interests would have done. Or suppose the wholly mechanical force of the wind tears a tile off the roof and hurls it onto my head, that is, acts as a malevolent spirit plotting against my person would have done. In both cases I find a mechanism where I would have looked for an intention, where, it seems, I ought to have encountered one. That is what I express when I speak of *chance*. And of an anarchic world, in which phenomena succeeded one another as [255] their whim dictated, I shall again say that it is the reign of chance. I mean by this that I find before me wills, or rather *decrees*, when it was mechanism I expected. This explains the curious way the mind is tossed back and forth when it tries to define chance. Neither the efficient cause nor the final cause can supply it with the definition sought. It oscillates, unable to settle, between the idea of an absence of final cause and that of an absence of efficient cause, each of these two definitions sending it back to the other. The problem does indeed remain insoluble so long as we take the idea of chance for a pure idea, with no admixture of feeling. But in reality chance merely objectifies the state of mind of someone who expected one of the two kinds of order and meets with the other. Chance and disorder are therefore necessarily conceived as relative. If we try to picture them as absolute, we find that we are involuntarily moving to and fro like a shuttle between the two kinds of order. We pass into the one at the precise moment when we would catch ourselves in the other. We find, too, that the supposed absence of all order is in reality the presence of both, with, in addition, the swaying of a mind that settles definitively on neither. Neither in things nor in our representation of things can there be any question of presenting this disorder as the substratum of order, since it implies both kinds of order and is made up of their combination.

But our intellect disregards all this. By a simple *sic jubeo*, it posits a disorder that would be an "absence of order." It thus thinks a word, or a juxtaposition of words, nothing more. Let it try to put an idea under the word. It will find that disorder may

well be the negation of an order, but that this negation is then [256] the implicit recognition of the presence of the opposite order. We shut our eyes to this recognition because it does not interest us, or we escape it by denying the second order in its turn, that is, at bottom, by restoring the first. How, then, can we speak of an incoherent manifold which an understanding would organize?[20] It is no use saying that no one supposes this incoherence to be realized or realizable. As soon as we speak of it, it is because we believe we are thinking of it. Yet on analyzing the idea actually present, we shall find in it, once again, only one of three things. It may be the mind's disappointment before an order that does not interest it. It may be an oscillation of the mind between two kinds of order. Or, finally, it may be the pure and simple representation of the empty word we created by attaching the negative prefix to a word that meant something. But it is this analysis that we neglect to make. We omit it precisely because we do not think of distinguishing two kinds of order irreducible to each other.

We were saying, in fact, that all order necessarily appears contingent. If there are two kinds of order, this contingency of order is explained: the one form is contingent in relation to the other. Where I find the geometrical, the vital was possible; where the order is vital, it might have been geometrical. But suppose that order is everywhere of the same kind and merely admits of degrees, ranging from the geometrical to the vital. A given order would still appear to me contingent, and could no longer be so in relation to an order of another kind. I would then necessarily believe that order is contingent in relation to an *absence of itself*, that is, in relation to a state of things "in which there would be no order at all." And I would believe I was thinking of this state of things, because it is implied, it seems, in the very contingency [257] of order, which is an undeniable fact. I would therefore place the vital order at the top of the hierarchy. Next would come the geometrical order, as a diminution or

20 Latin, "thus I command": an echo of Juvenal's *hoc volo, sic jubeo* ("this I will, thus I command"), proverbial for an arbitrary decree.

lesser complication of the vital. Finally, at the very bottom, would come the absence of order, incoherence itself, on which order would be superimposed. That is why incoherence will strike me as a word behind which there must be something, if not realized, at least thought. But suppose I notice that the state of things implied by the contingency of a given order is simply the presence of the contrary order, and by that very fact posit two kinds of order, each the inverse of the other. I then realize that no intermediate degrees can be imagined between the two orders, and that one cannot descend from these two orders toward the "incoherent" either. Either the incoherent is merely a word devoid of meaning, or, if I give it a meaning, I can do so only by placing incoherence midway between the two orders, and not below both of them. There is not first the incoherent, then the geometrical, then the vital. There is simply the geometrical and the vital, and then, through the mind's swaying between the one and the other, the idea of the incoherent. To speak of an uncoordinated manifold to which order is superadded is therefore to commit a genuine begging of the question. In imagining the uncoordinated, we are really positing an order, or rather two.

This long analysis was necessary to show how the real could pass from tension to extension and from freedom to mechanical necessity by way of inversion. It was not enough to establish that this relation between the two terms is suggested to us both by consciousness and by sense experience. It had to be proved that geometrical order needs no explanation, being purely and simply the suppression of the inverse order. And for [258] that, it was indispensable to establish that suppression is always a substitution, and even that it is necessarily conceived as such. Here it is only the demands of practical life that suggest to us a way of speaking that deceives us both about what happens in things and about what is present to our thought. We must now examine more closely the inversion whose consequences we have just described. What, then, is the principle that has only to slacken

in order to extend itself, the interruption of the cause being equivalent here to a reversal of the effect?

THE PRINCIPLE THAT RELAXES INTO MATTER

Intuition, glimpsed in rare moments and in every lasting system, can reach the source of life.

For want of a better word, we have called it consciousness. But we do not mean the diminished consciousness that functions in each of us. Our own consciousness is the consciousness of a certain living being, placed at a certain point in space. And although it does move in the same direction as its principle, it is constantly pulled the opposite way: though it walks forward, it is obliged to look backward. This retrospective vision is, as we have shown, the natural function of the intellect, and consequently of distinct consciousness. For our consciousness to coincide with something of its principle, it would have to detach itself from the *ready-made* and attach itself to what is *in the making*. The faculty of *seeing* would have to turn back and twist upon itself until it became one with the act of *willing*. This is a painful effort, which we can make suddenly by doing violence to nature, but cannot sustain for more than a few moments. In free action, when we contract our whole being in order to thrust it forward, we are more or less clearly conscious of our motives and impulses, and even, up to a point, of the becoming through which they organize themselves into an act. But pure willing, the current that runs through this matter [259] and imparts life to it, is something we barely feel, something we at most brush against in passing. Let us try to install ourselves in it, if only for a moment: even then, what we grasp will be an individual, fragmentary willing. To reach the principle of all life, as also of all materiality, we would have to go further still. Is that impossible? Certainly not; the history of philosophy is there to bear witness. There is no lasting system that is not quickened by intuition, in some of its parts at least. Dialectic is necessary to put intuition to the test, and necessary too for intuition to be refracted into

concepts and passed on to other people. But very often it does no more than develop the result of that intuition, which goes beyond it. In truth, the two procedures run in opposite directions: the very effort by which we link ideas to ideas makes the intuition vanish that the ideas were meant to store up. The philosopher is obliged to abandon intuition once he has received its impetus, and to rely on himself to continue the movement, now pushing concepts one behind another. But very soon he feels that he has lost his footing; a new contact becomes necessary; most of what had been done will have to be undone. In short, dialectic is what ensures the agreement of our thought with itself. But through dialectic—which is only a slackening of intuition—many different agreements are possible, and yet there is only one truth. If intuition could be prolonged beyond a few moments, it would ensure not only the philosopher's agreement with his own thought, but also the agreement of all philosophers with one another. As it exists, fleeting and incomplete, it is, in each system, what is worth more than the system and what [260] survives it. The object of philosophy would be attained if this intuition could be sustained, generalized, and above all furnished with external landmarks so as not to go astray. For that, a continual coming and going between nature and mind is necessary.

CREATION OF FORM AND CREATION OF MATTER

A poet's creation scattering into letters suggests how matter might arise from an interrupted creative act.

When we put our being back into our willing, and our willing itself back into the impulse it prolongs, we understand, we feel, that reality is a perpetual growth, a creation pursued without end. Our will already performs this miracle. Every human work that contains some element of invention, every voluntary act that contains some element of freedom, every movement of an organism that shows spontaneity, brings something new into the world. These, it is true, are only creations of form. How

could they be anything else? We are not the vital current itself; we are that current already laden with matter, that is, with congealed parts of its own substance, which it carries along its course. In composing a work of genius, as in a simple free decision, we may strain the spring of our activity to the utmost and so create what no mere assemblage of materials could have produced (what juxtaposition of known curves will ever equal the pencil stroke of a great artist?). There are nonetheless elements here that preexist their organization and survive it. But if a mere halt in the action that generates form could constitute its matter (are not the original lines drawn by the artist themselves already the fixing, and as it were the congealing, of a movement?), then a creation of matter would be neither incomprehensible nor inadmissible. For we grasp from within, we live at every moment, a creation of form, [261] and this very thing, in cases where the form is pure and the creative current is momentarily interrupted, would be a creation of matter. Consider all the letters of the alphabet that go into the composition of everything that has ever been written: we cannot conceive of other letters springing up and adding themselves to these to make a new poem. But that the poet creates the poem and that human thought is enriched by it—this we understand very well. This creation is a simple act of mind, and the action need only pause, instead of continuing into a new creation, for it to scatter of its own accord into words, which break up into letters, which will be added to all the letters already in the world. In the same way, the idea that the number of atoms making up the material universe at a given moment might increase goes against our habits of mind and contradicts our experience. But that a reality of an entirely different order—one that stands out against the atom as the poet's thought stands out against the letters of the alphabet—should grow by sudden additions is not inadmissible. And the reverse side of each addition might well be a world, which we represent to ourselves, symbolically moreover, as a juxtaposition of atoms.

Indeed, the mystery that hangs over the existence of the universe comes in large part from our insisting that its genesis took place all at once, or else that all matter is eternal. Whether we speak of creation or posit an uncreated matter, in both cases it is the totality of the universe that is in question. If we probed this habit of mind more deeply, we would find in it the prejudice that we shall analyze in our next chapter: the idea, common to materialists and their opponents alike, that there is no really active duration, and that the absolute—matter or spirit—cannot take its place in [262] concrete time, the time we feel to be the very stuff of our life. From this it would follow that everything is given once and for all, and that we must posit from all eternity either material multiplicity itself or the act that creates this multiplicity, given as a single block in the divine essence. Once this prejudice is uprooted, the idea of creation becomes clearer, for it merges with the idea of growth. But then it is no longer of the universe in its totality that we shall have to speak.

ENERGY AND ITS DEGRADATION

Conservation is partly conventional, but Carnot's principle shows the solar system running down.

Why should we speak of it? The universe is an assemblage of solar systems which we have every reason to believe are analogous to our own. No doubt these systems are not absolutely independent of one another. Our sun radiates heat and light beyond the farthest planet, and moreover our entire solar system moves in a definite direction, as though it were being drawn there. So there is a link between the worlds. But this link can be regarded as infinitely loose compared with the solidarity that binds together the parts of one and the same world. So it is not artificially, for reasons of mere convenience, that we isolate our solar system: nature itself invites us to isolate it. As living beings, we depend on the planet we are on and on the sun that feeds it, but on nothing else. As thinking beings, we can apply the laws of our physics to our own world, and no doubt also extend them to

each of the worlds taken in isolation. But nothing says that they still apply to the whole universe, or even that such a statement has any meaning, for the universe is not made, but is unceasingly being made. It is no doubt growing indefinitely through the addition of new worlds.

Let us, then, extend to the whole of our solar system, [263] but restrict to this relatively closed system, as to the other relatively closed systems, the two most general laws of our science: the principle of the conservation of energy and the principle of its degradation. Let us see what follows. We must first note that these two principles do not have the same metaphysical scope. The first is a quantitative law, and therefore relative in part to our methods of measurement. It says that in a system assumed to be closed, the total energy—that is, the sum of kinetic and potential energy—remains constant. Now, if there were only kinetic energy in the world, or even if there were, besides kinetic energy, only one kind of potential energy, the artifice of measurement would not be enough to make the law artificial. The law of the conservation of energy would indeed express that *something* is conserved in constant quantity. But in reality there are energies of various kinds[21], and the measure of each of them has evidently been chosen so as to justify the principle of the conservation of energy. The element of convention inherent in this principle is therefore fairly large, even though there is no doubt, among the variations of the different energies making up one system, a solidarity which is precisely what has made it possible to extend the principle by suitably chosen measures. If, then, the philosopher applies this principle to the whole solar system, he will at least have to blur its outlines. Here the law of the conservation of energy will no longer be able to express the objective permanence of a certain quantity of a certain thing, but rather the necessity for every change that occurs to be counter-

21 BERGSON'S NOTE. On these differences of quality, see Duhem's work, *L'évolution de la mécanique,* Paris, 1905, p. 197 ff.

TRANSLATOR'S NOTE. Pierre Duhem (1861–1916), French physicist and historian of science; the title means "The Evolution of Mechanics."

balanced, [264] somewhere, by a change in the opposite direction. That is to say, even if it governs the whole of our solar system, the law of the conservation of energy tells us about the relation of one fragment of this world to another fragment rather than about the nature of the whole.

It is otherwise with the second law of thermodynamics. The law of the degradation of energy does not, in fact, bear essentially on magnitudes. No doubt its first idea arose in Carnot's mind from certain quantitative considerations about the efficiency of heat engines. No doubt too it was in mathematical terms that Clausius generalized it, and it was in the concept of a calculable magnitude, "entropy," that he ended up. These refinements are necessary for applications. But the law would still be formulable in a vague way, and could, at a pinch, have been formulated roughly, even if no one had ever thought of measuring the various energies of the physical world, even if the concept of energy had never been created.[22] For what it essentially expresses is that all physical changes tend to degrade into heat, and that heat itself tends to distribute itself uniformly among bodies. In this less precise form it becomes independent of all convention. It is the most metaphysical of the laws of physics, in that it points out to us, with no symbols interposed and no artifices of measurement, the direction in which the world is moving. It says that changes that are visible and heterogeneous to one another will be diluted more and more into changes that are invisible and homogeneous. And it says that the instability to which we owe the richness and variety of the changes taking place in our solar system will gradually give way to the relative stability of elementary vibrations repeating one [265] another indefinitely. Such would be a man who kept his strength but devoted less and less of it to action, and ended by using it all to keep his lungs breathing and his heart beating.

Seen from this point of view, a world such as our solar system appears to be exhausting at every moment something of the

22 Sadi Carnot (1796–1832) laid the foundations of thermodynamics in 1824; Rudolf Clausius (1822–1888) stated its second law and coined the term "entropy."

mutability it contains. At the beginning there was the maximum possible utilization of energy; this mutability has been steadily decreasing ever since. Where does it come from? One might at first suppose that it came from some other point in space, but the difficulty would only be pushed back, and the same question would arise for this external source of mutability. It might be added, it is true, that the number of worlds capable of passing mutability on to one another is unlimited, that the sum of mutability contained in the universe is infinite, and that there is therefore no more reason to seek its origin than to foresee its end. A hypothesis of this kind is as irrefutable as it is unprovable. But to speak of an infinite universe is to admit a perfect coincidence of matter with abstract space, and consequently an absolute externality of all the parts of matter with respect to one another. We have seen above what to think of this last thesis, and how hard it is to reconcile with the idea of a reciprocal influence of all the parts of matter upon one another—the very influence that is being appealed to here. Finally, one might suppose that the general instability emerged from a general state of stability; that the period we are in, during which usable energy is decreasing, was preceded by a period in which mutability was on the increase; and that, moreover, alternations [266] of increase and decrease succeed one another without end. This hypothesis is theoretically conceivable, as has been shown with precision in recent times. But according to Boltzmann's calculations, its mathematical improbability passes all imagination and amounts, for practical purposes, to absolute impossibility[23]. In reality, the problem is insoluble if we remain on the ground of physics. For the physicist is obliged to attach energy to extended particles, and even if he sees particles as nothing but reservoirs of energy, he remains within space: he would be false to his role

23 BERGSON'S NOTE. Boltzmann, *Vorlesungen über Gastheorie*, Leipzig, 1898, p. 253 ff.

TRANSLATOR'S NOTE. Ludwig Boltzmann (1844–1906), Austrian physicist who gave the second law a statistical interpretation; the title means "Lectures on Gas Theory."

if he sought the origin of these energies in an extra-spatial process. Yet it is precisely there, in our view, that it must be sought.

LIFE DELAYS THE FALL

Life is an effort to lift the falling weight, storing solar energy in explosives it later releases.

Do we consider extent in general, *in abstracto*? *Extension,* we said, then appears only as an interrupted *tension*. Do we turn to the concrete reality that fills this extent? The order that reigns there, and that shows itself in the laws of nature, is an order that must arise of itself when the inverse order is suppressed; a slackening of the will would produce precisely this suppression. Finally, the direction in which this reality moves now suggests to us the idea of a thing *that is unmaking itself*; that, beyond any doubt, is one of the essential features of materiality. What are we to conclude from this, if not that the process by which this thing *makes itself* runs in the direction opposite to physical processes, and that it is therefore, by its very definition, immaterial? Our vision of the material world is that of a weight falling; no image drawn from matter properly so called will give us an idea of the weight rising. But this conclusion [267] will force itself upon us even more strongly if we look more closely at concrete reality—if we consider no longer just matter in general but, within that matter, living bodies.

All our analyses show us, in fact, that life is an effort to climb back up the slope that matter descends. In this way they let us glimpse the possibility, even the necessity, of a process inverse to materiality, a process that creates matter by its mere interruption. Certainly, the life that evolves on the surface of our planet is bound to matter. If it were pure consciousness, still more if it were supraconsciousness, it would be pure creative activity. In fact, it is riveted to an organism that subjects it to the general laws of inert matter. But everything happens as if it were doing all it can to free itself from these laws. It does not have the power to reverse the direction of physical changes as

Carnot's principle determines it. But at least it behaves exactly as a force would that, left to itself, worked in the opposite direction. Unable to *stop* the course of material changes, it nevertheless manages to *delay* it. The evolution of life does indeed, as we have shown, continue an initial impulsion. This impulsion, which determined the development of the chlorophyll function in the plant and of the sensorimotor system in the animal, leads life to ever more effective acts through the manufacture and use of ever more powerful explosives. Now, what do these explosives represent if not a storing-up of solar energy, an energy whose degradation is thus provisionally suspended at a few of the points where it was pouring out? The usable energy that the explosive holds will be spent, no doubt, at the moment of explosion; but [268] it would have been spent sooner if an organism had not been there to halt its dissipation, to hold it back and let it add up upon itself. As it appears to us today, at the point to which it has been brought by a splitting of the mutually complementary tendencies it contained, life hangs entirely on the chlorophyll function of the plant. That is to say that, considered in its initial impulsion, before any splitting, life was a tendency to accumulate in a reservoir—as the green parts of plants above all do—something that would have flowed away without it, with a view to an effective instantaneous discharge, like the one the animal performs. It is like an effort to raise the falling weight. It

succeeds, it is true, only in delaying its fall. But at least it can give us an idea of what the raising of the weight was[24].

THE VESSEL OF STEAM AND THE RISING ARM

Images of a steam jet and a falling arm show a reality making itself through one unmaking itself.

Let us imagine, then, a vessel full of steam at high pressure, and here and there in its walls a crack through which the steam escapes in a jet. The steam thrown into the air condenses almost entirely into droplets that fall back, and this condensation and this fall represent simply the loss of something, an [269] interruption, a deficit. But a small part of the jet of steam persists, uncondensed, for a few moments; this part strives to lift the falling drops, and at most it manages to slow their fall. In the same way, jets must be gushing out unceasingly from an immense reservoir of life, and each of them, falling back, is a world. The evolution of living species within this world represents what persists of the primitive direction of the original jet, and of an impulsion that continues in the direction opposite to materiality. But let us not cling too closely to this comparison. It would give us only a weakened and even misleading image of reality, for the crack, the jet of steam and the lifting of the droplets are necessarily determined, whereas the creation of a world is a free act, and life, within the material world, shares in this freedom.

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24 BERGSON'S NOTE. In a book rich in facts and ideas (*La dissolution opposée à l'évolution*, Paris, 1899), André Lalande shows us all things marching toward death, despite the momentary resistance that organisms seem to put up.—But, even on the side of unorganized matter, have we the right to extend to the whole universe considerations drawn from the present state of our solar system? Beside the worlds that are dying, there are no doubt worlds being born. On the other hand, in the organized world, the death of individuals does not appear at all as a diminution of "life in general," or as a necessity that life submits to reluctantly. As has been remarked more than once, life has never made any effort to prolong the existence of the individual indefinitely, whereas on so many other points it has made so many successful efforts. Everything happens *as if* this death had been willed, or at least accepted, for the greater progress of life in general.

TRANSLATOR'S NOTE. André Lalande (1867–1963), French philosopher; the title means "Dissolution as Opposed to Evolution."

Let us think rather of a gesture like that of raising an arm. Then let us suppose that the arm, left to itself, falls back, and yet that something of the will that animated it persists in it, striving to raise it again. With this image of a *creative gesture that is unmaking itself* we shall already have a more exact representation of matter. And we shall then see in vital activity what persists of the direct movement within the inverted movement: *a reality that is making itself through one that is unmaking itself.*

NO THINGS, ONLY ACTIONS

Worlds spring from a center that is not a thing but continuous springing forth; creation is action.

Everything in the idea of creation is obscure if we think of *things* that are created and a *thing* that creates, as we usually do, and as the understanding cannot help doing. We shall show the origin of this illusion in our next chapter. It is natural to our intellect, an essentially practical function, made to present us with things and states rather than with changes and acts. But things [270] and states are only views taken by our mind of becoming. There are no things; there are only actions. More particularly, if I consider the world we live in, I find that the automatic and strictly determined evolution of this well-knit whole is action unmaking itself, and that the unforeseen forms that life cuts out in it, forms capable of prolonging themselves into unforeseen movements, represent action making itself. Now, I have every reason to believe that the other worlds are analogous to ours, and that things happen there in the same way. And I know that they were not all formed at the same time, since observation shows me, even today, nebulae in the process of concentration. If the same kind of action is being performed everywhere, whether it is unmaking itself or trying to remake itself, I am simply expressing this probable similarity when I speak of a center from which worlds would shoot out like the rockets of an immense fireworks bouquet—provided, however, that I do not present this center as a *thing*, but as a continuity of springing forth. God, thus defined,

has nothing of the ready-made; he is unceasing life, action, freedom. Creation, so conceived, is not a mystery; we experience it in ourselves as soon as we act freely. That new things could be added to the things that exist is absurd, no doubt, since the *thing* results from a solidification performed by our understanding, and there are never any things other than those the understanding has constituted. To speak of things creating themselves would therefore amount to saying that the understanding gives itself more than it gives itself—an assertion that contradicts itself, an empty and idle representation. But that action swells as it advances, that it creates as it progresses, is what [271] each of us observes when he watches himself act. Things are constituted by the instantaneous cut that the understanding makes, at a given moment, in a flux of this kind; and what is mysterious when we compare the cuts with one another becomes clear when we go back to the flux. Indeed, the modalities of creative action, insofar as it is carried on in the organization of living forms, become singularly simpler when taken from this angle. Faced with the complexity of an organism and the almost infinite multitude of interwoven analyses and syntheses it presupposes, our understanding recoils in bewilderment. We find it hard to believe that the pure and simple play of physical and chemical forces could work this marvel. And if it is a profound science that is at work, how are we to understand the influence exerted on formless matter by this matterless form? But the difficulty arises from our picturing, statically, ready-made material particles juxtaposed with one another, and, statically too, an external cause that would clap a skillful organization onto them. In reality life is a movement, materiality is the inverse movement, and each of these two movements is simple. The matter that forms a world is an undivided flux, and the life that runs through it, cutting living beings out of it, is undivided too. Of these two currents, the second thwarts the first, but the first nonetheless obtains something from the second. The result is a *modus vivendi* between them, and this is precisely organization. This organization takes on, for our senses and our intellect, the

form of parts entirely external to parts in time and in space. Not only do we close our eyes to the unity of the impetus which, passing through the generations, links individuals to individuals, [272] species to species, and makes the whole series of living beings one single immense wave running over matter; but each individual itself appears to us as an aggregate—an aggregate of molecules and an aggregate of facts. The reason for this would lie in the structure of our intellect, which is made to act on matter from outside, and which succeeds in doing so only by making instantaneous cuts in the flux of the real, each of which, in its fixity, becomes indefinitely decomposable. Perceiving nothing in an organism but parts external to parts, the understanding has only two systems of explanation to choose from. Either it regards the infinitely complicated (and therefore infinitely skillful) organization as a fortuitous assemblage, or it ascribes it to the incomprehensible influence of an external force that grouped its elements together. But this complication is the work of the understanding, and this incomprehensibility is its work too. Let us try to see no longer with the eyes of the intellect alone, which grasps only the ready-made and looks from outside, but with the mind—I mean with that faculty of seeing which is immanent in the faculty of acting and which springs, in a sense, from the twisting of the will upon itself. Everything will be set in motion again, and everything will resolve itself into movement. Where the understanding, working on the supposedly fixed image of action in progress, showed us infinitely many parts and an infinitely skillful order, we shall divine a simple process: an action making itself through an action of the same kind that is unmaking itself—something like the path that the last rocket of a fireworks display cuts for itself through the debris falling from the spent rockets.

From this point of view, the general considerations we presented on [273] the evolution of life will become clearer and more complete. We shall bring out more distinctly what is accidental and what is essential in that evolution.

STORING AND SPENDING ENERGY

The vital impetus accumulates solar energy and channels it into free acts; plants and animals split the task.

The *vital impetus* of which we speak consists, in short, in a demand for creation. It cannot create absolutely, because it meets matter in its path, that is, the movement inverse to its own. But it seizes upon this matter, which is necessity itself, and tends to introduce into it the greatest possible amount of indeterminacy and freedom. How does it go about this?

An animal high in the series can be represented roughly, we said, by a sensorimotor nervous system set upon digestive, respiratory, circulatory systems, and so on. The role of the latter is to cleanse it, repair it, protect it, and make it as independent as possible of external circumstances, but above all to supply it with the energy it will expend in movements. The growing complexity of the organism is therefore due, in theory (despite the countless exceptions owing to the accidents of evolution), to the necessity of complicating the nervous system. Moreover, each complication of any part of the organism entails many others, because that part itself must live, and every change at one point of the body has its repercussions everywhere. The complication may therefore go on to infinity in every direction; but it is the complication of the nervous system that conditions the others in principle, if not always in fact. Now, what does the progress of the nervous system itself consist in? In a simultaneous development of automatic activity and voluntary activity, the first providing the second with an appropriate instrument. Thus, in an organism such as ours, a considerable number of [274] motor mechanisms are set up in the spinal cord and the medulla, waiting only for a signal to release the corresponding act. The will is employed, in some cases, in setting up the mechanism itself, and in others in choosing which mechanisms to trigger, how to combine them, and when to trigger them. The will of an animal is the more effective, and also the more intense, the greater the

number of these mechanisms among which it can choose, the more complicated the crossroads where all the motor pathways intersect—in other words, the more considerable the development its brain attains. Thus the progress of the nervous system secures for the act increasing precision, increasing variety, increasing efficiency and independence. The organism behaves more and more like a machine for acting that would rebuild itself entirely for each new action, as if it were made of rubber and could, at any moment, change the shape of all its parts. But before the appearance of the nervous system, even before the formation of an organism properly so called, this essential property of animal life was already manifest in the undifferentiated mass of the amoeba. The amoeba changes its shape in varying directions; its whole mass therefore does what, in the developed animal, the differentiation of parts will localize in a sensorimotor system. Since it does so only in a rudimentary way, it is spared the complication of higher organisms: there is no need here for auxiliary elements to pass on to motor elements the energy to be expended. The undivided animal moves, and, undivided too, obtains energy through the organic substances it assimilates. Thus, whether we place ourselves at the bottom or at the top of the animal series, we always [275] find that animal life consists (1) in procuring a supply of energy, and (2) in expending it, by means of a matter as supple as possible, in varying and unforeseen directions.

Now, where does the energy come from? From the food ingested, for food is a kind of explosive, waiting only for the spark to discharge the energy it stores. Who made this explosive? The food may be the flesh of an animal that fed on animals, and so on; but in the end it is the plant that we come to. It alone truly gathers solar energy. Animals merely borrow it from the plant, either directly or by passing it on to one another. How has the plant stored this energy? Chiefly by the chlorophyll function, that is, by a chemistry *sui generis* to which we do not have the key, and which probably does not resemble the chemistry of our laboratories. The operation consists in using solar energy to fix

the carbon of carbonic acid, and thereby storing that energy, just as one would store the energy of a water-carrier by employing him to fill an elevated tank: once raised, the water can set a mill or a turbine in motion, however and whenever one wishes. Each atom of carbon fixed represents something like the raising of that weight of water, or like the stretching of an elastic thread that had bound the carbon to the oxygen in the carbonic acid. The elastic will relax, the weight will fall back, and the energy held in reserve will be recovered, in short, on the day when, by a simple release, the carbon is allowed to rejoin its oxygen.

So all of life, animal and vegetable, in what is essential to it, appears as an effort to accumulate energy and then release it into [276] flexible, deformable channels, at the end of which it will perform infinitely varied kinds of work. That is what the *vital impetus*, passing through matter, would like to achieve all at once. It would succeed, no doubt, if its power were unlimited, or if some help could come to it from outside. But the impetus is finite, and it was given once and for all. It cannot overcome every obstacle. The movement it imparts is sometimes deflected, sometimes divided, always opposed, and the evolution of the organized world is simply the unfolding of this struggle. The first great split that had to take place was the one between the two kingdoms, vegetable and animal, which thus turn out to be complementary to each other, although no agreement has been established between them. It is not for the animal that the plant accumulates energy; it is for its own consumption. But its own expenditure is less discontinuous, less concentrated, and therefore less effective than was required by the initial impetus of life, which was directed essentially toward free acts. The same organism could not sustain both roles at once with equal force: accumulating gradually and using abruptly. That is why, of themselves, without any outside intervention, through the mere effect of the duality of tendency implied in the original vital impetus and of the resistance that matter opposes to this impetus, organisms leaned some in the first direction, others in the second. This splitting was followed by many others. Hence

the divergent lines of evolution, at least in what is essential to them. But we must take into account regressions, halts and accidents of every kind. And we must remember, above all, that each species behaves as if the general movement of life stopped at it instead of passing through it. It thinks only of itself; it lives only for itself. Hence the countless [277] struggles of which nature is the stage. Hence a disharmony that is striking and shocking, but for which we must not hold the principle of life itself responsible.

WHAT IS CONTINGENT AND WHAT NECESSARY

Forms, chemistry and lines of evolution are contingent; life may exist elsewhere in unimaginable forms.

The part played by contingency in evolution is therefore large. Contingent, most often, are the forms adopted, or rather invented. Contingent, and relative to the obstacles encountered in a given place at a given moment, is the dissociation of the primordial tendency into these or those complementary tendencies, which create divergent lines of evolution. Contingent are the halts and the setbacks; contingent, to a large extent, are the adaptations. Only two things are necessary: (1) a gradual accumulation of energy, and (2) an elastic channeling of this energy in variable and indeterminable directions, at the end of which lie free acts.

This twofold result has been obtained in one particular way on our planet. But it could have been obtained by entirely different means. It was not necessary for life to set its heart chiefly on the carbon of carbonic acid. What mattered to it was to store up solar energy. But instead of asking the Sun to pull apart, for example, atoms of oxygen and carbon, it could have offered it other chemical elements (theoretically at least, and leaving aside difficulties of execution that were perhaps insurmountable). These would then have had to be combined or separated by entirely different physical means. And if the characteristic element of the organism's energy-yielding substances had been

something other than carbon, the characteristic element of its plastic substances would probably have been something other than nitrogen. The chemistry of living bodies would therefore have been radically different from what it is. The result would have been living forms bearing no analogy to those we [278] know, with a different anatomy and a different physiology. The sensorimotor function alone would have been preserved, if not in its mechanism, at least in its effects. It is therefore likely that life unfolds on other planets, and in other solar systems too. It may take forms of which we have no idea, under physical conditions that seem to us, from the standpoint of our physiology, utterly incompatible with it. If what life essentially aims at is capturing usable energy in order to expend it in explosive actions, it doubtless chooses in each solar system and on each planet, as it does on the earth, the means best suited to obtaining this result under the conditions it finds there. That at least is what reasoning by analogy tells us. To declare life impossible wherever it meets conditions other than those on earth is to use this reasoning backwards. The truth is that life is possible wherever energy descends the slope indicated by Carnot's law and a cause acting in the opposite direction can delay the descent—that is to say, doubtless, in all the worlds hanging from all the stars. Let us go further: it is not even necessary for life to concentrate and take definite shape in organisms properly so called. By these we mean defined bodies that offer the flow of energy ready-made channels, though elastic ones. It is conceivable (although we can hardly manage to imagine it) that energy might be stored up and then expended along variable lines running through a matter not yet solidified. All that is essential to life would be there, since there would still be slow accumulation of energy and sudden release. Between this vague, blurred vitality and the definite vitality we know, there would hardly be more difference than there is, in our [279] psychological life, between the state of dreaming and the waking state. Such may have been the condition of life in our nebula before the condensation of matter was complete. That is, if it is true that life takes flight at the very moment

when nebular matter appears through the effect of an inverse movement.[25]

It is conceivable, then, that life could have assumed an entirely different outward appearance and traced forms very different from those we know. With another chemical substrate, under other physical conditions, the impulse would have remained the same. But it would have split up quite differently along the way, and, on the whole, a different road would have been traveled—a shorter one perhaps, or perhaps a longer one. In any case, of the whole series of living beings, no term would have been what it is. Now, was it necessary that there should be a series and terms at all? Why should the single impetus not have been imparted to a single body, which would have gone on evolving indefinitely?

UNITY, MULTIPLICITY AND INDIVIDUATION

Life is neither one nor many; it swings between individuating itself and associating into societies.

This question arises, no doubt, when we compare life to an impetus. And we have to compare it to an impetus, because no image borrowed from the physical world can give a closer idea of it. But it is only an image. Life is in reality of a psychological order, and it is of the essence of the psychical to envelop a confused plurality of interpenetrating terms. In space, and in space alone, beyond any doubt, is distinct multiplicity possible: one point is absolutely external to another point. But pure and empty unity, too, is found only in space: it is the unity of a mathematical point. Abstract unity and multiplicity are, as one prefers, determinations of space or categories of the understanding, since spatiality and intellectuality are modeled on each other. But what is psychological in nature cannot be laid exactly upon [280] space, nor fit entirely into the frameworks of the understanding. Is my person, at a given moment, one or many?

25 The primitive nebula from which, on the nebular hypothesis of Kant and Laplace, our solar system condensed.

If I declare it one, inner voices rise up in protest. These are the voices of the sensations, feelings and representations among which my individuality is divided. But if I make it distinctly many, my consciousness rebels just as strongly. It asserts that my sensations, my feelings, my thoughts are abstractions I carry out upon myself, and that each of my states implies all the others. I am therefore a multiple unity and a unified multiplicity[26]—one has to adopt the language of the understanding, since the understanding alone has a language. But unity and multiplicity are only views taken of my personality by an understanding that trains its categories upon me. I fit into neither the one nor the other, nor into both at once. Yet the two together may give an approximate imitation of that reciprocal interpenetration and that continuity which I find in the depths of myself. Such is my inner life, and such too is life in general. In its contact with matter, life is comparable to an impulse or an impetus. Considered in itself, however, it is an immensity of virtuality, a mutual encroachment of thousands upon thousands of tendencies. Yet these will be "thousands upon thousands" only once they have been externalized in relation to one another, that is, spatialized. Contact with matter determines this dissociation. Matter actually divides what was only virtually multiple; and in this sense individuation is partly the work of matter, partly the effect of what life carries within itself. In the same way, a poetic feeling may unfold into distinct stanzas, distinct [281] lines, distinct words. We may say of it that it contained this multiplicity of individuated elements, and yet that it is the materiality of language that creates that multiplicity.

But through the words, the lines and the stanzas runs the simple inspiration that is the whole of the poem. So too, among the dissociated individuals, life still circulates. Everywhere the tendency to individuate is opposed, and at the same time completed, by an antagonistic and complementary tendency to asso-

26 BERGSON'S NOTE. We have developed this point in a work entitled *Introduction à la métaphysique* ("Introduction to Metaphysics"), in the *Revue de métaphysique et de morale*, January 1903, pp. 1–25.

ciate. It is as if the multiple unity of life, drawn in the direction of multiplicity, made all the more effort to draw itself back in upon itself. No sooner is a part detached than it tends to reunite, if not with all the rest, at least with what is nearest to it. Hence, throughout the whole domain of life, a swinging back and forth between individuation and association. Individuals come together side by side in a society. But the society, scarcely formed, would like to fuse the juxtaposed individuals into a new organism. It would thus itself become an individual that could, in its turn, form an integral part of a new association. At the very lowest rung of the scale of organisms we already find genuine associations, namely microbial colonies. In these associations, if a recent study is to be believed, we also find the tendency to individuate through the formation of a nucleus[27]. The same tendency is found again on a higher rung. It appears in those protophytes which, once they have emerged from the mother cell by division, remain joined to one another by the gelatinous substance surrounding their surface. It appears likewise in those protozoa which begin by intertwining their pseudopodia and end by fusing together. The so-called "colonial" theory of the genesis of higher organisms is well known. On this theory, the protozoa, [282] each consisting of a single cell, formed aggregates by coming together side by side; these aggregates, drawing together in turn, gave rise to aggregates of aggregates. In this way organisms ever more complicated, and ever more differentiated too, were supposedly born of the association of barely differentiated, elementary organisms[28]. In this extreme form the thesis has met with serious objections, and the idea seems more and more to be gaining ground that polyzoism is an exceptional and abnormal fact[29]. But it is no less true

27 BERGSON'S NOTE. Serkovski, a memoir (in Russian) summarized in the *Année biologique*, 1898, p. 317.

28 BERGSON'S NOTE. Ed. Perrier, *Les colonies animales* ("Animal Colonies"), Paris, 1897 (2nd ed.).

29 BERGSON'S NOTE. Delage, *L'Hérédité*, 2nd ed., Paris, 1903, p. 97. Cf., by the same author, *La conception polyzoïque des êtres* ("The Polyzoic Conception of Living Beings"), in the *Revue scientifique*, 1896, pp. 641–653.

that things happen *as if* every higher organism had been born of an association of cells that had divided the work among themselves. Very probably it was not the cells that made the individual by association; it was rather the individual that made the cells by dissociation[30]. But this very fact reveals to us, in the genesis of the individual, an obsession with the social form. It is as if the individual could develop only on condition of splitting its substance into elements that themselves have an appearance of individuality and are united with one another by an appearance of sociability. Numerous are the cases in which nature seems to hesitate between the two forms, and to ask itself whether it will make a society or an individual. The slightest push is then enough to tip the balance one way or the other. Take a fairly large infusorian, such as the Stentor, and cut it into two halves, each containing part of the nucleus: each of the two halves regenerates an independent Stentor. But suppose we [283] make the division incompletely, leaving a protoplasmic connection between the two halves. We then see them carry out, each on its own side, perfectly concerted movements. So here a thread kept or cut is enough for life to take the social form or the individual form. Thus in rudimentary organisms made of a single cell we already observe that the apparent individuality of the whole is composed of an *undefined* number of virtual individualities, virtually associated.[31] But the same law shows itself from the bottom to the top of the series of living beings. And this is what we express by saying that unity and multiplicity are categories of inert matter, and that the *vital impetus* is neither pure unity nor pure multiplicity. The matter to which it communicates itself may force it to choose one of the two, but its choice will never be final: it will leap indefinitely from one to the other. The evolution of life in the double direction of individuality and associ-

30 BERGSON'S NOTE. This is the theory upheld by Kunstler, Delage, Sedgwick, Labbé and others. It is set out, with bibliographical references, in Busquet's work *Les êtres vivants* ("Living Beings"), Paris, 1899.

31 The Stentor is a genus of large, trumpet-shaped single-celled ciliates, a classic subject of regeneration experiments.

ation therefore has nothing accidental about it. It is bound up with the very essence of life.

CONSCIOUSNESS AND THE BRAIN

Consciousness is not produced by the brain; both measure a living being's power of choice.

Essential, too, is the progress toward reflection. If our analyses are correct, it is consciousness, or rather supraconsciousness, that lies at the origin of life. Consciousness or supraconsciousness is the rocket whose spent fragments fall back as matter. Consciousness, again, is what remains of the rocket itself, passing through the fragments and lighting them up into organisms. But this consciousness, which is a *need for creation*, becomes manifest to itself only where creation is possible. It falls asleep when life is condemned to automatism; it wakes as soon as the possibility of a choice is reborn. That is why, in organisms without a nervous system, it varies in proportion to the power of locomotion and deformation that the organism [284] has at its disposal. And in animals with a nervous system, it is proportional to the complexity of the brain, that is, of the crossroads where the so-called sensory pathways and the motor pathways meet. How are we to understand this solidarity between the organism and consciousness?

We shall not dwell here on a point we have examined in depth in earlier works. Let us simply recall one theory: that consciousness is attached to certain neurons, for example, and given off by their activity like a phosphorescence. The scientist may accept this theory for the details of analysis; it is a convenient way of speaking. But it is nothing more. In reality, a living being is a center of action. It represents a certain sum of contingency entering into the world, that is, a certain quantity of possible action—a quantity that varies with individuals and above all with species. An animal's nervous system traces the flexible lines along which its action will run, although the potential energy to be released is stored up in the muscles rather than in

the nervous system itself. Its nerve centers indicate, by their development and their configuration, the more or less extensive choice it will have among more or less numerous and complicated actions. Now, the awakening of consciousness in a living being is all the more complete the greater the latitude of choice left to it and the larger the sum of action allotted to it. It is clear, therefore, that the development of consciousness will appear to be regulated by that of the nerve centers. On the other hand, every state of consciousness is, in one respect, a question put to motor activity, and even the beginning of an answer. So there is no psychological fact that does not imply the bringing into play of cortical mechanisms. Everything will [285] therefore appear to happen as if consciousness sprang from the brain, and as if the details of conscious activity were modeled on those of cerebral activity. In reality consciousness does not spring from the brain. Brain and consciousness correspond because they both measure the quantity of *choice* the living being has at its disposal—the one by the complexity of its structure, the other by the intensity of its awakening.

A cerebral state simply expresses what there is of nascent action in the corresponding psychological state. Precisely for that reason, the psychological state tells us more than the cerebral state. The consciousness of a living being, as we have tried to prove elsewhere, is bound up with its brain in the sense in which a sharp knife is bound up with its point. The brain is the sharp point by which consciousness penetrates the compact tissue of events, but it is no more coextensive with consciousness than the point is with the knife. Thus two brains, such as that of the ape and that of man, may closely resemble each other. But from this fact we cannot conclude that the corresponding consciousnesses are comparable or commensurable with each other.

MAN BREAKS THE CHAIN

Only in man does consciousness free itself from the automatisms it builds; the difference is one of kind.

But perhaps they resemble each other less than is supposed. How can we fail to be struck by the fact that man is capable of learning any exercise, of manufacturing any object, in short of acquiring any motor habit whatever? In the best-endowed animal, by contrast, even in the ape, the faculty of combining new movements is strictly limited. Here lies the cerebral characteristic of man. The human brain is made, like every brain, to set up motor mechanisms. It is also made to let us choose among them, at any given moment, the one we shall set in [286] motion by releasing a trigger. But it differs from other brains in that the number of mechanisms it can set up is indefinite, and so, consequently, is the number of triggers among which it offers a choice. Now, from the limited to the unlimited there is all the distance between the closed and the open. It is not a difference of degree but of kind.

Radical, too, therefore, is the difference between the consciousness of the animal, even the most intelligent, and human consciousness. For consciousness corresponds exactly to the living being's power of choice. It is coextensive with the fringe of possible action that surrounds real action: consciousness is synonymous with invention and with freedom. Now in the animal, invention is never anything but a variation on the theme of routine. Shut up within the habits of the species, the animal no doubt manages to enlarge them by its individual initiative. But it escapes automatism only for an instant, just long enough to create a new automatism. The doors of its prison close again as soon as they are opened; by pulling on its chain it succeeds only in lengthening it. With man, consciousness breaks the chain. In man, and in man alone, it sets itself free. The whole history of life until then had been that of an effort of consciousness to lift matter, and of a more or less complete crushing of conscious-

ness by matter falling back upon it. The enterprise was paradoxical—if indeed we may speak here of enterprise and effort other than by metaphor. The task was to create, out of matter, which is necessity itself, an instrument of freedom. It was to make a machine that would triumph over mechanism, and to use the determinism of nature to pass through the meshes of the net that determinism had spread. But everywhere except in man, consciousness has let itself be caught in the net whose [287] meshes it meant to pass through. It has remained captive to the mechanisms it had set up. Automatism, which it claimed to pull in the direction of freedom, winds itself around it and drags it along. Consciousness lacks the strength to escape, because the energy it had stored up for acts is spent almost entirely on maintaining the infinitely subtle, essentially unstable equilibrium into which it has brought matter. But man does not merely maintain his machine; he manages to use it as he pleases. He owes this, no doubt, to the superiority of his brain. It allows him to build an unlimited number of motor mechanisms and to keep setting new habits against old ones, and so, by dividing automatism against itself, to master it. He owes it to his language, which provides consciousness with an immaterial body in which to become incarnate. Language thus spares consciousness from having to settle exclusively on material bodies, whose flux would first carry it away and soon swallow it up. He owes it to social life, which stores up and preserves efforts as language stores up thought. Social life thereby fixes an average level to which individuals will have to raise themselves from the start. And by this initial stimulus it keeps the mediocre from falling asleep and pushes the best to climb higher. But our brain, our society and our language are only the various outward signs of one and the same inner superiority. Each in its own way, they tell of the unique, exceptional success that life won at a given moment of its evolution. They express the difference of kind, and not merely of degree, that separates man from the rest of the animal world. And they let us guess something more. At the end of the broad springboard on which life had gathered its

impetus, all the others stepped down, finding the rope stretched too high; man alone leaped the obstacle.

IN WHAT SENSE MAN IS THE GOAL

Humanity is not preformed, yet it alone carries the vital movement on, leaving other tendencies behind.

[288] It is in this quite special sense that man is the "term" and the "goal" of evolution. Life, as we have said, transcends finality as it does the other categories. It is essentially a current launched through matter, drawing from matter what it can. There has therefore been, properly speaking, neither project nor plan. On the other hand, it is only too evident that the rest of nature has not been arranged with reference to man. We struggle like the other species, and we have struggled against the other species. Lastly, the evolution of life might have met with different accidents along the way, and the current of life might thereby have been divided differently. In that case we should have been, physically and morally, rather different from what we are. For these various reasons it would be wrong to regard humanity, as we see it before us, as preformed in the evolutionary movement. We cannot even say that it is the outcome of the whole of evolution. For evolution has taken place along several divergent lines, and, while the human species is at the end of one of them, other lines have been followed with other species at their end. It is in a very different sense that we hold humanity to be the raison d'être of evolution.

From our point of view, life as a whole appears like an immense wave spreading out from a center. Over almost the whole of its circumference, this wave comes to a halt and turns into oscillation on the spot. At one single point the obstacle has been forced, and the impulse has passed freely. It is this freedom that the human form records. Everywhere except in man, consciousness has found itself driven into a blind alley; with man alone it has continued on its way. Man therefore continues the vital movement indefinitely, although he does not carry with

him all that life bore within it. Along other lines of evolution have [289] traveled other tendencies that life implied. Man has no doubt kept something of them, since everything interpenetrates, but he has kept only a little. *Everything happens as if an indeterminate, vague being, whom we may call, as we please,* man *or* superman, *had sought to realize itself, and had succeeded only by abandoning part of itself along the way.* These discards are represented by the rest of the animal world, and even by the vegetable world—at least in what is positive in them and superior to the accidents of evolution.[32]

From this point of view the discords that nature displays before us are singularly softened. The whole of the organized world becomes, as it were, the humus in which either man himself or a being morally resembling him was to grow. The animals, however remote from our species, and even however hostile to it, have nonetheless been useful traveling companions. Onto them consciousness unloaded the encumbrances it was dragging along. And they allowed it to rise, with man, to the heights from which it sees an unlimited horizon opening out again before it.

INTELLECT, INTUITION AND THE SOUL

Our intuition is a flickering lamp; philosophy must sustain it and place mind on life's rising tide.

It is true that it has not merely abandoned cumbersome baggage along the way. It has also had to give up precious goods. Consciousness, in man, is above all intellect. It could have been, and, it seems, should have been, intuition as well. Intuition and intellect represent two opposite directions of conscious work. Intuition goes in the very direction of life; the intellect goes the opposite way, and so finds itself quite naturally regulated by the movement of matter. A complete and perfect humanity would be one in which these two forms of conscious activity reached

32 "Superman" (*sur-homme*) echoes the French rendering of Nietzsche's *Übermensch*.

their full [290] development. Between that humanity and ours, moreover, one can conceive many possible intermediate stages, corresponding to all imaginable degrees of intellect and intuition. There lies the part played by contingency in the mental structure of our species. A different evolution might have led to a humanity either still more intellectual or more intuitive. In fact, in the humanity of which we are part, intuition is almost completely sacrificed to the intellect. It seems that in conquering matter, and in winning itself back from itself, consciousness has had to exhaust the best of its strength. This conquest, under the particular conditions in which it was made, required consciousness to adapt itself to the habits of matter and to concentrate all its attention on them. In short, it required consciousness to determine itself more especially as intellect. Intuition is there nevertheless, but vague and above all discontinuous. It is a lamp almost gone out, which flares up only now and then, for a few moments at most. But on the whole it does flare up wherever a vital interest is at stake. It casts its light on our personality, on our freedom, on the place we occupy in nature as a whole, on our origin and perhaps also on our destiny. That light is flickering and feeble, but it nonetheless pierces the darkness of the night in which the intellect leaves us.

These fading intuitions, which light up their object only at intervals, are what philosophy must seize upon. It must first sustain them, then expand them and so join them together. The further it advances in this work, the more it perceives that intuition is mind itself and, in a certain sense, life itself. The intellect is cut out of it by a process that imitates the one that generated matter. Thus the unity of mental life appears. We recognize this unity only by placing ourselves in intuition in order to [291] proceed from there to the intellect, for from the intellect we shall never pass to intuition.

Philosophy thus leads us into the spiritual life. And at the same time it shows us the relation of the life of the spirit to that of the body. The great error of spiritualist doctrines has been to believe that by isolating the spiritual life from everything else,

by suspending it in space as high above the earth as possible, they were putting it beyond reach of all attack. As if they were not simply exposing it, in this way, to being taken for an effect of mirage! Certainly they are right to listen to consciousness when consciousness affirms human freedom—but the intellect is there, saying that the cause determines its effect, that like conditions like, that everything repeats itself and everything is given. They are right to believe in the absolute reality of the person and in its independence of matter—but science is there, showing the solidarity of conscious life and cerebral activity. They are right to assign man a privileged place in nature, and to regard the distance from animal to man as infinite—but the history of life is there. It makes us witnesses of the genesis of species by gradual transformation, and thus seems to reintegrate man into the animal world. When a powerful instinct proclaims the probable survival of the person, they are right not to close their ears to its voice—but if such "souls" capable of an independent life exist, where do they come from? When, how, why do they enter this body, which we see before our very eyes arising quite naturally from a mixed cell derived from the bodies of its two parents? All these questions will remain unanswered unless a philosophy of intuition resolves to see the life of the body where it really is, on the road that leads to the life of the spirit. Otherwise such a philosophy will be the negation of science, and sooner or later it will be swept [292] away by science. But then it will no longer have to deal with this or that particular living being. Life as a whole, from the initial impulse that launched it into the world, will appear to it as a rising tide, opposed by the descending movement of matter. Over the greater part of its surface, at various heights, the current is converted by matter into a whirling on the spot. At one point alone it passes freely, carrying the obstacle along with it; the obstacle will weigh down its progress but will not stop it. At this point stands humanity; here lies our privileged situation. On the other hand, this rising tide is consciousness, and, like all consciousness, it envelops countless interpenetrating virtualities. Consequently neither the cat-

egory of unity nor that of multiplicity applies to them, both being made for inert matter. Only the matter the tide carries along with it, and into whose interstices it inserts itself, can divide it into distinct individualities. So the current passes on, running through the human generations and subdividing itself into individuals. This subdivision was vaguely outlined in it, but it would not have become distinct without matter. Thus souls are continually being created, which nevertheless, in a certain sense, preexisted. They are nothing other than the rivulets into which the great river of life divides as it flows through the body of humanity. The movement of a stream is distinct from what it flows through, although it necessarily adopts its windings. Consciousness is distinct from the organism it animates, although it undergoes certain of the organism's vicissitudes. A state of consciousness contains the outline of possible actions, and these receive at every moment, in the nerve centers, a beginning [293] of execution. So the brain at every moment underlines the motor articulations of the state of consciousness. But there the interdependence of consciousness and brain ends; the fate of consciousness is not, for all that, bound up with the fate of cerebral matter. Finally, consciousness is essentially free; it is freedom itself. But it cannot pass through matter without settling on it, without adapting itself to it, and this adaptation is what we call intellectuality. The intellect, turning back toward active, that is, free, consciousness, naturally fits it into the frameworks into which it is accustomed to see matter fit. It will therefore always perceive freedom in the form of necessity. It will always neglect the element of novelty or creation inherent in the free act. It will always substitute for the action itself an artificial, approximate imitation, obtained by compounding the old with the old and the same with the same.

THE CHARGE OF ALL THE LIVING

All life forms one impulse; humanity is an army galloping beside each of us, perhaps beyond death.

Thus, in the eyes of a philosophy that strives to reabsorb the intellect into intuition, many difficulties vanish or diminish. But such a doctrine does not merely make speculation easier. It also gives us more strength to act and to live. For with it we no longer feel isolated within humanity, nor does humanity seem to us isolated within the nature it dominates. The smallest grain of dust is bound up with our entire solar system, carried along with it in that undivided movement of descent which is materiality itself. In the same way, all organized beings, from the humblest to the highest, from the first origins of life to the time in which we live, and in all places as in all times, merely make visible to the eye a single impulse. That impulse is the inverse of the movement of matter and, in itself, indivisible. All the living hold together, and all yield to [294] the same tremendous thrust. The animal takes its stand on the plant, man rides upon the animal world, and all humanity, in space and in time, is one immense army galloping beside each of us, in front of us and behind us. It moves in an overwhelming charge, able to overthrow every resistance and to clear many obstacles, perhaps even death.

Chapter IV: The Cinematographic Mechanism of Thought and the Mechanistic Illusion

Le mécanisme cinématographique de la pensée et l'illusion mécanistique. Coup d'œil sur l'histoire des systèmes. Le devenir réel et le faux évolutionnisme
The ideas of nothingness and disorder, thought as a cinematograph, and a survey of philosophy from the Eleatics to Spencer.

295 It remains for us to examine in themselves two theoretical illusions that we have constantly encountered on our way. Until now we had considered their consequences rather than their principle. Such will be the subject of the present chapter. It will give us the opportunity to set aside certain objections and to clear up certain misunderstandings. Above all, it will allow us to define more sharply, by contrasting it with others, a philosophy that sees in duration the very stuff of reality.

[1] The part of this chapter dealing with the history of systems, and in particular with Greek philosophy, is only a very brief summary of views we developed at length from 1900 to 1904 in our lectures at the Collège de France. We did so especially in a course on the *Histoire de l'idée de temps* ("History of the Idea of Time," 1902–1903). There we compared the mechanism of conceptual thought to that of the *cinematograph.* We believe we may take up that comparison again here.[1]

Whether as matter or as mind, reality has appeared to us as a perpetual becoming. It is making itself or unmaking itself, but it

1 Bergson held a chair of philosophy at the Collège de France, Paris, from 1900.

is never something made. Such is the intuition we have of mind when we draw aside the veil that interposes itself between our consciousness and ourselves. This, too, is [296] what the intellect and the senses themselves would show us of matter, if they obtained an immediate and disinterested representation of it. But the intellect, like the senses, is preoccupied above all with the necessities of action. It therefore confines itself to taking, at intervals, views of the becoming of matter that are instantaneous and, by that very fact, immobile. Consciousness, modeling itself in turn on the intellect, looks at what is already made in the inner life, and feels that life making itself only confusedly. Thus the moments that interest us, which we have gathered along the course of duration, are detached from it. We retain only them. And we are right to do so, as long as action alone is in question. But when, speculating on the nature of the real, we still look at it as our practical interest required us to look at it, we become incapable of seeing true evolution, radical becoming. Of becoming we perceive only states, of duration only instants; and even when we speak of duration and becoming, it is something else we are thinking of. Such is the more striking of the two illusions we wish to examine. It consists in believing that we can think the unstable by means of the stable, the moving by means of the immobile.

The other illusion is a close relative of the first. It has the same origin. It too comes from our carrying over into speculation a procedure made for practice. All action aims either at obtaining an object we feel the lack of, or at creating something that does not yet exist. In this very particular sense it fills a void, and goes from the empty to the full, from an absence to a presence, from the unreal to the real. The unreality in question here is, moreover, purely relative to the direction in which our attention is engaged, for we are immersed in realities and cannot get out of them. Only, if the present reality is not [297] the one we were seeking, we speak of the *absence* of the latter where we observe the *presence* of the former. We thus express what we have in terms of what we should like to obtain. Nothing could be more

legitimate in the domain of action. But, whether we like it or not, we keep this way of speaking, and of thinking too, when we speculate on the nature of things independently of the interest they have for us. Thus arises the second of the two illusions we pointed out, the one we shall examine first. Like the first, it is due to the static habits our intellect contracts when it prepares our action on things. Just as we pass through the immobile to reach the moving, so we make use of the void to think the full.

We already met this illusion on our way when we tackled the fundamental problem of knowledge. The question, we said, is to know why there is order, and not disorder, in things. But the question has meaning only if we suppose that disorder, understood as an absence of order, is possible, or imaginable, or conceivable. Now, only order is real. But order can take two forms, and the presence of one consists, if you will, in the absence of the other. So we speak of disorder whenever we are faced with the one of the two kinds of order that we were not looking for. The idea of disorder is therefore entirely practical. It corresponds to a certain disappointment of a certain expectation. It designates not the absence of all order, but merely the presence of an order that holds no current interest. If we try to deny order completely, absolutely, we find that we leap indefinitely from one kind of order to the other. We find, too, that the supposed [298] suppression of both implies the presence of both. Finally, suppose we go further and deliberately shut our eyes to this movement of the mind and to all that it presupposes. We are then no longer dealing with an idea, and of disorder nothing remains but a word. Thus the problem of knowledge is complicated, and perhaps made insoluble, by the idea that order fills a void and that its actual presence is superimposed on its virtual absence. We go from absence to presence, from the void to the full, by virtue of the fundamental illusion of our understanding. This is the error of which we pointed out one consequence in our last chapter. As we then gave reason to expect, we shall get the better of this error once and for all only if we grapple with it at close quarters. We must look it squarely in the face, in itself, in

the radically false conception of negation, of the void and of nothingness that it implies[2].

WHY IS THERE SOMETHING RATHER THAN NOTHING?

The idea that being fills a prior void drives metaphysics toward logical, timeless existence.

Philosophers have hardly concerned themselves with the idea of nothingness. And yet it is often the hidden spring, the invisible motor, of philosophical thought. From the first awakening of reflection, it is this idea that pushes forward, straight under the gaze of consciousness, the anguishing problems, the questions one cannot fix one's eyes on without being seized by vertigo. No sooner have I begun to philosophize than I ask myself why I exist. And when I have realized the solidarity that binds me to the rest of the universe, the difficulty is only pushed back: I want to know why the universe exists. And if I tie the universe to a Principle, immanent or transcendent, that supports it or creates it, my thought rests in this principle for only a few [299] moments. The same problem arises, this time in all its breadth and generality: where does it come from, and how are we to understand, that anything exists? Here, in the present work, once matter has been defined as a kind of descent, this descent as the interruption of an ascent, and this ascent itself as a growth, once, in short, a Principle of creation has been placed at the bottom of things, the same question arises: how, why, does this principle exist rather than nothing?

Now, if I set these questions aside to get at what lies hidden behind them, here is what I find. Existence appears to me as a conquest over nothingness. I tell myself that there could be, that there even should be, nothing at all, and I am then astonished that there is something. Or else I picture all reality as spread out over nothingness, as over a carpet: nothingness was there first, and being came as an addition. Or again, if something has

2 BERGSON'S NOTE. The analysis of the idea of nothingness given here (pp. 298–322) has already appeared in the *Revue philosophique* (November 1906).

always existed, nothingness must always have served as its substratum or receptacle, and must therefore be eternally prior to it. However long a glass has been full, the liquid that fills it nonetheless fills a void. In the same way, being may always have been there: the nothingness that is filled and, as it were, stopped up by it preexists it nonetheless, if not in fact, at least in principle. In short, I cannot rid myself of the idea that the full is an embroidery on the canvas of the void, that being is superimposed on nothingness, and that in the representation of "nothing" there is *less* than in that of "something." Hence the whole mystery.

This mystery must be cleared up. It must be cleared up above all if we place duration and free choice at the bottom of things. For metaphysics' disdain for every reality that endures comes precisely from the fact that it reaches being only by [300] passing through "nothingness." It also comes from the fact that an existence that endures does not seem to metaphysics strong enough to overcome non-existence and posit itself. It is chiefly for this reason that metaphysics tends to endow true being with a *logical* existence, and not a psychological or physical one. For such is the nature of a purely logical existence that it seems to be self-sufficient, and to posit itself by the sole effect of the force immanent in truth. If I ask myself why bodies or minds exist rather than nothing, I find no answer. But that a logical principle such as A = A should have the power of creating itself, triumphing over nothingness in eternity, seems natural to me. The appearance of a circle drawn in chalk on a blackboard is something that needs explaining: this wholly physical existence does not have, in itself, what it takes to overcome non-existence. But the "logical essence" of the circle—that is, the possibility of drawing it according to a certain law, that is, in short, its definition—is something that seems to me eternal. It has neither place nor date, for nowhere, at no moment, did the drawing of a circle begin to be possible. Let us suppose, then, that the principle on which all things rest, and which all things manifest, has an existence of the same nature as that of the definition of the

circle, or that of the axiom A = A. The mystery of existence vanishes, for the being that lies at the bottom of everything then posits itself in the eternal, just as logic itself does. True, this will cost us a fairly heavy sacrifice. If the principle of all things exists in the manner of a logical axiom or a mathematical definition, things themselves will have to issue from this principle as the applications of an axiom or the consequences of a definition. There will then be no room left, either in things or in their principle, for efficient causality understood in the sense of free choice. [301] Such are precisely the conclusions of a doctrine like that of Spinoza, or even of Leibniz, for example, and such has been its genesis.[3]

If we could establish that the idea of nothingness, in the sense we give it when we oppose it to that of existence, is a pseudo-idea, the problems it raises around it would become pseudo-problems. The hypothesis of an absolute that acted freely, that endured in the fullest sense, would no longer be at all shocking. The way would be open to a philosophy closer to intuition, one that would no longer demand the same sacrifices of common sense.

TRYING TO IMAGINE NOTHING

Extinguishing every sensation, we always find some consciousness still watching; nothing is never imagined.

Let us see, then, what we are thinking of when we speak of nothingness. To represent nothingness to oneself is either to imagine it or to conceive it. Let us examine what this image or this idea can be. Let us begin with the image.

I am going to close my eyes, stop my ears, and extinguish one by one the sensations that reach me from the outside world. There, it is done: all my perceptions vanish, and the material universe sinks, for me, into silence and night. Yet I remain, and cannot help remaining. I am still there, with the organic sensa-

3 Baruch Spinoza (1632–1677), Dutch rationalist philosopher who derived all things from God by logical necessity.

tions that reach me from the periphery and the interior of my body, with the memories my past perceptions leave me, with the very impression—a quite positive and quite full one—of the void I have just made around me. How am I to suppress all that? How is one to eliminate oneself? I can, if need be, set aside my memories and forget even my immediate past; at least I retain the consciousness I have of my present, reduced to its most extreme poverty, that is, of the current state of my body. Still, I am going to try to be done [302] with this consciousness itself. I will weaken more and more the sensations my body sends me: now they are on the verge of going out; they go out, they vanish into the night where all things have already been lost. But no! At the very instant my consciousness goes out, another consciousness lights up—or rather, it had already lit up: it had arisen the instant before, to witness the disappearance of the first. For the first could disappear only for another and in relation to another. I see myself annihilated only if, by a positive act, however involuntary and unconscious, I have already resurrected myself. So, try as I may, I always perceive something, either from without or from within. When I no longer know anything of external objects, it is because I am taking refuge in the consciousness I have of myself. If I abolish this inner realm, its very abolition becomes an object for an imaginary self, which, this time, perceives the disappearing self as an external object. External or internal, then, there is always an object that my imagination represents to itself. It can, it is true, pass from one to the other, and imagine in turn a nothingness of external perception or a nothingness of internal perception—but not both at once, for the absence of the one consists, at bottom, in the exclusive presence of the other. But from the fact that two relative nothings are imaginable in turn, people wrongly conclude that they are imaginable together. The absurdity of this conclusion ought to be obvious, since one cannot imagine a nothingness without noticing, at least confusedly, that one is imagining it, that is, that one is acting, thinking, and that something, consequently, still remains.

The image, properly speaking, of a suppression of everything is therefore never formed by thought. The effort by which we [303] strive to create this image simply ends by making us oscillate between the vision of an external reality and that of an internal reality. In this coming and going of our mind between without and within, there is a point, equidistant from the two, where it seems to us that we no longer perceive the one and do not yet perceive the other: it is there that the image of nothingness is formed. In reality, we then perceive both, having arrived at the point where the two terms share a common boundary. The image of nothingness, so defined, is an image full of things: an image that contains at once that of the subject and that of the object, with, in addition, a perpetual leaping from one to the other and a refusal ever to settle definitively on either. Clearly, it is not this nothingness that we could oppose to being and place before it or beneath it, since it already contains existence in general. But we shall be told that if the representation of nothingness enters, visibly or latently, into the reasonings of philosophers, it does so not in the form of an image but in that of an idea.

TRYING TO CONCEIVE NOTHING

Abolishing an object always means replacing it; the idea of abolishing everything is like a square circle.

It will be granted that we do not imagine an abolition of everything, but it will be claimed that we can conceive it. We understand, said Descartes, a polygon with a thousand sides, even though we do not see it in imagination: it is enough that we clearly represent to ourselves the possibility of constructing it. The same holds, it will be said, for the idea of an abolition of all things. Nothing is simpler than the procedure by which one constructs this idea. There is not, indeed, a single object of our experience that we cannot suppose abolished. Let us extend this abolition from a first object to a second, then to a third, and so on for as long as we like: nothingness is simply the limit toward

which the operation tends.[4] And nothingness so defined is indeed the abolition of the whole.—That is the thesis. We need only [304] consider it in this form to see the absurdity it conceals.

An idea built up piece by piece by the mind is in fact an idea only if the pieces are capable of coexisting. It would be reduced to a mere word if the elements brought together to compose it drove one another out as fast as they were assembled. Once I have defined the circle, I can easily picture a black circle or a white circle, a circle of cardboard, iron or copper, a transparent circle or an opaque one—but not a square circle, because the law by which the circle is generated excludes the possibility of bounding this figure with straight lines. Thus my mind can represent any existing thing as abolished. But suppose the abolition of anything whatever by the mind were an operation whose mechanism implied that it is performed on a part of the Whole and not on the Whole itself. Then the extension of such an operation to the totality of things might become something absurd, self-contradictory, and the idea of an abolition of everything might perhaps present the same features as that of a square circle: it would no longer be an idea, only a word. Let us, then, examine the mechanism of the operation closely.

In fact, the object one suppresses is either external or internal: it is a thing or it is a state of consciousness. Let us consider the first case. I abolish an external object in thought: in the place where it was, "there is no longer anything."—No longer anything of this object, no doubt, but another object has taken its place: there is no absolute void in nature. Let us grant, though, that an absolute void is possible. It is not this void that I am thinking of when I say that the object, once abolished, leaves its place unoccupied, for what is at issue, by hypothesis, is a *place*, that is, a [305] void bounded by precise contours, that is, a kind of *thing*. The void I am speaking of is thus, at bottom, only the absence of some particular object. That object was here at first, is now elsewhere, and, insofar as it is no longer in its

4 Descartes uses the thousand-sided polygon (the chiliagon) in his Sixth Meditation to distinguish pure understanding from imagination.

former place, leaves behind it, so to speak, the void of itself. A being not endowed with memory or foresight would never utter the words "void" or "nothingness" here; it would simply express what is and what it perceives. Now, what is and what one perceives is the *presence* of one thing or another, never the *absence* of anything whatever. There is absence only for a being capable of remembering and expecting. It remembered an object and perhaps expected to encounter it; it finds another, and it expresses the disappointment of its expectation, itself born of memory, by saying that it no longer finds anything, that it comes up against nothingness. Even if it did not expect to encounter the object, it is a possible expectation of that object, it is still the disappointment of its possible expectation, that it expresses by saying that the object is no longer where it was. What it actually perceives, what it actually succeeds in thinking, is the presence of the old object in a new place or that of a new object in the old one. The rest, all that is expressed negatively by words such as nothingness or void, is not so much thought as affect, or, to speak more exactly, the affective coloring of thought. The idea of abolition, or of partial nothingness, is thus formed here in the course of the substitution of one thing for another, as soon as this substitution is thought by a mind that would prefer to keep the old thing in place of the new one, or that at least conceives this preference as possible. On the subjective side it implies a preference, on the objective side a substitution, and it is nothing other than a combination, or rather [306] an interference, between this feeling of preference and this idea of substitution.

Such is the mechanism of the operation by which our mind abolishes an object and comes to represent to itself, in the external world, a partial nothingness. Let us now see how it represents such a nothingness within itself. What we observe in ourselves are, again, phenomena that occur, and not, obviously, phenomena that do not occur. I feel a sensation or an emotion, I conceive an idea, I make a decision: my consciousness perceives these facts, which are so many *presences*, and there is no moment when facts of this kind are not present to me. I can no doubt

interrupt, in thought, the course of my inner life, and suppose that I am sleeping without dreams or that I have ceased to exist. But at the very instant I make this supposition, I conceive myself, I imagine myself, keeping watch over my sleep or surviving my annihilation; I give up perceiving myself from within only to take refuge in the external perception of myself. That is to say that here again the full always succeeds the full, and that an intellect that was nothing but intellect, that had neither regret nor desire, that regulated its movement by the movement of its object, would not even conceive of an absence or a void. The conception of a void arises here when consciousness, lagging behind itself, remains attached to the memory of an earlier state while another state is already present. It is only a comparison between what is and what could or should be, between full and full. In a word, whether it is a void of matter or a void of consciousness, *the representation of the void is always a full representation, which analysis resolves into two positive elements: the idea, distinct or confused, of a* [307] *substitution, and the feeling, experienced or imagined, of a desire or a regret*.

It follows from this twofold analysis that the idea of absolute nothingness, understood in the sense of an abolition of everything, is a self-destructive idea, a pseudo-idea, a mere word. If suppressing a thing consists in replacing it with another, if thinking the absence of a thing is possible only through the more or less explicit representation of the presence of some other thing—in short, if abolition means first of all substitution—then the idea of an "abolition of everything" is as absurd as that of a square circle. The absurdity is not obvious, because there is no particular object that cannot be supposed abolished. So, from the fact that it is not forbidden to suppress each thing in thought in turn, people conclude that it is possible to suppose them all suppressed together. They do not see that suppressing each thing in turn consists precisely in replacing it, as one goes along, with another. Nor do they see that the suppression of absolutely everything therefore implies a genuine

contradiction in terms, since this operation would consist in destroying the very condition that enables it to be carried out.

But the illusion is tenacious. From the fact that suppressing a thing consists *in fact* in substituting another for it, people will not conclude, will not want to conclude, that the abolition of a thing *in thought* implies the substitution, in thought, of a new thing for the old. It will be granted that a thing is always replaced by another thing, and even that our mind cannot think the disappearance of an object, external or internal, without representing to itself—in an indeterminate and confused form, it is true—that another object takes its place.

MORE IN THE NON-EXISTENT THAN THE EXISTENT

To think an object non-existent is to think it existing and then add its exclusion by reality.

But it will be added that the representation of a disappearance is that of a phenomenon [308] occurring in space, or at least in time; that it therefore still implies calling up an image; and that the point here is precisely to free ourselves from imagination and appeal to pure understanding. Let us no longer speak, then, we shall be told, of disappearance or abolition; those are physical operations. Let us no longer represent object A as abolished or absent. Let us simply say that we think of it as "non-existent." To abolish it is to act on it in time and perhaps also in space. It is therefore to accept the conditions of spatial and temporal existence, to accept the solidarity that binds an object to all others and prevents it from disappearing without being immediately replaced. But we can free ourselves from these conditions. It is enough that, by an effort of abstraction, we call up the representation of object A by itself, that we agree first to consider it as existing, and that then, with an intellectual stroke of the pen, we strike out this clause. The object will then be, by our decree, non-existent.

Very well. Let us strike out the clause, purely and simply. We must not suppose that our stroke of the pen is self-sufficient, or

that it, at least, can be isolated from the rest of things. We shall see that it brings back with it, whether we like it or not, everything we claimed to be abstracting from. Let us compare, in fact, the two ideas: that of object A supposed real, and that of the same object supposed "non-existent."

The idea of object A supposed existing is only the pure and simple representation of object A, for one cannot represent an object without, by that very act, attributing a certain reality to it. Between thinking an object and thinking it as existing there is absolutely no difference: Kant brought this point fully to light in his critique of the ontological argument. That being so, what is it to think of object A [309] as non-existent? To represent it as non-existent cannot consist in removing from the idea of object A the idea of the attribute "existence," since, once again, the representation of the object's existence is inseparable from the representation of the object, and is indeed one with it.[5] To represent object A as non-existent can therefore consist only in *adding* something to the idea of this object: what we add, in fact, is the idea of an *exclusion* of this particular object by actual reality in general. To think object A as non-existent is first to think the object, and consequently to think it as existing; it is then to think that another reality, with which it is incompatible, supplants it. Only, there is no need for us to represent this latter reality explicitly; we need not concern ourselves with what it is. It is enough for us to know that it drives out object A, which alone interests us. That is why we think of the expulsion rather than of the cause that expels. But this cause is nonetheless present to the mind. It is there implicitly, since what expels is inseparable from the expulsion, as the hand that pushes the pen is inseparable from the stroke of the pen that strikes out. The act by which one declares an object unreal therefore posits the existence of the real in general. In other words, to represent an object as unreal cannot consist in depriving it of every kind of existence, since the representation of an object is necessarily

5 In the *Critique of Pure Reason*, Kant argued against the ontological proof of God that existence is not a real predicate: it adds nothing to the concept of a thing.

that of the object existing. Such an act consists simply in declaring that the existence our mind attaches to the object, and which is inseparable from its representation, is a wholly ideal existence, that of a mere possible. But the ideality of an object, the mere possibility of an object, have meaning only in relation to a reality that drives this object, incompatible with it, into the region of the ideal or the merely possible. Suppose the stronger [310] and more substantial existence abolished: it is the attenuated and weaker existence of the mere possible that will become reality itself, and you will then no longer be representing the object as non-existent. In other words, and however strange our assertion may seem, there is more, and *not* less, *in the idea of an object conceived as "not existing" than in the idea of the same object conceived as "existing"; for the idea of the object "not existing" is necessarily the idea of the object "existing," with, in addition, the representation of an exclusion of this object by actual reality taken as a whole*.

NEGATION AS A JUDGMENT ON A JUDGMENT

Saying "this table is not white" warns someone off a possible affirmation; negation is social and pedagogical.

But it will be claimed that our representation of the non-existent is not yet sufficiently freed from every imaginative element, not negative enough. "It matters little," we shall be told, "that the unreality of a thing consists in its expulsion by other things. We want to know nothing of that. Are we not free to direct our attention wherever we please and however we please? Well then, having called up the representation of an object, and having thereby supposed it, if you like, existing, we shall simply attach a 'not' to our affirmation, and that will be enough for us to think of it as non-existent. This is a wholly intellectual operation, independent of what goes on outside the mind. Let us, then, think of anything whatever, or think of everything, and then put in the margin of our thought the 'not' that prescribes the rejection of what it contains: we abolish all things ideally by the mere

fact of decreeing their abolition."—At bottom, it is indeed from this supposed power inherent in negation that all the difficulties and all the errors here arise. Negation is pictured as exactly symmetrical with affirmation. It is imagined that negation, like affirmation, is self-sufficient. Negation would then have, like affirmation, the power of creating ideas, with this sole difference, [311] that they would be negative ideas. By affirming one thing, then another thing, and so on indefinitely, I form the idea of All; likewise, by denying one thing, then the other things, and finally by denying All, one would arrive at the idea of Nothing. But it is precisely this assimilation that seems to us arbitrary. What is not seen is that, while affirmation is a complete act of the mind, which can succeed in constituting an idea, negation is never more than half of an intellectual act, whose other half is left understood, or rather deferred to an indeterminate future. Nor is it seen that, while affirmation is an act of pure intellect, an extra-intellectual element enters into negation, and that it is precisely to the intrusion of a foreign element that negation owes its specific character.

To begin with the second point, let us note that to deny always consists in setting aside a possible affirmation[6]. Negation is only an attitude taken by the mind toward a possible affirmation. When I say, "This table is black," it is indeed the table I am speaking of: I have seen it black, and my judgment expresses what I have seen. But if I say, "This table is not white," I am surely not expressing something I have perceived, for I saw black, and not an absence of white. It is therefore not, at bottom, on the table itself that I pass this judgment, but rather on the judgment that would declare it white. I am judging a judgment, and not the table. The proposition "this table is not white" implies that you might believe it white, that you did believe it

6 BERGSON'S NOTE. Kant, *Critique de la raison pure*, 2nd ed., p. 737: "With regard to the content of our knowledge in general, ... the proper function of negative propositions is simply to prevent error." Cf. Sigwart, *Logik*, 2nd ed., vol. I, p. 150 ff.

TRANSLATOR'S NOTE. Christoph Sigwart (1830–1904), German philosopher and author of an influential treatise on logic.

so, [312] or that I was about to believe it so. I am warning you, or warning myself, that this judgment is to be replaced by another (which, it is true, I leave undetermined). Thus, whereas affirmation bears directly on the thing, negation aims at the thing only indirectly, through an interposed affirmation. An affirmative proposition expresses a judgment passed on an object; a negative proposition expresses a judgment passed on a judgment. *Negation therefore differs from affirmation proper in that it is an affirmation of the second degree: it affirms something about an affirmation which, for its part, affirms something about an object.*

But it follows first of all that negation is not the work of a pure mind—I mean a mind detached from every motive, placed before objects and wanting to deal with them alone. As soon as we deny, we are lecturing others or lecturing ourselves. We take to task an interlocutor, real or possible, who is mistaken, and we put him on his guard. He was affirming something: we warn him that he will have to affirm something else (without, however, specifying the affirmation that should be substituted for the first). There is then no longer simply a person and an object facing each other; there is, facing the object, a person speaking to a person, combating and helping him at the same time. There is a beginning of society. Negation is aimed at someone, and not merely, like a purely intellectual operation, at something. It is pedagogical and social in its essence. It corrects, or rather warns; and the person warned and corrected may, moreover, by a kind of splitting in two, be the very one who is speaking.

So much for the second point. Now for the first. We said that negation is never more than half of an intellectual act whose other half is left undetermined. If [313] I utter the negative proposition "this table is not white," I mean that you must substitute another judgment for your judgment "the table is white." I am giving you a warning, and the warning concerns the necessity of a substitution. As to what you must substitute for your affirmation, I tell you nothing, it is true. This may be because I do not know the table's color. But it is just as much—indeed, much more likely—because white is the only color that interests us at

the moment, so that I simply have to announce to you that some other color will have to be substituted for white, without having to tell you which. A negative judgment is therefore indeed a judgment indicating that there is reason to substitute another affirmative judgment for an affirmative judgment. The nature of this second judgment is not specified—sometimes because one does not know it, more often because it is of no present interest, attention being directed only to the content of the first.

Thus, whenever I attach a "not" to an affirmation, whenever I deny, I perform two well-defined acts: (1) I take an interest in what one of my fellow beings affirms, or in what he was about to say, or in what might have been said by another self whom I forewarn; (2) I announce that a second affirmation, whose content I do not specify, will have to be substituted for the one I find before me. But in neither of these two acts will anything be found except affirmation. The *sui generis* character of negation comes from the superimposing of the first upon the second. It is therefore in vain that one would attribute to negation the power of creating ideas *sui generis*, symmetrical with those that affirmation creates and directed the opposite way. No idea will come out of it, for it has no content other than that of the affirmative judgment it judges.

[314] To be more precise, let us consider an existential judgment rather than an attributive one. If I say, "Object A does not exist," I mean first that one might believe that object A exists. How, besides, could one think of object A without thinking of it as existing, and what difference can there be, once again, between the idea of object A existing and the pure and simple idea of object A? So, by the mere fact that I say "object A," I attribute to it a kind of existence, even if only that of a mere possible, that is, of a pure idea. Consequently, in the judgment "object A is not," there is first an affirmation such as "object A has been," or "object A will be," or, more generally, "object A exists at least as a mere possible." Now, when I add the two words "is not," what can I mean by them, if not that anyone who goes further, who raises the possible object into a real object, is mistaken, and that

the possible I am speaking of is excluded from actual reality as incompatible with it? Judgments that posit the non-existence of a thing are therefore judgments that formulate a contrast between the possible and the actual (that is, between two kinds of *existence*, one thought and the other observed), in cases where a person, real or imaginary, wrongly believed that a certain possible was realized. In place of this possible there is a reality that differs from it and drives it out. The negative judgment expresses this contrast, but it expresses it in a deliberately incomplete form, because it is addressed to a person who, by hypothesis, is interested exclusively in the possible indicated and will not trouble to learn by what kind of reality the possible has been replaced. The expression of the substitution is thus obliged to cut itself short. Instead of affirming that a second term has been substituted for the first, one will keep on the first, and on the first alone, [315] the attention that was directed to it at the outset. And, without going beyond the first, one will implicitly affirm that a second term replaces it, by saying that the first "is not." One will thus judge a judgment instead of judging a thing. One will warn others, or warn oneself, of a possible error, instead of supplying positive information. Remove every intention of this kind; give knowledge back its exclusively scientific or philosophical character; suppose, in other words, that reality comes to inscribe itself of its own accord on a mind that cares only for things and takes no interest in persons. Then it will be affirmed that this or that thing is; it will never be affirmed that a thing is not.

THE GROUND IS NOT WET

Affirmation and negation only look symmetrical; a mind simply following experience would never deny.

Why is it, then, that people insist on putting affirmation and negation on the same footing and endowing them with equal objectivity? Why is it so hard to recognize what is subjective in negation, what is artificially truncated, relative to the human

mind and above all to social life? The reason is no doubt that negation and affirmation are both expressed in propositions, and that every proposition, being made up of *words* that symbolize *concepts*, is something relative to social life and to the human intellect. Whether I say "the ground is wet" or "the ground is not wet," in both cases the terms "ground" and "wet" are concepts more or less artificially created by the human mind—I mean, extracted by its free initiative from the continuity of experience. In both cases these concepts are represented by the same conventional words. In both cases one may even say, strictly speaking, that the proposition aims at a social and pedagogical end, since the first would propagate a truth just as the second would forestall an error. If we take this point of view, which is that of [316] formal logic, affirming and denying are indeed two acts symmetrical with each other, the first establishing a relation of agreement, and the second a relation of disagreement, between a subject and a predicate.—But how can we fail to see that the symmetry is entirely external and the resemblance superficial? Suppose language abolished, society dissolved, and all intellectual initiative atrophied in human beings, along with every faculty of splitting in two and judging oneself. The wetness of the ground will subsist nonetheless, capable of inscribing itself automatically in sensation and of sending a vague representation to the dulled intellect. The intellect will thus still affirm, in implicit terms. Consequently, neither distinct concepts, nor words, nor the desire to spread truth around oneself, nor that of improving oneself, belonged to the very essence of affirmation. But this passive intellect, mechanically keeping step with experience, neither ahead of nor behind the course of the real, would have no inclination to deny. It could not receive an imprint of negation, for, once again, what exists can come to be recorded, but the non-existence of the non-existent is not recorded. For such an intellect to come to deny, it will have to awaken from its torpor, formulate the disappointment of an expectation, real or possible, correct an error, actual or possible, and, in short, set out to lecture others or itself.

This will be harder to see in the example we have chosen, but the example will be all the more instructive and the argument all the more convincing. If wetness can register itself automatically, the same holds, it will be said, for non-wetness, since the dry, just as much as the wet, can make impressions on [317] sensibility, which will pass them on to the intellect as more or less distinct representations. In this sense the negation of wetness would be something as objective, as purely intellectual, as free of any teaching intention as the affirmation. —But look closely and you will see that the negative proposition "the ground is not wet" and the affirmative proposition "the ground is dry" have quite different contents. The second implies that one knows the dry, that one has experienced the specific sensations, tactile or visual for example, that underlie this representation. The first requires nothing of the kind. It could just as well be formulated by an intelligent fish that had never perceived anything but the wet. This fish, it is true, would need to have risen to the distinction between the real and the possible, and to care about forestalling the error of its fellows, who no doubt regard the wet conditions in which they actually live as the only possible ones. Keep strictly to the terms of the proposition "the ground is not wet" and you will find that it means two things: (1) that one might believe the ground to be wet, and (2) that the wetness is in fact replaced by a certain quality x. This quality is left undetermined, either because one has no positive knowledge of it, or because it holds no present interest for the person to whom the negation is addressed. To deny, then, always consists in presenting in truncated form a system of two affirmations. One is determinate and bears on a certain possible. The other is indeterminate and relates to the unknown or indifferent reality that supplants this possibility. The second affirmation is virtually contained in the judgment we pass on the first, and that judgment is the negation itself. What gives [318] negation its subjective character is precisely that, in noting a replacement, it takes account only of what is replaced and pays no attention to what replaces it. What is replaced exists only as a conception of the

mind. To go on seeing it, and therefore to speak of it, one must turn one's back on reality, which flows from past to present, from back to front. This is what we do when we deny. We note the change, or more generally the substitution, as a traveler would see the carriage's route if he looked backward and wished to know at each moment only the point where he had ceased to be. He would never determine his current position except in relation to the one he had just left, instead of expressing it in terms of itself.

HOW THE IDEA OF NOTHING ARISES

Memory, regret and practical interest turn substitution into absence; action always goes from void to full.

In short, for a mind that purely and simply followed the thread of experience, there would be no void, no nothingness, even relative or partial, no possible negation. Such a mind would see facts succeeding facts, states succeeding states, things succeeding things. What it would note at every moment are things that exist, states that appear, facts that occur. It would live in the actual and, if it were capable of judging, it would never affirm anything but the existence of the present.

Let us endow this mind with memory, and above all with the desire to dwell on the past. Let us give it the faculty of dissociating and distinguishing. It will no longer note only the current state of the passing reality. It will represent the passing to itself as a change, and therefore as a contrast between what has been and what is. And since there is no essential difference between a past one remembers and a past one imagines, it will soon rise to the representation of the possible in general.

It will thus be switched onto the track of negation. And [319] above all it will be on the point of representing a disappearance to itself. Yet it will not get there just yet. To represent to oneself that a thing has disappeared, it is not enough to perceive a contrast between past and present. One must also turn one's back on the present, dwell on the past, and think the contrast of the

past with the present in terms of the past alone, without letting the present figure in it.

The idea of abolition is therefore not a pure idea. It implies that one regrets the past or conceives of it as regrettable, that one has some reason to linger over it. It arises when the phenomenon of substitution is cut in two by a mind that considers only its first half, because that half alone interests it. Remove all interest, all feeling, and nothing is left but reality flowing, and the endlessly renewed knowledge of its present state that it imprints on us.

From abolition to negation, which is a more general operation, there is now only one step. It is enough to represent to oneself the contrast between what is and not only what has been but also everything that might have been. And one must express this contrast in terms of what might have been and not of what is, affirming the existence of the actual while looking only at the possible. The formula thus obtained no longer simply expresses a disappointment of the individual. It is made to correct or forestall an error, which is assumed to be someone else's rather than one's own. In this sense negation has a pedagogical and social character.

Now, once negation has been formulated, it presents an aspect symmetrical with that of affirmation. It then seems to us that if affirmation affirmed an objective reality, negation must affirm a non-reality that is equally objective and, so to speak, equally real. [320] In this we are both wrong and right. We are wrong, since negation cannot become objective in what is negative about it. Yet we are right, in that the negation of a thing implies the latent affirmation of its replacement by another thing, which is systematically left aside. But the negative form of negation benefits from the affirmation that lies at the bottom of it: riding on the body of positive reality to which it is attached, this phantom takes on objectivity. This is how the idea of the void, or of partial nothingness, is formed: a thing is now replaced not by another thing but by a void that it leaves, that is, by the negation of itself. Since, moreover, this operation can be

performed on any thing whatever, we suppose it performed on each thing in turn, and finally performed on all things at once. We thus obtain the idea of "absolute nothingness." If we now analyze this idea of Nothing, we find that it is at bottom the idea of All, together with a movement of the mind that leaps endlessly from one thing to another, refuses to stay in place, and concentrates all its attention on this refusal, never determining its current position except in relation to the one it has just left. It is therefore an eminently comprehensive and full representation, as full and comprehensive as the idea of All, to which it is most closely related.

How, then, can we set the idea of Nothing against that of All? Can we not see that this is setting the full against the full, and that the question of "why something exists" is therefore a meaningless question, a pseudo-problem raised around a pseudo-idea? Yet we must say once more why this phantom of a problem haunts the mind so obstinately. In vain do we show that in the [321] representation of an "abolition of the real" there is only the image of all realities driving one another out, endlessly, in a circle. In vain do we add that the idea of non-existence is merely the idea of an imponderable existence, or "merely possible" existence, being expelled by a more substantial existence, which would be the true reality. In vain do we find something extra-intellectual in the *sui generis* form of negation, negation being the judgment of a judgment, a warning given to others or to oneself, so that it would be absurd to credit it with the power of creating representations of a new kind, ideas without content. The conviction always persists that before things, or at least beneath things, there is nothingness. If we look for the reason for this fact, we find it precisely in the affective, social and, in a word, practical element that gives negation its specific form. The greatest philosophical difficulties arise, as we said, because the forms of human action venture outside their proper domain. We are made for acting as much as, and more than, for thinking —or rather, when we follow the movement of our nature, we think in order to act. We should not be surprised, then, that the

habits of action rub off on those of representation, and that our mind always perceives things in the very order in which we are accustomed to picture them when we set out to act on them. Now it is indisputable, as we pointed out above, that all human action starts from a dissatisfaction and, by that very fact, from a feeling of absence. We would not act if we did not set ourselves an aim, and we seek a thing only because we feel the lack of it. Our action thus proceeds from "nothing" to "something," and its
322 very essence is to embroider "something" on the canvas of "nothing." To tell the truth, the nothing in question here is not so much the absence of a thing as the absence of a utility. If I show a visitor into a room that I have not yet furnished, I warn him that "there is nothing." Yet I know that the room is full of air. But since air is not something one sits on, the room truly contains nothing that, at this moment, for the visitor and for me, counts for anything. Generally speaking, human work consists in creating utility; and as long as the work is not done, there is "nothing"—nothing of what we wanted to obtain. Our life is thus spent filling voids, which our intellect conceives under the extra-intellectual influence of desire and regret, under the pressure of vital necessities. And if by a void we mean an absence of utility and not of things, we can say, in this wholly relative sense, that we are constantly going from the void to the full. Such is the direction in which our action moves. Our speculation cannot help doing the same, and it naturally passes from the relative sense to the absolute sense, since it works on things themselves and not on the utility they have for us. So the idea takes root in us that reality fills a void, and that nothingness, conceived as an absence of everything, preexists all things by right, if not in fact. It is this illusion that we have tried to dispel. We have shown that the idea of Nothing, if one claims to see in it the idea of an abolition of all things, is a self-destructive idea and comes down to a mere word—and that if, on the contrary, it is truly an idea, there is as much matter in it as in the idea of All.

THINKING DURATION DIRECTLY

Freed from the phantom of nothingness, the absolute appears close to us and, like us, it endures.

This long analysis was needed to show that *a* [323] *reality that is sufficient unto itself is not necessarily a reality foreign to duration*. If we pass (consciously or unconsciously) through the idea of nothingness to reach the idea of Being, the Being we arrive at is a logical or mathematical essence, and therefore timeless. From then on a static conception of the real forces itself on us: everything seems given all at once, in eternity. But we must get used to thinking Being directly, without a detour, without first appealing to the phantom of nothingness that comes between it and us. Here we must try to see for the sake of seeing, and no longer to see for the sake of acting. Then the Absolute reveals itself very close to us and, to a certain extent, within us. It is psychological in essence, not mathematical or logical. It lives with us. Like us, but in certain respects infinitely more concentrated and more gathered in upon itself, it endures.

But do we ever think true duration? Here again we would need to take direct possession. Duration will not be reached by a detour: we must settle into it at once. This is what the intellect most often refuses to do, accustomed as it is to thinking what moves by means of what is motionless.

STABLE VIEWS OF INSTABILITY

Aiming at results, perception and language break becoming into qualities, forms and acts.

The role of the intellect is, in fact, to preside over actions. Now in action it is the result that interests us; the means matter little provided the goal is reached. That is why we strain our whole being toward the end to be realized, most often trusting that end to turn from idea into act. And that is also why only the end point where our activity will come to rest is explicitly represented to our mind: the movements that make up the action itself

either escape our consciousness or reach it only confusedly. Consider a very simple act [324] such as raising one's arm. Where would we be if we had to imagine in advance all the elementary contractions and tensions it involves, or even to perceive them one by one as they occurred? The mind goes straight to the goal, that is, to the schematic and simplified vision of the act supposed accomplished. Then, if no opposing representation neutralizes the effect of the first, the appropriate movements come of their own accord to fill in the schema, sucked in, in a sense, by the void of its interstices. The intellect, then, presents activity only with goals to be reached, that is, with points of rest. And from one goal reached to another goal reached, from rest to rest, our activity moves by a series of leaps. During them our consciousness turns away as far as possible from the movement being accomplished and looks only at the anticipated image of the movement accomplished.

Now, for the intellect to represent to itself, as motionless, the result of the act being accomplished, it must perceive the setting in which that result is framed as motionless too. Our activity is inserted into the material world. If matter appeared to us as a perpetual flowing, we would assign an end to none of our actions. We would feel each of them dissolve as it was being accomplished, and we would not anticipate a future forever slipping away. For our activity to leap from an *act* to an *act,* matter must pass from a *state* to a *state,* for it is only into a state of the material world that action can insert a result and so be accomplished. But is this really how matter presents itself?

A priori, we may presume that our perception arranges to take matter from this angle. Sense [325] organs and motor organs are in fact coordinated with one another. Now the former symbolize our faculty of perceiving, as the latter do our faculty of acting. The organism thus reveals to us, in visible and tangible form, the perfect accord between perception and action. If, then, our activity always aims at a *result* into which it momentarily inserts itself, our perception must retain from the material world, at each instant, little more than a *state* on which it provi-

sionally settles. Such is the hypothesis that comes to mind. It is easy to see that experience confirms it.

From the very first glance we cast on the world, even before we mark out *bodies* in it, we distinguish *qualities.* A color succeeds a color, a sound a sound, a resistance a resistance, and so on. Each of these qualities, taken separately, is a state that seems to persist as it is, motionless, until another replaces it. Yet each of these qualities resolves, under analysis, into an enormous number of elementary movements. Whether we see vibrations in it or picture it in some quite different way, one fact is certain: every quality is change. In vain, moreover, do we look here, beneath the change, for the thing that changes. It is always provisionally, and to satisfy our imagination, that we attach movement to something that moves. The moving thing constantly slips away under the gaze of science, which only ever deals with mobility. In the smallest perceptible fraction of a second, in the almost instantaneous perception of a sensible quality, there may be trillions of oscillations repeating themselves. The permanence of a sensible quality consists in this repetition of movements, just as the persistence of life is made of successive beats. The first function of perception [326] is precisely to grasp a series of elementary changes in the form of a quality or simple state, by a work of condensation. The greater the power of acting allotted to an animal species, the more numerous, no doubt, are the elementary changes that its faculty of perceiving concentrates into one of its instants. And in nature the progress must be continuous, from beings that vibrate almost in unison with the oscillations of the ether to those that immobilize trillions of these oscillations in the briefest of their simple perceptions. The former feel little but movements; the latter perceive quality.[7] The former come very close to being caught in the gearwork of things; the latter react, and the tension of their faculty of acting is no doubt proportional to the concentration of their faculty of perceiving. The progress continues into humanity itself. One is

7 The ether was the medium then widely supposed by physicists to carry light and electromagnetic waves.

all the more a "man of action" the greater the number of events one can take in at a glance: the same principle decides whether one perceives successive events one by one and lets oneself be led by them, or grasps them as a whole and masters them. In short, the qualities of matter are so many stable views that we take of its instability.

Now, within the continuity of sensible qualities we mark out bodies. Each of these bodies is in reality changing at every moment. First, it resolves into a group of qualities, and every quality, as we said, consists of a succession of elementary movements. But even if we regard quality as a stable state, the body is still unstable in that it is constantly changing its qualities. The body par excellence, the one we are most justified in isolating within the continuity of matter because it forms a relatively [327] closed system, is the living body; indeed, it is for its sake that we carve the others out of the whole. Now life is an evolution. We concentrate a period of this evolution into a stable view that we call a form, and when the change has become great enough to overcome the happy inertia of our perception, we say that the body has changed its form. But in reality the body changes form at every instant. Or rather, there is no form, since form is something motionless and reality is movement. What is real is the continual change of form: *form is only a snapshot taken of a transition.* So here again our perception arranges to solidify the fluid continuity of the real into discontinuous images. When the successive images do not differ too much from one another, we regard them all as the increase and decrease of a single *average* image, or as the distortion of that image in different directions. And it is this average that we have in mind when we speak of the *essence* of a thing, or of the thing itself.

Finally, things, once constituted, show on the surface, by their changes of position, the deep modifications taking place within the Whole. We then say that they *act* on one another. This action no doubt appears to us in the form of movement. But we turn our gaze away as far as possible from the mobility of the movement. What interests us, as we said above, is the motion-

less outline of the movement rather than the movement itself. Is it a simple movement? We ask *where* it is going. It is by its direction, that is, by the position of its provisional goal, that we represent it to ourselves at every moment. Is it a [328] complex movement? We want to know, above all, *what* is going on, *what* the movement is doing, that is, the result obtained or the intention governing it. Examine closely what you have in mind when you speak of an action in progress. The idea of change is there, granted, but it hides in the half-light. In full light stands the motionless outline of the act supposed accomplished. It is by this, and by this alone, that the complex act is distinguished and defined. We would be hard put to imagine the movements inherent in the actions of eating, drinking, fighting, and so on. It is enough for us to know, in a general and indeterminate way, that all these acts are movements. Once that is settled, we simply try to represent to ourselves the *overall plan* of each of these complex movements, that is, the *motionless outline* underlying them. Here again knowledge bears on a state rather than on a change. This third case, then, is like the other two. Whether the movement is qualitative, evolutionary or extensive, the mind arranges to take stable views of instability. And so, as we have just shown, it arrives at three kinds of representations: (1) qualities, (2) forms or essences, (3) acts.

To these three ways of seeing correspond three categories of words: *adjectives, nouns* and *verbs,* which are the primordial elements of language. Adjectives and nouns therefore symbolize *states.* But the verb itself, if we keep to the illuminated part of the representation it evokes, expresses little else.

If we now tried to characterize our natural attitude toward becoming more precisely, [329] this is what we would find. Becoming is infinitely varied. The becoming that goes from yellow to green is not like the one that goes from green to blue: these are different qualitative movements. The becoming that goes from flower to fruit is not like the one that goes from larva to pupa and from pupa to adult insect: these are different evolutionary movements. The action of eating or drinking is not like the

action of fighting: these are different extensive movements. And these three kinds of movement themselves, qualitative, evolutionary and extensive, differ profoundly. The artifice of our perception, like that of our intellect and that of our language, consists in extracting from these very varied becomings the single representation of becoming in general. This is an indeterminate becoming, a mere abstraction that says nothing by itself and of which we even rarely think. To this idea, always the same and moreover obscure or unconscious, we then add, in each particular case, one or more clear images that represent *states* and serve to distinguish all the becomings from one another. It is this combination of a specific and determinate state with change in general and indeterminate that we substitute for the specificity of change. An indefinite multiplicity of becomings, variously colored, so to speak, passes before our eyes. We arrange to see mere differences of color, that is, of state, beneath which a becoming always and everywhere the same, invariably colorless, would flow in obscurity.

THE CINEMATOGRAPH

Like a film projector, our knowledge strings snapshots on an abstract movement of becoming in general.

Suppose we wanted to reproduce an animated scene on a screen, the march-past of a regiment, for example. There would be one way of going about it. This would be to cut out jointed figures representing the soldiers, [330] to give each of them the movement of marching—a movement that varies from individual to individual, though common to the human species—and to project the whole onto the screen. This little game would cost a tremendous amount of work, and the result would, moreover, be rather mediocre: how could one reproduce the suppleness and variety of life? Now there is a second way of proceeding, much easier and at the same time more effective. It is to take a series of snapshots of the passing regiment and to project these snapshots onto the screen so that they replace one another very rap-

idly. This is what the cinematograph does. With photographs, each of which represents the regiment in a motionless attitude, it reconstitutes the mobility of the passing regiment. It is true that if we were dealing with the photographs alone, we could look at them as long as we liked and we would not see them come to life: out of immobility, even set beside itself indefinitely, we shall never make movement. For the images to come to life, there must be movement somewhere. And indeed there is movement here: it is in the apparatus.[8] It is because the film unrolls, bringing the various photographs of the scene in turn to continue one another, that each actor in the scene regains his mobility: he strings all his successive attitudes on the invisible movement of the film. In sum, then, the procedure has consisted in extracting from all the movements peculiar to all the figures an impersonal, abstract and simple movement, *movement in general,* so to speak; in putting it into the apparatus; and in reconstituting the individuality of each particular movement by combining this anonymous movement with the personal 331 attitudes. Such is the artifice of the cinematograph. And such also is the artifice of our knowledge. Instead of attaching ourselves to the inner becoming of things, we place ourselves outside them in order to recompose their becoming artificially. We take snapshots, as it were, of the passing reality, and, since these are characteristic of that reality, we need only string them along an abstract, uniform, invisible becoming, situated at the back of the apparatus of knowledge, in order to imitate what is characteristic in this becoming itself. Perception, intellection and language generally proceed in this way. Whether it is a matter of thinking becoming, or of expressing it, or even of perceiving it, we do little more than set going a kind of inner cinematograph. We might therefore sum up all that precedes by saying that *the mechanism of our ordinary knowledge is cinematographic in nature.*

8 The cinematograph, the motion-picture camera and projector of the Lumière brothers, was first shown publicly in Paris in 1895.

A METHOD MADE FOR ACTION

The cinematographic method suits action, but applied to speculation it only multiplies snapshots endlessly.

There can be no doubt about the wholly practical character of this operation. Each of our acts aims at a certain insertion of our will into reality. It is an arrangement between our body and other bodies, comparable to the arrangement of the bits of glass that make up a kaleidoscopic pattern. Our activity goes from an arrangement to a rearrangement, giving the kaleidoscope a new shake each time, no doubt, but taking no interest in the shake and seeing only the new pattern. The knowledge it forms of nature's operation must therefore be exactly symmetrical with the interest it takes in its own operation. In this sense one might say, if it were not abusing a certain kind of comparison, that *the cinematographic character of our knowledge of things stems from the kaleidoscopic character of our adaptation to them.*

[332] The cinematographic method is therefore the only practical one, since it consists in adjusting the general pace of knowledge to that of action, until the detail of each act in turn adjusts itself to that of knowledge. For action to be always enlightened, the intellect must always be present in it. But in order to accompany the course of activity in this way and to direct it, the intellect must begin by adopting its rhythm. Action is discontinuous, like every pulse of life; discontinuous, therefore, knowledge will be. The mechanism of the faculty of knowing has been built on this plan. Essentially practical as it is, can it serve, just as it is, for speculation? Let us try, with it, to follow reality in its windings, and see what happens.

On the continuity of a certain becoming I have taken a series of views, which I have linked together by "becoming" in general. But of course I cannot stop there. What is not determinable is not representable: of "becoming in general" I have only a verbal knowledge. Just as the letter x designates a certain unknown, whatever it may be, so my "becoming in general,"

always the same, here symbolizes a certain transition of which I have taken snapshots; of the transition itself it tells me nothing. So I shall concentrate entirely on the transition and look for what happens between two snapshots. But since I am applying the same method, I arrive at the same result: a third view will simply slip in between the other two. Endlessly I shall begin again, and endlessly I shall set views beside views, without obtaining anything else. Here, then, the application of the cinematographic method will lead to a perpetual beginning again, in which the mind, never finding satisfaction and seeing nowhere to settle, [333] no doubt persuades itself that by its instability it is imitating the very movement of the real. But if, by working itself up to dizziness, it ends by giving itself the illusion of mobility, its operation has not advanced it a single step, since it leaves it as far as ever from the goal. To advance with moving reality, it is within it that we would have to place ourselves again. Settle into change, and you will grasp at once both change itself and the successive states in which *it could* at any instant come to a halt. But with these successive states, perceived from outside as real rather than virtual immobilities, you will never reconstitute movement. Call them, as the case may be, *qualities, forms, positions* or *intentions*; you may multiply their number as much as you please and so bring two consecutive states indefinitely closer together. Before the intermediate movement you will always feel the disappointment of the child who tries to crush smoke by bringing his two open hands together. The movement will slip through the interval, because every attempt to reconstitute change out of states implies the absurd proposition that movement is made of immobilities.

ZENO'S ARROW AND ACHILLES

Zeno's paradoxes arise from treating an indivisible movement as if it were the divisible line it traces.

Philosophy noticed this as soon as it opened its eyes. The arguments of Zeno of Elea, though formulated with a very different intention, say nothing else.[9]

What of the flying arrow? At every instant, says Zeno, it is motionless, for it would have time to move, that is, to occupy at least two successive positions, only if it were granted at least two instants. At a given moment, therefore, it is at rest at a given point. Motionless at every point of its path, [334] it is motionless for the whole time it is moving.

Yes, if we suppose that the arrow can ever *be* at a point of its path. Yes, if the arrow, which is something moving, ever coincided with a position, which is something motionless. But the arrow never *is* at any point of its path. At most we should say that it could be there, in the sense that it passes there and would be free to stop there. It is true that if it stopped there, it would stay there, and at that point it would no longer be movement that we were dealing with. The truth is that if the arrow leaves point A and comes down at point B, its movement AB is as simple, as indecomposable, as movement, as the tension of the bow that shoots it. Just as a shrapnel shell, bursting before it hits the ground, covers the zone of explosion with an indivisible danger, so the arrow going from A to B unfolds its indivisible mobility at a single stroke, though over a certain extent of duration. Imagine an elastic band that you stretch from A to B: could you divide its stretching? The flight of the arrow is this very stretching, as simple as it is, undivided as it is. It is one single leap.[10] You fix a point C in the interval traversed and say that at a

9 Zeno of Elea (5th century BC), a follower of Parmenides, devised paradoxes meant to show that motion and plurality are impossible.

10 A shrapnel shell was an artillery shell packed with metal balls, designed to burst in the air above its target.

certain moment the arrow was at C. If it had been there, it would have stopped there, and you would no longer have one flight from A to B but two flights, one from A to C and the other from C to B, with an interval of rest. A single movement is, by hypothesis, entirely movement between two stops: if there are intermediate stops, it is no longer a single movement. At bottom, the illusion arises because the movement, *once performed,* has laid down along its path a motionless trajectory on which one can [335] count as many immobilities as one likes. From this one concludes that the movement, *while being performed,* laid down beneath it at each instant a position with which it coincided. One fails to see that the trajectory is created all at once, even though it needs a certain time to be created, and that while the trajectory, once created, can be divided at will, its creation cannot be divided, for that is an act in progress and not a thing. To suppose that the moving body *is* at a point of its course is to cut the course in two with a snip of the scissors at that point, and to substitute two trajectories for the single trajectory first considered. It is to distinguish two successive acts where, by hypothesis, there is only one. Finally, it is to transfer to the arrow's flight itself everything that can be said of the interval it has traversed, that is, to admit *a priori* the absurdity that movement coincides with the motionless.

We shall not dwell here on Zeno's three other arguments. We have examined them elsewhere. Let us simply recall that they, too, consist in applying the movement along the line traversed and supposing that what is true of the line is true of the movement. For example, the line can be divided into as many parts as we like, of whatever size we like, and it is always the same line. From this it will be concluded that we are entitled to suppose the movement articulated however we like, and that it is always the same movement. We shall thus obtain a series of absurdities that will all express the same fundamental absurdity.[11] But the possibility of applying the movement *to* the line traversed exists

11 Zeno's other three arguments are the Dichotomy, the Achilles and the Stadium; Bergson had examined them in the *Essai* (1889) and in *Matière et mémoire* (1896).

only for an observer who stands outside the movement, considers at every instant the possibility of a stop, and claims to recompose the real movement out of these [336] possible immobilities. It vanishes as soon as we adopt in thought the continuity of real movement, the continuity of which each of us is conscious when raising an arm or taking a step forward. We then clearly feel that the line traversed between two stops is described in a single indivisible stroke, and that it would be vain to try to make divisions in the movement that traces it corresponding, one by one, to the arbitrarily chosen divisions of the line once traced. The line traversed by the moving body lends itself to any mode of decomposition whatever because it has no internal organization. But all movement is articulated internally. It is either an indivisible leap (which may, moreover, occupy a very long duration) or a series of indivisible leaps. Take the articulations of this movement into account, or else do not speculate about its nature.

When Achilles pursues the tortoise, each of his steps must be treated as an indivisible, and so must each step of the tortoise. After a certain number of steps, Achilles will have stepped past the tortoise. Nothing is simpler. If you insist on dividing the two movements further, distinguish on both sides, in Achilles' course and in the tortoise's, *submultiples* of each one's step; but respect the natural articulations of the two courses. As long as you respect them, no difficulty will arise, because you will be following the indications of experience. But Zeno's trick consists in recomposing Achilles' movement according to an arbitrarily chosen law. Achilles would reach, with a first leap, the point where the tortoise was; with a second leap, the point to which it had moved while he was making the first; and so on. In that case Achilles would indeed always have a new leap to make. But it goes without saying that Achilles, to catch up with the [337] tortoise, goes about it quite differently. The movement Zeno considers would be equivalent to Achilles' movement only if we could treat movement as we treat the interval traversed, which

can be decomposed and recomposed at will. Once we have subscribed to this first absurdity, all the others follow[12].

THE CHILD BECOMES A MAN

Language cuts change into stops such as childhood and manhood and loses the transition between them.

Nothing would be easier, moreover, than to extend Zeno's argument to qualitative becoming and to evolutionary becoming. We should find the same contradictions. That the child becomes an adolescent, then a mature adult, and finally an old man, is understandable when we consider that vital evolution is here reality itself. Childhood, adolescence, maturity and old age are mere views of the mind, *possible stops* imagined by us, from outside, along the continuity of a progress. Suppose, on the contrary, that we take childhood, adolescence, maturity and old age as integral parts of the evolution: they become *real stops*, and we can no longer conceive how evolution is possible, for rests set side by side will never be equivalent to a movement. How, out of what is made, are we to reconstitute what is in the making? How, for example, [338] once childhood has been posited as a *thing*, are we to pass to adolescence, when by hypothesis we have given ourselves childhood alone? Look closely and you will see that our habitual way of speaking, which is modeled on our habitual way of thinking, leads us into real logical dead ends—

12 BERGSON'S NOTE. That is to say, we do not regard Zeno's sophism as refuted by the fact that the geometric progression a(1+1n+1n2+1n3+...,etc.), where a denotes the initial gap between Achilles and the tortoise and n the ratio of their respective speeds, has a finite sum if n is greater than one. On this point we refer to Évellin's argument, which we consider decisive (see Évellin, *Infini et quantité,* Paris, 1880, pp. 63–97; cf. *Revue philosophique,* vol. XI, 1881, pp. 564–568). The truth is that mathematics—as we tried to prove in an earlier work—operates, and can operate, only on lengths. It has therefore had to devise artifices: first, to transfer to movement, which is not a length, the divisibility of the line it traverses; and then to restore agreement between experience and the idea (contrary to experience and pregnant with absurdities) of a movement-length, that is, of a movement *applied against* its trajectory and arbitrarily decomposable like it.

TRANSLATOR'S NOTE. François Évellin (1835–1910), French philosopher; his title means "Infinity and Quantity."

dead ends we enter without anxiety because we vaguely feel that we are always free to get out of them. All we should have to do, in fact, is give up the cinematographic habits of our intellect. When we say "the child becomes a man," let us take care not to probe too deeply into the literal meaning of the expression. We should find that when we posit the subject "child," the attribute "man" does not yet apply to it, and that when we state the attribute "man," it no longer applies to the subject "child." The reality, which is the *transition* from childhood to maturity, has slipped through our fingers. We have only the imaginary stops "child" and "man," and we come very close to saying that one of these stops *is* the other, just as Zeno's arrow *is*, according to that philosopher, at every point of its course. The truth is that if language were here molded on the real, we should say not "the child becomes a man," but "there is becoming from the child to the man." In the first proposition, "becomes" is a verb of indeterminate meaning, intended to mask the absurdity we fall into when we attribute the state "man" to the subject "child." It behaves rather like the movement—always the same—of the cinematograph film, a movement hidden in the apparatus whose role is to superimpose the successive images one on another so as to imitate the movement of the real object. In the second, "becoming" is a subject. It moves into the foreground. It is reality itself: childhood and [339] manhood are then no more than virtual stops, mere views of the mind. This time we are dealing with objective movement itself, and no longer with its cinematographic imitation. But only the first way of expressing ourselves conforms to our habits of language. To adopt the second, we should have to escape from the cinematographic mechanism of thought.

We should have to set it aside completely in order to dispel at a stroke the theoretical absurdities that the question of movement raises. All is obscurity, all is contradiction, when we try to manufacture a transition out of states. The obscurity clears and the contradiction falls away as soon as we place ourselves along the transition, so as to distinguish states in it by making cross-

sections in thought. The reason is that there is *more* in the transition than the series of states, that is, of possible cuts, and *more* in the movement than the series of positions, that is, of possible stops. Only, the first way of seeing conforms to the procedures of the human mind, whereas the second requires us to climb back up the slope of our intellectual habits.

THE PHILOSOPHY OF IDEAS

The Greeks declared becoming unreal or degraded, placing immutable Forms beneath the flux.

Is it any wonder that philosophy at first shrank from such an effort? The Greeks trusted nature; they trusted the mind left to its natural bent; above all they trusted language, insofar as it externalizes thought naturally. Rather than find fault with the attitude that thought and language adopt toward the course of things, they preferred to find fault with the course of things.

That is what the philosophers of the Eleatic school did, without any compunction. Since becoming offends the habits of thought and fits poorly into the frameworks of language, they declared it unreal. In spatial movement and in change in general they saw nothing but pure illusion. One 340 could soften this conclusion without changing the premises, and say that reality changes, but that it *ought not* to change. Experience confronts us with becoming: that is sensible reality. But intelligible reality, the reality that ought to be, is more real still—and that reality, it will be said, does not change.[13] Beneath qualitative becoming, beneath evolutionary becoming, beneath extensive becoming, the mind must seek what resists change: the definable quality, the form or essence, the end. Such was the fundamental principle of the philosophy that developed throughout classical antiquity, the philosophy of Forms—or, to use a term closer to the Greek, the philosophy of Ideas.

The word εἶδος, which we translate here as Idea, does in fact have this threefold meaning. It denotes: (1) quality; (2) form or

essence; (3) the aim or *design* of the act in progress, that is, at bottom, the *sketch* of the act supposed complete. *These three points of view are those of the adjective, the noun and the verb, and they correspond to the three essential categories of language.* After the explanations we gave a little earlier, we could—and perhaps should—translate εἶδος as "view," or rather as "moment." [14] For εἶδος is the stable view taken of the instability of things: the *quality*, which is a moment of becoming; the *form*, which is a moment of evolution; the *essence*, which is the mean form above and below which the other forms are ranged as alterations of it; and finally the *design* that inspires the act in progress, which is nothing other, as we said, than the anticipated *sketch* of the completed action. To reduce things to Ideas therefore consists in resolving becoming into its principal moments, each of these being, moreover, withdrawn by hypothesis from the law of time and, as it were, gathered in [341] eternity. That is to say, we arrive at the philosophy of Ideas when we apply the cinematographic mechanism of the intellect to the analysis of the real.

But as soon as we place immutable Ideas at the bottom of moving reality, a whole physics, a whole cosmology, even a whole theology, necessarily follow. Let us dwell on this point. It is not our intention to summarize in a few pages a philosophy as complex and comprehensive as that of the Greeks. But since we have just described the cinematographic mechanism of the intellect, it is important that we show what representation of the real the working of this mechanism leads to. This representation is, we believe, precisely the one found in ancient philosophy. The broad outlines of the doctrine that developed from Plato to Plotinus, by way of Aristotle (and even, to some extent, of the Stoics), have nothing accidental about them, nothing contingent, nothing to be put down to a philosopher's fancy. They trace the vision that a systematic intellect will form of universal

13 The Eleatics, named after Elea in southern Italy, were Parmenides and his followers, who denied the reality of change and plurality.

14 Greek *eidos*, Plato's term for Form or Idea. Bergson plays on the French *dessein* (intention, design) and *dessin* (drawing, outline).

becoming when it looks at it through views taken of its flow at intervals. So that even today we shall philosophize in the manner of the Greeks; we shall rediscover, without needing to know them, this or that of their general conclusions, exactly insofar as we trust the cinematographic instinct of our thought.

We were saying that there is *more* in a movement than in the successive positions attributed to the moving body, *more* in a becoming than in the forms passed through in turn, *more* in the evolution of form than in the forms realized one after another. Philosophy can therefore derive from [342] terms of the first kind those of the second, but not the first from the second: it is from the first that speculation ought to start. But the intellect reverses the order of the two terms, and on this point ancient philosophy proceeds as the intellect does. It therefore settles itself in the immutable; it will allow itself nothing but Ideas. Yet there is becoming: that is a fact. Having posited immutability alone, how are we to make change emerge from it? It cannot be by adding something, since by hypothesis nothing positive exists outside the Ideas. It will therefore be by a diminution. At the bottom of ancient philosophy there necessarily lies this postulate: there is more in the immobile than in the moving, and we pass from immutability to becoming by way of diminution or attenuation.

So it is something negative, or at most a zero, that must be added to the Ideas to obtain change. That is what the Platonic "non-being" and the Aristotelian "matter" consist in—a metaphysical zero which, attached to the Idea as the arithmetical zero is attached to the unit, multiplies it in space and in time. Through it the immobile and simple Idea is refracted into an indefinitely propagated movement. By right, there ought to be nothing but immutable Ideas, immutably nested one within another. In fact, matter comes and adds its void to them, and in so doing sets universal becoming loose. It is the elusive nothing which, slipping in between the Ideas, creates endless agitation and eternal restlessness, like a suspicion insinuated between two loving hearts. Degrade the immutable ideas, and you

thereby obtain the perpetual flux of things. The Ideas or Forms are no doubt the whole of intelligible reality, that is, of truth, in that together they represent the theoretical equilibrium of Being. As [343] for sensible reality, it is an indefinite oscillation to either side of this point of equilibrium.

TIME AS SMALL CHANGE FOR ETERNITY

Ancient philosophy made time and space a degradation of eternal Forms, like coins that never pay the debt.

Hence, throughout the philosophy of Ideas, a certain conception of duration, and also of the relation of time to eternity. To someone who settles into becoming, duration appears as the very life of things, as the fundamental reality. The Forms, which the mind isolates and stores up in concepts, are then only views taken of changing reality. They are moments gathered along duration, and precisely because the thread that bound them to time has been cut, they no longer endure. They tend to merge with their own definition, that is, with the artificial reconstruction and symbolic expression that is their intellectual equivalent. They enter eternity, if you like; but what is eternal in them is one and the same with what is unreal in them.—If, on the contrary, we treat becoming by the cinematographic method, the Forms are no longer views taken of change: they are its constituent elements, they represent all that is positive in becoming. Eternity no longer hovers above time as an abstraction; it grounds time as a reality. Such, precisely, is the attitude of the philosophy of Forms or Ideas on this point. It establishes between eternity and time the same relation as between a gold coin and small change—change so small that payment goes on indefinitely without the debt ever being paid off, whereas one could settle it at a stroke with the gold coin. This is what Plato expresses in his magnificent language when he says that God, unable to make the world eternal, gave it Time, "a moving image of eternity"[15].

15 BERGSON'S NOTE. Plato, *Timaeus*, 37 D.

[344] Hence also a certain conception of extension, which underlies the philosophy of Ideas, though it has not been brought out so explicitly. Let us again imagine a mind that places itself back along becoming and adopts its movement. Each successive state, each quality—each Form, in short—will appear to it as a mere cut made by thought in universal becoming. It will find that form is essentially extended, inseparable as it is from the extensive becoming that materialized it in the course of its flow. Every form thus occupies space as it occupies time. But the philosophy of Ideas takes the opposite path. It starts from the Form and sees in it the very essence of reality. It does not obtain form by a view taken of becoming; it gives itself forms in the eternal, and duration and becoming are supposed to be merely the degradation of this immobile eternity. Form posited in this way, independently of time, is then no longer the form held within a perception: it is a *concept.* And since a reality of the conceptual order occupies no more extension than it has duration, the Forms must reside outside space just as they hover above time. In ancient philosophy, therefore, space and time necessarily have the same origin and the same value. It is the same diminution of being that is expressed by a distension in time and by an extension in space.

Extension and distension then simply manifest the gap between what is and what ought to be. From the standpoint ancient philosophy adopts, space and time can only be the field that an incomplete reality—or rather a reality that has strayed outside itself—gives itself in which to run in search of itself. Only, we shall have to admit here that the field is created as the race proceeds, [345] and that the race lays it down, in a sense, beneath itself. Move an ideal pendulum, a mere mathematical point, away from its position of equilibrium: an endless oscillation results, along which points are set beside points and instants succeed instants. The space and time born in this way have no more "positivity" than the movement itself. They represent the gap between the position artificially given to the pendulum and its normal position—*what it lacks* in order to regain

its natural stability. Bring it back to its normal position, and space, time and movement shrink into a mathematical point. In the same way, human reasonings go on in an endless chain, but they would suddenly be swallowed up in truth grasped by intuition, for their extension and distension are only a gap, so to speak, between our thought and the truth[16]. So it is with extension and duration in relation to the pure Forms or Ideas. The sensible forms are before us, always ready to recapture their ideality, always prevented by the matter they carry within them —that is, by their inner void, by the interval they leave between what they are and what they ought to be. Ceaselessly they are on the point of recovering themselves, and ceaselessly they are busy losing themselves. An inescapable law condemns them, like the rock of Sisyphus, to fall back just as they are about to reach the summit; and this law, which hurled them into space and time, is nothing other than the very constancy of their original insufficiency.[17] The alternations of generation and decay, the ever-renewed evolutions, the endlessly repeated circular movement of the celestial spheres— [346] all this simply represents a certain fundamental deficit in which materiality consists. Make good this deficit, and at a stroke you abolish space and time, that is, the indefinitely renewed oscillations around a stable equilibrium that is always pursued and never reached. Things re-enter one another. What was stretched out in space draws itself together again into pure form. And past, present and future shrink into a single moment, which is eternity.

THE PHYSICAL AS THE LOGICAL SPOILED

Ancient science is the system of Ideas; Aristotle gathered them into God, thought of thought.

This amounts to saying that the physical is the logical spoiled. The whole philosophy of Ideas is summed up in this proposi-

16 BERGSON'S NOTE. We have tried to disentangle what is true and what is false in this idea as regards *spatiality* (see our Chapter III). As regards *duration*, it seems to us radically false.

tion. And here, too, lies the hidden principle of the philosophy innate in our understanding. If immutability is more than becoming, form is more than change, and it is by a veritable fall that the logical system of Ideas, rationally subordinated and coordinated among themselves, scatters into a physical series of objects and events placed accidentally one after another. The generating idea of a poem unfolds into thousands of imaginings, which materialize into sentences, which in turn spread out into words. And the further we descend from the immobile idea, coiled up on itself, to the words that unroll it, the more room is left for contingency and choice: other metaphors, expressed in other words, might have arisen; one image was called up by another, one word by another. All these words now run one after another, seeking in vain, by themselves, to render the simplicity of the generating idea. Our ear hears only the words; it therefore perceives only accidents. But our mind, by successive leaps, jumps from the words to the images, from the images to the original idea, and so climbs back from the perception of words—accidents called forth by accidents— [347] to the conception of the Idea that posits itself. So proceeds the philosopher before the universe. Experience passes before his eyes phenomena that likewise run one after another in an accidental order, determined by circumstances of time and place. This physical order, a veritable subsidence of the logical order, is nothing other than the fall of the logical into space and time. But the philosopher, climbing back from percept to concept, sees all the positive reality the physical possessed condensed into the logical. His intellect, setting aside the materiality that distends being, recaptures being in itself in the immutable system of Ideas. In this way Science is obtained, which appears to us complete and ready-made as soon as we put our intellect back in its true place, correcting the gap that separated it from the intelligible. Science, then, is not a human construction. It is prior to our intellect, independent of it, truly the generator of things.

17 In Greek myth Sisyphus was condemned in the underworld to roll a rock up a hill, only for it to roll back down each time it neared the top.

And indeed, if we held the Forms to be mere views taken by the mind of the continuity of becoming, they would be relative to the mind that represents them to itself; they would have no existence in themselves. At most we could say that each of these Ideas is an ideal. But we have placed ourselves in the opposite hypothesis. The Ideas must therefore exist by themselves. Ancient philosophy could not escape this conclusion. Plato formulated it, and Aristotle tried in vain to evade it. Since movement arises from the degradation of the immutable, there would be no movement—and consequently no sensible world—unless there were, somewhere, immutability realized. So, having begun by denying the Ideas an [348] independent existence, and yet being unable to deprive them of it, Aristotle pressed them into one another, rolled them up into a ball, and placed above the physical world a Form that thus turned out to be the Form of Forms, the Idea of Ideas, or finally, to use his own expression, the Thought of Thought. Such is Aristotle's God—necessarily immutable and a stranger to what happens in the world, since he is only the synthesis of all concepts in a single concept. It is true that none of the many concepts could exist apart, as such, within the divine unity: it would be vain to look for Plato's Ideas inside Aristotle's God. But we need only imagine Aristotle's God refracting himself, or simply inclining toward the world, and at once the Platonic Ideas, implied in the unity of his essence, seem to pour out of him—just as rays come out of the sun, which nevertheless did not contain them. It is doubtless this *possibility of an outpouring* of the Platonic Ideas from the Aristotelian God that is represented, in Aristotle's philosophy, by the active intellect, the νοῦς that has been called ποιητικός—that is, by what is essential, and yet unconscious, in the human intellect. The νοῦς ποιητικός is integral Science, posited all at once, which the conscious, discursive intellect is condemned to reconstruct laboriously, piece by piece.[18] There is therefore within us, or rather behind us, a possible vision of God, as the Alexandrians will say

18 Greek *nous poiētikos*, "productive" or "making" intellect: a name given by later commentators to the active intellect described in Aristotle's *On the Soul*, III.5.

—a vision always virtual, never actually realized by the conscious intellect. In this intuition we should see God blossom out into Ideas. It is this intuition that "makes all things[19]," playing in [349] relation to the discursive intellect, moving in time, the same role that the Unmoved Mover himself plays in relation to the movement of the heavens and the course of things.[20]

THE ANCIENT IDEA OF CAUSALITY

Positing God with nothingness automatically posits every degree of being between them, as in a sum.

We should thus find, immanent in the philosophy of Ideas, a *sui generis* conception of causality—a conception that it is important to bring into full light, because it is the one each of us will arrive at on following the natural movement of the intellect to the end, in order to go back to the origin of things. In truth, the ancient philosophers never formulated it explicitly. They confined themselves to drawing its consequences, and in general they pointed out views of it rather than presenting it to us itself. Sometimes, indeed, we are told of an *attraction*, sometimes of an *impulsion*, exerted by the first mover on the world as a whole. Both views are found in Aristotle, who shows us in the movement of the universe an aspiration of things toward divine perfection, and consequently an ascent toward God, while elsewhere he describes it as the effect of a contact of God with the first sphere, and consequently as descending from God to things. The Alexandrians, moreover, did no more, we believe, than follow this double indication when they spoke of procession and conversion: everything derives from the first principle, and everything aspires to return to it.[21] But these two concep-

19 BERGSON'S NOTE. Aristotle, *De Anima,* 430 a 14: "And there is an intellect of this kind by becoming all things, and another by making all things, as a kind of state, like light; for in a sense light too makes colors that exist potentially into colors in actuality."

20 The Alexandrians: the Neoplatonists, Plotinus and his successors, whose school had its roots in Alexandria.

21 Conversion (*epistrophē*) is the Neoplatonic return of all things toward the One, the counterpart of their procession (*proodos*) from it.

tions of divine causality can be identified with each other only if both are brought back to a third, which we regard as fundamental and which alone will make us understand not only why, and in what sense, things [350] move in space and time, but also why there is space and time at all, why there is movement, why there are things.

This conception, which shows through more and more clearly beneath the reasonings of the Greek philosophers as we go from Plato to Plotinus, we would formulate thus: *The positing of a reality implies the simultaneous positing of all the degrees of reality intermediate between it and pure nothingness.* The principle is evident in the case of number: we cannot posit the number 10 without thereby positing the existence of the numbers 9, 8, 7, etc. in short, of the whole interval between 10 and zero. But here our mind passes naturally from the sphere of quantity to that of quality. It seems to us that, a certain perfection being given, the whole continuity of degradations is also given between this perfection on the one hand and, on the other, the nothingness we imagine we conceive. Let us posit, then, Aristotle's God, thought of thought—that is, thought *making a circle*, turning from subject into object and from object into subject by a circular process that is instantaneous, or rather eternal. Since, on the other hand, nothingness seems to posit itself, and since, these two extremes being given, the interval between them is given too, it follows that all the descending degrees of being, from divine perfection down to "absolute nothing," will be realized, so to speak, automatically as soon as God has been posited.

Let us then run through this interval from top to bottom. First, the slightest diminution of the first principle is enough for being to be cast down into space and time; but the duration and extension representing this first diminution will be as close as possible to the divine inextension and eternity. We shall therefore have to [351] picture this first degradation of the divine principle as a sphere turning on itself, imitating by the perpetuity of its circular movement the eternity of the circling of divine thought; creating, moreover, its own place, and thereby place in

general[22], since nothing contains it and it does not change its position; and creating also its own duration, and thereby duration in general, since its movement is the measure of all others[23]. Then, degree by degree, we shall see perfection diminish down to our sublunary world, where the cycle of generation, growth and death imitates one last time, and spoils, the original circling. Understood in this way, the causal relation between God and the world appears as an attraction if we look from below, and as an impulsion or an action by contact if we look from above, since the first heaven, with its circular movement, is an imitation of God, and imitation is the reception of a form. So, depending on which direction we look in, we see God as efficient cause or as final cause. And yet neither of these two relations is the definitive causal relation. The true relation is the one found between the two sides of an equation whose first side is a single term and whose second is a summation of an indefinite number of terms. It is, if you like, the relation of the gold coin to its change—provided we suppose the change to offer itself automatically as soon as the gold coin is presented. Only in this way shall we understand why Aristotle demonstrated 352 the necessity of an unmoved first mover not on the ground that the movement of things must have had a beginning, but, on the contrary, by laying down that this movement cannot have begun and must never end. If movement exists—in other words, if the change is being counted out—it is because the gold coin is somewhere. And if the summation goes on without end, never having begun, it is because the single term that is its eminent equivalent is eternal. A perpetuity of mobility is possible only if it is backed by an eternity of immutability, which it unrolls in a chain without beginning or end.

22 BERGSON'S NOTE. *De Cælo,* II, 287 a 12: "Outside the outermost revolution there is neither void nor place." *Phys.*, IV, 212 a 34: "The whole is in one sense in motion and in another not. For as a whole it does not change its place all at once; but it moves in a circle, for this is the place of its parts."

23 BERGSON'S NOTE. *De Cælo,* I, 279 a 12: "Nor is there time outside the heaven." *Phys.*, VIII, 251 b 27: "Time is an affection of movement."

THE NATURAL METAPHYSICS OF THE INTELLECT

Stripped of its poetry and old science, Greek philosophy is the metaphysics our intellect makes naturally.

Such is the last word of Greek philosophy. We have not claimed to reconstruct it *a priori.* It has many origins. It is connected by invisible threads to every fiber of the ancient soul. It would be vain to try to deduce it from a simple principle[24]. But if we remove from it everything that came from poetry, from religion and from social life, as well as from a physics and a biology that were still rudimentary—if we set aside the crumbling materials that went into the construction of this immense edifice—a solid framework remains, and this framework traces the broad outlines of a metaphysics which is, we believe, the natural metaphysics of the human intellect. We arrive at a philosophy of this kind, in fact, as soon as we follow the cinematographic tendency of perception and thought to the end. For the continuity of evolutionary change, our perception and thought begin by substituting a series of stable forms that would be [353] threaded on in turn as they pass, like the rings that children riding the wooden horses of a merry-go-round pick off with their sticks as they go by. What, then, will the passing consist in, and on what will the forms be threaded? Since we obtained the stable forms by extracting from change everything definite to be found in it, there remains, to characterize the instability on which the forms are laid, only a negative attribute: it will be indeterminacy itself. Such is the first step of our thought: it dissociates each change into two elements, one stable and definable for each particular case, namely the Form, the other indefinable and always the same, which would be change in general. And such, too, is the essential operation of language. Forms are all it is capable of expressing. It is reduced to leaving unspoken, or it confines

24 BERGSON'S NOTE. Above all, we have almost entirely left aside those admirable but somewhat elusive intuitions that Plotinus was later to recapture, deepen and fix.

itself to *suggesting*, a mobility which, precisely because it remains unexpressed, is assumed to remain the same in every case. Then along comes a philosophy that holds the dissociation thus effected by thought and language to be legitimate. What will it do but objectify the distinction more forcefully, push it to its extreme consequences, and reduce it to a system? It will therefore compose the real out of definite Forms, or immutable elements, on the one hand, and, on the other, a principle of mobility which, being the negation of form, will by hypothesis escape all definition and will be pure indeterminacy. The more it directs its attention to these forms that thought delimits and language expresses, the more it will see them rise above the sensible and become refined into pure concepts, capable of entering into one another and even of gathering at last into a single concept, the synthesis of all reality, the consummation of all perfection. The further, on the contrary, it descends toward
354 the invisible source of universal mobility, the more it will feel that source slipping away beneath it and at the same time emptying itself, sinking into what it will call pure nothingness. In the end it will have on one side the system of Ideas, logically coordinated among themselves or concentrated into one, and on the other a quasi-nothingness, the Platonic "non-being" or the Aristotelian "matter." But having cut, we must sew. The task now is to reconstitute the sensible world out of supra-sensible Ideas and an infra-sensible non-being. This can be done only by postulating a kind of metaphysical necessity by virtue of which bringing this All and this Zero face to face *is equivalent* to positing all the degrees of reality that measure the interval between the two—just as an undivided number, as soon as it is regarded as a difference between itself and zero, reveals itself as a certain sum of units and at the same stroke makes all the lower numbers appear. That is the natural postulate. It is also the one we discern at the bottom of Greek philosophy. It will then only remain, in order to explain the specific characters of each of these intermediate degrees of reality, to measure the distance separating it from integral reality. Each lower degree consists in

a diminution of the higher, and whatever sensible novelty we perceive in it would resolve itself, from the point of view of the intelligible, into a new quantity of negation added to it. The smallest possible quantity of negation—the one already found in the highest forms of sensible reality, and consequently, *a fortiori,* in the lower forms—will be the one expressed by the most general attributes of sensible reality, extension and duration. By increasing degradations we shall obtain more and more specialized attributes. Here the philosopher's fancy will [355] have free rein, for it is by an arbitrary, or at least debatable, decree that we shall equate this or that aspect of the sensible world with this or that diminution of being. We shall not necessarily arrive, as Aristotle did, at a world made up of concentric spheres turning on themselves. But we shall be led to an analogous cosmology—I mean a construction whose parts, though all different, will nonetheless bear the same relations to one another. And this cosmology will always be governed by the same principle. The physical will be defined by the logical. Beneath the changing phenomena we shall be shown, as though showing through, a closed system of concepts subordinated and coordinated one to another. Science, understood as the system of concepts, will be more real than sensible reality. It will be prior to human knowledge, which merely spells it out letter by letter, and prior also to things, which clumsily try to imitate it. It would only have to be distracted from itself for an instant to come out of its eternity and thereby coincide with all this knowledge and all these things. Its immutability is therefore indeed the cause of universal becoming.

Such was the view of ancient philosophy on change and on duration. That modern philosophy has repeatedly—but above all at its beginnings—felt some inclination to depart from it seems to us beyond dispute. But an irresistible attraction brings the intellect back to its natural movement, and the metaphysics of the moderns back to the general conclusions of Greek metaphysics. It is this last point that we shall now try to bring to light, in order to show by what invisible threads our mechan-

istic philosophy is connected to the ancient philosophy of Ideas, and how, too, it answers the demands—above all practical—of our intellect.

ANCIENT AND MODERN SCIENCE

Both use the cinematographic method, but modern science considers any moment, not privileged ones.

356 Modern science, like ancient science, proceeds according to the cinematographic method. It cannot do otherwise; all science is subject to this law. For it is of the essence of science to manipulate *signs*, which it substitutes for the objects themselves. These signs no doubt differ from those of language in their greater precision and their higher efficacy. They are nonetheless bound by the general condition of the sign, which is to record, in a set form, a fixed aspect of reality. To think movement requires an effort of mind that must be constantly renewed. Signs are made to spare us this effort. They substitute for the moving continuity of things an artificial recomposition which is equivalent to it in practice and which has the advantage of being easily manipulated. But let us leave the procedures aside and consider only the result. What is the essential aim of science? It is to increase our influence over things. Science may be speculative in form and disinterested in its immediate ends: in other words, we can give it credit for as long as it likes. But however far off the day of reckoning is put, we must in the end be paid for our trouble. So it is always, in short, practical utility that science will aim at. Even when it launches into theory, science is bound to adapt its procedure to the general configuration of practice. However high it rises, it must be ready to fall back into the field of action and to land there at once on its feet. This would not be possible if its rhythm differed absolutely from that of action itself. Now action, as we have said, proceeds by leaps. To act is to readapt oneself. To know, that is, to foresee in order to act, will therefore be to go from one situation to another, from one arrangement to a 357 rearrangement. Science may consider rearrangements

closer and closer to one another; it will thus increase the number of moments it isolates, but it will always isolate moments. As for what happens in the interval, science is no more concerned with it than are the ordinary intellect, the senses and language: it bears not on the interval but on the extremities. The cinematographic method is therefore forced upon our science, as it was already forced upon that of the ancients.

Where, then, is the difference between these two sciences? We indicated it when we said that the ancients reduced the physical order to the vital order, that is, laws to genera, whereas the moderns seek to resolve genera into laws. But it is important to look at it from another angle, which is, moreover, only a transposition of the first. In what does the difference between the attitudes of these two sciences toward change consist? We would formulate it by saying that *ancient science believes it knows its object sufficiently when it has recorded certain privileged moments of it, whereas modern science considers it at any moment whatever.*

The forms or ideas of a Plato or an Aristotle correspond to privileged or salient moments in the history of things—the very ones, in general, that language has fixed. Like the childhood or old age of a living being, they are supposed to characterize a period whose quintessence they would express, all the rest of that period being filled by the passage, of no interest in itself, from one form to another. Is it a question of a falling body? We think we have grasped the fact closely enough once we have characterized it as a whole: it is a movement *downward*, it is the tendency toward a [358] *center*, it is the *natural* movement of a body which, separated from the earth to which it belonged, now goes to find its place there again. So we note the final term or culminating point (τέλος, ἀκμή), we set it up as the essential moment, and this moment, which language has retained to express the fact as a whole, also suffices for science to characterize it.[25] In Aristotle's physics, the movement of a body thrown through space or falling freely is defined by the concepts of up and

25 Greek *telos*, "end, goal," and *akmē*, "peak, prime."

down, of spontaneous and forced displacement, of proper place and alien place. But Galileo held that there was no essential moment, no privileged instant: to study the falling body is to consider it at any moment of its course. The true science of gravity will be the one that determines, for any instant of time whatever, the position of the body in space. For that, it is true, it will need signs far more precise than those of language.

It might be said, then, that our physics differs from that of the ancients above all in the indefinite decomposition of time that it carries out. For the ancients, time comprises as many undivided periods as there are successive facts, displaying a kind of individuality, which our natural perception and our language carve out in it. That is why each of these facts admits, in their eyes, of only a *global* definition or description. If, in describing it, we are led to distinguish phases in it, we will have several facts instead of one, several undivided periods instead of a single period. But time will always have been divided into determinate periods, and this mode of division will always have been imposed on the mind by apparent crises in reality, comparable to that of puberty—by the apparent onset of a new form. For a [359] Kepler or a Galileo, on the contrary, time is not objectively divided in one way or another by the matter that fills it. It has no natural joints. We can, and we must, divide it as we please. All instants are of equal value. None of them has the right to set itself up as an instant representative of the others or dominant over them. And consequently we know a change only when we are able to determine where it stands at any one of its moments.

The difference is profound. In one respect it is even radical. But from the point of view from which we are considering it, it is a difference of degree rather than of kind. The human mind passed from the first kind of knowledge to the second by gradual perfecting, simply by seeking greater precision. Between these two sciences there is the same relation as between the eye's noting of the phases of a movement and the much more complete recording of those phases by instantaneous photography. It is the same cinematographic mechanism in

both cases, but in the second it attains a precision it cannot have in the first.

THE PARTHENON FRIEZE AND THE SNAPSHOT

Instantaneous photography scatters a horse's gallop into any number of attitudes; modern science does the same with time.

Of a horse's gallop our eye perceives chiefly a characteristic attitude, essential or rather schematic, a form that seems to radiate over a whole period and so to fill a whole beat of the gallop: it is this attitude that sculpture has fixed on the friezes of the Parthenon. But instantaneous photography isolates any moment whatever; it puts them all on the same level. And so, for it, a horse's gallop scatters into as many successive attitudes as we please, instead of gathering itself into a single attitude that would shine forth in a privileged instant and light up a whole period.

From this original difference all the others flow. [360] A science that considers undivided periods of duration one after another sees only phases succeeding phases, forms replacing forms; it contents itself with a *qualitative* description of objects, which it likens to organized beings. But when we try to find out what happens within one of these periods, at any moment of time, we are aiming at something quite different. The changes that occur from one moment to another are no longer, by hypothesis, changes of quality; they are thenceforth *quantitative* variations, either of the phenomenon itself or of its elementary parts. It has therefore rightly been said that modern science stands out from that of the ancients in that it bears on magnitudes and sets out, above all, to measure them. The ancients had already practiced experimentation; and on the other hand Kepler did not experiment, in the proper sense of the word, in discovering a law that is the very type of scientific knowledge as we understand it. What distinguishes our science is not that it experiments, but that it experiments, and more generally works, only with a view to measuring.

That is why it has also rightly been said that ancient science dealt with *concepts*, while modern science seeks *laws*—constant relations between variable magnitudes. The concept of circularity sufficed Aristotle to define the movement of the heavenly bodies. But even with the more exact concept of elliptical form, Kepler would not have thought he had accounted for the movement of the planets. He needed a law, that is, a constant relation between the quantitative variations of two or more elements of planetary motion.

Yet these are only consequences—I mean differences that derive from the [361] fundamental difference. The ancients may have happened, by accident, to experiment with a view to measuring, and also to discover a law stating a constant relation between magnitudes. Archimedes' principle is a genuine experimental law. It takes into account three variable magnitudes: the volume of a body, the density of the liquid in which it is immersed, and the upward thrust it undergoes. And it does state, in short, that one of these three terms is a function of the other two.

The essential, original difference must therefore be sought elsewhere. It is the very one we pointed out at first. The science of the ancients is static. Either it considers the change it studies as a single block, or, if it divides it into periods, it makes each of these periods a block in its turn: which amounts to saying that it takes no account of time. But modern science took shape around the discoveries of Galileo and Kepler, which immediately furnished it with a model. Now what do Kepler's laws say? They establish a relation between the areas swept out by a planet's heliocentric radius vector and the *times* taken to sweep them out, and between the major axis of the orbit and the *time* taken to travel around it. What was Galileo's principal discovery? A law connecting the space traveled by a falling body with the time taken by the fall. Let us go further. In what did the first of the great transformations of geometry in modern times consist? In introducing—in veiled form, it is true—time and movement even into the consideration of figures. For the ancients, geo-

metry was a purely static science. Its figures were given all at once, in their finished state, like the Platonic Ideas. But the essence of Cartesian geometry (though Descartes did not give it this form) was to [362] consider every plane curve as described by the movement of a point on a moving straight line that shifts, parallel to itself, along the axis of abscissas—the displacement of the moving line being assumed uniform, and the abscissa thus becoming representative of time. The curve will then be defined if we can state the relation that connects the space traveled on the moving line with the time taken to travel it, that is, if we can indicate the position of the moving point on the line it travels at any moment of its course. This relation will be nothing other than the equation of the curve. To substitute an equation for a figure consists, in short, in seeing how far the tracing of the curve has got at any moment, instead of taking in that tracing all at once, gathered up in the single movement in which the curve is in its finished state.

Such, then, was indeed the guiding idea of the reform by which both the science of nature and the mathematics that served as its instrument were renewed. Modern science is the daughter of astronomy; it came down from heaven to earth along Galileo's inclined plane, for it is through Galileo that Newton and his successors are linked to Kepler. Now how did the astronomical problem present itself to Kepler? The task was, knowing the respective positions of the planets at a given moment, to calculate their positions at any other moment. The same question arose, from then on, for every material system.[26] Each material point became a rudimentary planet, and the question par excellence, the ideal problem whose solution was to provide the key to all the others, was to determine the relative positions of these elements at any moment whatever, once their positions at a given moment were known. No doubt the problem is [363] posed in these precise terms only in very simple cases, for a schematized reality. For we never know the respective positions

26 Galileo studied falling bodies by timing balls rolling down inclined planes, which slowed the motion enough to measure it.

of the true elements of matter—supposing there are real elements—and, even if we knew them at a given moment, calculating their positions for another moment would most often require a mathematical effort beyond human powers. But it is enough for us to know that these elements could be known, that their current positions could be recorded, and that a superhuman intellect could, by subjecting these data to mathematical operations, determine the positions of the elements at any other moment of time. This conviction lies at the bottom of the questions we ask ourselves about nature and of the methods we use to answer them. That is why every law in static form appears to us as a provisional installment, or as a partial point of view on a dynamic law that alone would give us complete and final knowledge.

Let us conclude that our science is distinguished from ancient science not only in that it looks for laws, nor even in that its laws state relations between magnitudes. We must add that the magnitude to which we should like to be able to relate all the others is time, and that *modern science must be defined above all by its aspiration to take time as an independent variable.* But what time is in question?

THE TIME THAT SCIENCE COUNTS

Science counts simultaneities and would change nothing if the world's whole history were given at once.

We have said it, and we cannot repeat it too often: the science of matter proceeds like ordinary knowledge. It perfects this knowledge, increases its precision and scope, but it works [364] in the same direction and brings the same mechanism into play. If, then, ordinary knowledge, by reason of the cinematographic mechanism to which it is subject, gives up following becoming in its moving aspect, the science of matter gives it up likewise. No doubt it distinguishes as many moments as we please in the interval of time it considers. However small the intervals at which it has stopped, it allows us to divide them further if we

need to. Unlike ancient science, which stopped at certain supposedly essential moments, it concerns itself indifferently with any moment whatever. But it always considers moments, always virtual stopping-places, always, in short, immobilities. That is to say that real time, regarded as a flow or, in other words, as the very mobility of being, here escapes the grip of scientific knowledge. We have already tried to establish this point in an earlier work. We touched on it again in the first chapter of this book. But it is important to come back to it one last time, to dispel misunderstandings.

When positive science speaks of time, it refers to the movement of a certain moving body T along its trajectory. This movement has been chosen by it as representative of time, and it is uniform by definition. Let us call T1, T2, T3,... etc., points that divide the trajectory of the moving body into equal parts from its origin T0. We will say that 1, 2, 3,... units of time have elapsed when the moving body is at points T1, T2, T3,... of the line it travels. Then, to consider the state of the universe at the end of a certain time *t* is to examine where it will be when the moving body T is at point Tt of its trajectory. But of the *flow* of time itself, still less of its effect on [365] consciousness, there is no question here; for what enters into account are points T1, T2, T3,... taken on the flow, never the flow itself. We may narrow the time under consideration as much as we like, that is, break up at will the interval between two consecutive divisions Tn and Tn+1: it is always with points, and with points only, that we shall be dealing. What we retain of the movement of the moving body T are positions taken on its trajectory. What we retain of the movement of all the other points in the universe are their positions on their respective trajectories. To each *virtual stop* of the moving body T at the points of division T1, T2, T3,... we make correspond a *virtual stop* of all the other moving bodies at the points they are passing. And when we say that a movement or any other change has taken a time *t*, we mean by this that we have noted a number *t* of correspondences of this kind. So we have counted simultaneities; we have not concerned ourselves with

the flow that goes from one to the other. The proof is that I can, at will, vary the speed of the universe's flow in relation to a consciousness that would be independent of it and would perceive the variation by the wholly qualitative *feeling* it would have of it: so long as the movement of T shared in this variation, I should have nothing to change in my equations or in the numbers that figure in them.

Let us go further. Suppose this speed of flow becomes infinite. Let us imagine, as we said in the first pages of this book, that the trajectory of the moving body T is given all at once, and that the whole past, present and future history of the material universe is spread out instantaneously in space. The same mathematical correspondences will persist between the moments of the history of the world, unfolded like a fan, so to speak, and the divisions T1, T2, T3,... of the line that will be called, by [366] definition, "the course of time." In the eyes of science nothing will have changed. But if, when time is thus spread out into space and succession becomes juxtaposition, science has nothing to change in what it tells us, it is because in what it was telling us it took no account either of *succession* in what is specific to it or of *time* in its flowing aspect. It has no sign to express what strikes our consciousness in succession and duration. It no more applies to becoming, in its moving aspect, than the bridges thrown across a river at intervals follow the water flowing under their arches.

TIME IS INVENTION

Waiting for the sugar, or painting a portrait, shows that real time creates the unforeseeable.

Yet succession exists; I am conscious of it; it is a fact. When a physical process is taking place before my eyes, it is not within the power of my perception or my inclination to speed it up or slow it down. What matters to the physicist is the *number* of units of duration that the process fills. He need not concern himself with the units themselves, and that is why the successive states of the world could be unfolded all at once in space

without his science being changed and without his ceasing to speak of time. But for us, conscious beings, it is the units that matter, for we do not count the extremities of intervals: we feel and live the intervals themselves. Now we are conscious of these intervals as *determinate* intervals. I always come back to my glass of sugared water[27]: why must I wait for the sugar to melt? If the duration of the phenomenon is relative for the physicist, inasmuch as it comes down to a certain number of units of time and the units themselves are whatever we like, this duration is [367] an absolute for my consciousness, for it coincides with a certain degree of impatience which is itself rigorously determinate. Where does this determination come from? What obliges me to wait, and to wait for a certain length of psychological duration that is imposed on me, over which I have no power? If succession, as distinct from mere juxtaposition, has no real efficacy, if time is not a kind of force, why does the universe unroll its successive states at a speed which, in relation to my consciousness, is a veritable absolute? Why at this particular speed rather than any other? Why not at an infinite speed? Why is it, in other words, that everything is not given all at once, as on the film of the cinematograph? The more I go into this point, the more it seems to me that if the future is condemned to *succeed* the present instead of being given alongside it, it is because it is not altogether determined at the present moment. And if the time taken up by this succession is something other than a number, if it has, for the consciousness installed in it, an absolute value and reality, it is because something unforeseeable and new is constantly being created in it—not, no doubt, in this or that artificially isolated system, such as a glass of sugared water, but in the concrete whole with which that system forms one body. This duration may not be the doing of matter itself, but that of Life, which reascends its course: the two movements are nonetheless bound up with each other. *The duration of the universe must therefore be one with the latitude for creation that can find room in it.*

When a child amuses himself by reconstructing a picture from the pieces of a jigsaw puzzle, he succeeds faster and faster the more he practices. The reconstruction, moreover, was instantaneous: the child found it [368] ready-made when he opened the box on leaving the shop. So the operation does not require a determinate time, and indeed, theoretically, it requires no time at all. That is because its result is given. It is because the picture has already been created, and to obtain it, all that is needed is a work of recomposition and rearrangement—a work that can be supposed to go faster and faster, and even infinitely fast, to the point of being instantaneous. But for the artist who creates a picture by drawing it from the depths of his soul, time is no longer an accessory. It is not an interval that can be lengthened or shortened without altering its content. The duration of his work is an integral part of his work. To contract or dilate it would be to alter both the psychological evolution that fills it and the invention that is its outcome. The time of invention is one here with the invention itself. It is the progress of a thought that changes as it takes shape. In short, it is a vital process, something like the ripening of an idea.

The painter is before his canvas, the colors are on the palette, the model is sitting; we see all this, and we also know the painter's manner: do we foresee what will appear on the canvas? We possess the elements of the problem. We know, with an abstract knowledge, how it will be solved, for the portrait will surely resemble the model and surely also the artist; but the concrete solution brings with it that unforeseeable nothing which is the whole of the work of art. And it is this nothing that takes time. A nothing of matter, it creates itself as form. The germination and flowering of this form stretch out into a duration that cannot be shrunk, and that forms one body with them. So too with the works of nature. What appears new in them springs from an inner push [369] which is progress or succession, which confers on succession a power of its own or derives all its power from succession—which, in any case, makes succession, or *con-*

27 BERGSON'S NOTE. See p. 10.

tinuity of interpenetration in time, irreducible to a mere instantaneous juxtaposition in space. That is why the idea of reading the future of living forms in a present state of the material universe, and of unfolding their future history all at once, must contain a genuine absurdity. But this absurdity is hard to bring to light, because our memory is in the habit of lining up in an ideal space the terms it perceives one after another, because it always represents *past* succession in the form of juxtaposition. It can do so, moreover, precisely because the past is what has already been invented, what is dead, and no longer creation and life. Then, since future succession will end up being past succession, we persuade ourselves that future duration admits of the same treatment as past duration, that it could be unrolled even now, that the future is there, rolled up, already painted on the canvas. An illusion, no doubt, but a natural, ineradicable illusion, which will last as long as the human mind!

Time is invention, or it is nothing at all. But physics cannot take time-as-invention into account, bound as it is to the cinematographic method. It confines itself to counting simultaneities between the events that make up this time and the positions of the moving body T on its trajectory. It detaches these events from the whole, which at each instant takes on a new form and imparts to them something of its novelty. It considers them in the abstract, as they would be outside the living whole, that is, in a time unrolled into space.

A SECOND KIND OF KNOWLEDGE

Beside physics there should have arisen a metaphysics of duration, grasping the real by sympathy.

It retains only those events or systems of events [370] that can be isolated in this way without subjecting them to too deep a distortion, because they alone lend themselves to the application of its method. Our physics dates from the day when it became possible to isolate such systems. In sum, *if modern physics differs from ancient physics in that it considers any moment of time*

whatever, it rests entirely on a substitution of time-as-length for time-as-invention.

It seems, then, that parallel with this physics a second kind of knowledge should have taken shape, one that would have retained what physics let slip. Science neither wished nor was able to get a hold on the very flow of duration, tied as it was to the cinematographic method. We would have freed ourselves from that method. We would have required the mind to give up its dearest habits. It is into the inside of becoming that we would have transported ourselves, by an effort of sympathy. We would no longer have asked where a moving body will be, what configuration a system will take, through what state a change will pass at any moment whatever. The moments of time, which are only halts of our attention, would have been abolished; it is the flowing of time, it is the very flow of the real, that we would have tried to follow. The first kind of knowledge has the advantage of enabling us to foresee the future and of making us, to a certain extent, masters of events. On the other hand, it retains of moving reality only possible immobilities, that is, views taken of it by our mind: it symbolizes the real and transposes it into human terms rather than expressing it. The other kind of knowledge, if it is possible, will be practically useless. It will not extend our dominion over nature; it will even thwart certain natural aspirations of the intellect. But if it succeeded, it is reality itself [371] that it would clasp in a final embrace. In this way we would not only complete the intellect and its knowledge of matter, by accustoming it to settle into what moves: by developing also another faculty, complementary to it, we would open up a view onto the other half of the real. For as soon as we find ourselves in the presence of true duration, we see that it means creation, and that if what is unmaking itself endures, this can only be through its solidarity with what is making itself. Thus the necessity of a continual growth of the universe would appear—I mean, of a *life* of the real. And from then on we would regard in a new light the life we encounter on the surface of our planet, a life directed the same way as that of the universe, and

the inverse of materiality. To the intellect, finally, we would add intuition.

The more we reflect on it, the more we shall find that this conception of metaphysics is the one suggested by modern science.

For the ancients, indeed, time is theoretically negligible, because the duration of a thing only manifests the degradation of its essence: it is with this motionless essence that science is concerned. Change being only the effort of a Form toward its own realization, the realization is all that it matters for us to know. No doubt this realization is never complete: that is what ancient philosophy expresses by saying that we do not perceive form without matter. But if we consider the changing object at a certain essential moment, at its peak, we may say that it *brushes against* its intelligible form. This intelligible form—ideal and, so to speak, a limit—is what our science takes hold of. And when it thus possesses the gold coin, it holds eminently the small change that is change. Change is less than being. [372] The knowledge that took it as its object, supposing such knowledge were possible, would be less than science.

But for a science that places all the instants of time on the same level, that admits no essential moment, no culminating point, no peak, change is no longer a diminution of essence, nor duration a dilution of eternity. The flow of time here becomes reality itself, and what we study are the things that flow. It is true that we confine ourselves to taking snapshots of the flowing reality. But precisely for that reason scientific knowledge ought to call for another kind of knowledge to complete it. The ancient conception of scientific knowledge ended in making time a degradation, and change the diminution of a Form given from all eternity. By following the new conception through to the end, on the contrary, we would have come to see in time a progressive growth of the absolute, and in the evolution of things a continual invention of new forms.

It is true that this would have meant breaking with the metaphysics of the ancients. They perceived only one way of know-

ing definitively. Their science consisted of a scattered and fragmentary metaphysics, their metaphysics of a concentrated and systematic science: they were, at most, two species of one and the same genus. On the hypothesis we are adopting, by contrast, science and metaphysics would be two opposed, though complementary, ways of knowing: the first retaining only instants, that is, what does not endure, the second bearing on duration itself. It was natural that there should have been hesitation between so new a conception of metaphysics and the traditional one.

DESCARTES BETWEEN TWO ROADS

Descartes wavered between universal mechanism and free will, between given time and continuous creation.

The temptation must even have been great to do over again with the new science [373] what had been attempted with the old: to suppose our scientific knowledge of nature already complete, to unify it entirely, and to give this unification, as the Greeks had already done, the name of metaphysics. Thus, beside the new road that philosophy could open up, the old one remained open. It was the very road along which physics was traveling. And since physics retained of time only what could just as well be spread out all at once in space, the metaphysics that set off in this direction necessarily had to proceed as if time created and annihilated nothing, as if duration had no efficacy. Bound, like the physics of the moderns and the metaphysics of the ancients, to the cinematographic method, it arrived at this conclusion, implicitly accepted at the outset and immanent in the method itself: *Everything is given.*

That metaphysics at first hesitated between the two roads seems to us beyond dispute. The oscillation is visible in Cartesianism. On the one hand, Descartes asserts universal mechanism: from this point of view movement would be relative[28], and since time has exactly as much reality as movement,

28 BERGSON'S NOTE. Descartes, *Principes*, II, 29.

past, present and future would have to be given from all eternity. But on the other hand (and this is why the philosopher did not go as far as these extreme consequences) Descartes believes in man's free will. He superimposes on the determinism of physical phenomena the indeterminism of human actions, and consequently, on time-as-length, a duration in which there is invention, creation, true succession. This duration he props against a God who unceasingly renews the creative act and who, being thus tangent to time and becoming, [374] sustains them and necessarily imparts to them something of his absolute reality. When he takes up this second point of view, Descartes speaks of movement, even spatial movement, as an absolute[29].

So he set out on each of the two roads in turn, resolved to follow neither to the end. The first would have led him to deny free will in man and genuine willing in God. It meant the suppression of all efficacious duration, the likening of the universe to a *given* thing that a superhuman intellect would embrace all at once, in the instantaneous or in the eternal. By following the second, on the contrary, one arrived at all the consequences that the intuition of true duration implies. Creation no longer appeared simply as *continued*, but as *continuous*. The universe, regarded as a whole, truly evolved. The future was no longer determinable as a function of the present. At most one could say that, once realized, it could be found again in its antecedents, as the sounds of a new language can be expressed with the letters of an old alphabet: we then stretch the value of the letters, retroactively assigning them sounds that no combination of the old sounds could have led us to foresee. Finally, mechanistic explanation could remain universal, in that it would extend to as many systems as one cared to cut out of the continuity of the universe; but mechanism then became a *method* rather than a *doctrine*. It expressed the fact that science must proceed in the cinematographic manner, that its role is to mark the rhythm of the flowing of things and not to insert itself into it. Such were the two

29 BERGSON'S NOTE. *Ibid.*, II, § 36 ff.

opposed [375] conceptions of metaphysics that offered themselves to philosophy.

SPINOZA AND LEIBNIZ

Modern metaphysics took the old road, unifying physics as the Greeks had unified the Ideas.

It was toward the first that philosophy turned. The reason for this choice lies, no doubt, in the mind's tendency to proceed according to the cinematographic method—a method so natural to our intellect, and also so well adjusted to the requirements of our science, that one must be doubly sure of its speculative impotence before giving it up in metaphysics. But the influence of ancient philosophy also played its part. Artists forever admirable, the Greeks created a type of suprasensible truth, as of sensible beauty, whose appeal is hard to resist. As soon as one inclines to make metaphysics a systematization of science, one slides in the direction of Plato and Aristotle. And once one has entered the zone of attraction in which the Greek philosophers move, one is drawn into their orbit.

It was in this way that the doctrines of Leibniz and Spinoza took shape. We do not fail to recognize the treasures of originality they contain. Spinoza and Leibniz poured into them the content of their souls, rich with the inventions of their genius and the acquisitions of the modern mind. And in both of them, especially in Spinoza, there are surges of intuition that make the system crack. But if we strip from the two doctrines what gives them animation and life, if we keep only their skeleton, we have before us the very image we would obtain by looking at Platonism and Aristotelianism through Cartesian mechanism. We are confronted with a systematization of the new physics, a systematization built on the model of the old metaphysics.

What, in fact, could the unification of physics be? The idea that inspired this science was to isolate, within [376] the universe, systems of material points such that, if the position of each of these points was known at a given moment, it could then be cal-

culated for any moment whatever. Since, moreover, the systems so defined were the only ones on which the new science had any hold, and since one could not tell *a priori* whether a system did or did not satisfy the required condition, it was useful to proceed always and everywhere *as if* the condition were fulfilled. Here was a methodological rule that suggested itself, one so obvious that it did not even need to be stated. Plain common sense tells us, in fact, that when we possess an effective instrument of research and do not know the limits of its applicability, we should act as if its applicability were unlimited: there will always be time to scale back. But the temptation must have been great for the philosopher to hypostatize this hope, or rather this impetus, of the new science, and to convert a general rule of method into a fundamental law of things. One then leaped to the limit: one supposed physics completed and embracing the whole of the sensible world. The universe became a system of points whose position was rigorously determined at each instant in relation to the preceding instant, and theoretically calculable for any moment whatever. In a word, one arrived at universal mechanism. But it was not enough to formulate this mechanism; it had to be grounded—that is, its necessity had to be proved and its reason given. And since the essential assertion of mechanism is that all the points of the universe are mathematically bound up with one another, and all the moments of the universe with one another, the reason for mechanism had to be found in the unity of a principle in which everything juxtaposed [377] in space and successive in time would be contracted together. From then on, the whole of reality was supposed to be given all at once. The reciprocal determination of appearances juxtaposed in space was due to the indivisibility of true being. And the rigorous determinism of phenomena successive in time simply expressed the fact that the whole of being is given in the eternal.

The new philosophy was thus going to be a fresh start, or rather a transposition, of the old. The old philosophy had taken each of the *concepts* in which a becoming is concentrated or in

which its high point is marked; it supposed them all known and gathered them into a single concept, form of forms, idea of ideas, like Aristotle's God. The new philosophy was going to take each of the *laws* that condition one becoming in relation to others and that are, as it were, the permanent substratum of phenomena; it would suppose them all known and would gather them into a unity that would likewise express them eminently, but that, like Aristotle's God and for the same reasons, had to remain immutably shut up within itself.

PARALLELISM OF MIND AND BODY

Having split quality from quantity, Spinoza and Leibniz made thought and extension translations of each other.

It is true that this return to ancient philosophy was not without serious difficulties. When a Plato, an Aristotle or a Plotinus fuses all the concepts of their science into one, they thereby embrace the whole of reality, for concepts represent things themselves and possess at least as much positive content as they do. But a law, in general, expresses only a relation, and physical laws in particular express only quantitative relations between concrete things. So if a modern philosopher works on the laws of the new science as ancient philosophy worked on the concepts of the old, if he makes all the conclusions of a physics supposed to be [378] omniscient converge on a single point, he leaves aside what is concrete in phenomena: the qualities perceived, the perceptions themselves. His synthesis takes in, it seems, only a fraction of reality. In fact, the first result of the new science was to cut reality into two halves, quantity and quality, one of which was credited to *bodies* and the other to *souls.* The ancients had raised no such barriers, either between quality and quantity or between soul and body. For them, mathematical concepts were concepts like any others, related to the rest and fitting quite naturally into the hierarchy of ideas. Body was not then defined by geometrical extension, nor soul by consciousness. If Aristotle's ψυχή (soul), the entelechy of a living body, is less spiritual than our

"soul," it is because his σῶμα (body), already steeped in idea, is less corporeal than our "body." So the split between the two terms was not yet irremediable.[30] It has become so, and from then on a metaphysics that aimed at an abstract unity had to resign itself either to taking in only one half of reality in its synthesis or, on the contrary, to taking advantage of the absolute irreducibility of the two halves to each other in order to regard one as a *translation* of the other. Different sentences will say different things if they belong to the same language, that is, if there is a certain kinship of sound between them. If, on the contrary, they belong to two different languages, they may, precisely because of their radical difference of sound, express the same thing. So it is with quality and quantity, with soul and body. It was because they had cut every tie between the two terms that philosophers were led to establish a rigorous parallelism between them, of which the ancients had never [379] thought; to regard them as translations of each other, not as inversions; and finally to give their duality a fundamental identity as its substratum. The synthesis to which they had risen thus became capable of embracing everything. A divine mechanism made the phenomena of thought correspond, one by one, to those of extension, qualities to quantities, and souls to bodies.

It is this parallelism that we find in both Leibniz and Spinoza —in different forms, it is true, because of the unequal importance they attach to extension. In Spinoza, the two terms Thought and Extension are placed, in principle at least, on the same level. They are therefore two translations of one and the same original or, as Spinoza says, two attributes of one and the same substance, which must be called God. And these two translations, like an infinity of others in languages we do not know, are called for, indeed required, by the original, just as the essence of the circle is translated automatically, so to speak, both by a figure and by an equation. For Leibniz, on the con-

30 Entelechy (*entelecheia*) is Aristotle's term for the actualized form that makes a thing what it is; in *De anima* II 1 the soul is "the first entelechy of a natural body having life."

trary, extension is indeed still a translation, but it is thought that is the original, and thought could do without translation, the translation being made only for us. In positing God, one necessarily also posits all the possible views of God, that is, the monads. But we can always imagine that a view has been taken from a point of view, and it is natural for an imperfect mind like ours to classify views, which are qualitatively different, according to the order and position of points of view, which are qualitatively identical, from which the views are supposed to have been taken.[31] In reality there are no points of view, for there are only views, each given in one indivisible block and representing, in its own way, the whole of reality, which is God. But we need to [380] translate the plurality of mutually dissimilar views by the multiplicity of these points of view, external to one another, and likewise to symbolize the more or less close kinship of the views with one another by the relative situation of these points of view, by their nearness or distance—that is, by a magnitude. This is what Leibniz expresses when he says that space is the order of coexistents, that the perception of extension is a confused perception (that is, one relative to an imperfect mind), and that there are only monads—meaning by this that the real Whole has no parts, but is repeated infinitely within itself, each time in its entirety (though diversely), and that all these repetitions complement one another. In the same way, the visible relief of an object is equivalent to the whole set of stereoscopic views that could be taken of it from every point; and instead of seeing in the relief a juxtaposition of solid parts, one could just as well regard it as made of the *reciprocal complementarity* of these complete views, each given as a block, each indivisible, each different from the others and yet representative of the same thing. For Leibniz the Whole, that is, God, is this very relief, and the monads are these flat views, complementary to one another: that is why he defines God as "the substance that has no point of view," or again as "universal harmony," that is, the reciprocal comple-

31 Monads: Leibniz's simple, indivisible substances, each of which mirrors the whole universe from its own standpoint.

mentarity of the monads. In short, Leibniz differs here from Spinoza in that he considers universal mechanism as an aspect that reality takes on for us, whereas Spinoza makes it an aspect that reality takes on for itself.

It is true that, having concentrated the whole of reality in God, they found it difficult to pass from God to [381] things, from eternity to time. The difficulty was even much greater for these philosophers than for an Aristotle or a Plotinus. Aristotle's God, in fact, had been obtained by compressing the Ideas, and making them interpenetrate, that represent, in their completed state or at their culminating point, the things that change in the world. He was therefore transcendent to the world, and the duration of things was juxtaposed to his eternity, of which it was a weakening. But the principle to which one is led by considering universal mechanism, and which must serve as its substratum, no longer condenses within itself concepts or *things,* but laws or *relations*. Now, a relation does not exist separately. A law links together terms that change; it is immanent in what it governs. The principle in which all these relations come to be condensed, and which grounds the unity of nature, can therefore no longer be transcendent to sensible reality; it is immanent in it, and one must suppose at one and the same time that it is in time and outside time, gathered up in the unity of its substance and yet condemned to unroll that substance in a chain without beginning or end. Rather than formulate so shocking a contradiction, the philosophers were bound to be led to sacrifice the weaker of the two terms and to regard the temporal aspect of things as pure illusion. Leibniz says so in so many words, for he makes time, like space, a confused perception. If the multiplicity of his monads expresses only the diversity of the views taken of the whole, the history of an isolated monad seems to be, for this philosopher, hardly anything other than the plurality of views that a monad can take of its own substance: so that time would consist in the set of points of view of each monad on itself, as space consists in the set of points of view of [382] all the monads on God. But Spinoza's thought is much less clear, and this philosopher seems

to have sought to establish between eternity and what endures the same difference that Aristotle made between essence and accidents—the most difficult of undertakings, since Aristotle's ὕλη (matter) was no longer there to measure the gap and explain the passage from the essential to the accidental, Descartes having eliminated it for good. Be that as it may, the more deeply one studies the Spinozist conception of the "inadequate" in its relation to the "adequate," the more one feels oneself moving in the direction of Aristotelianism, just as Leibniz's monads, the more clearly they take shape, tend all the more to come close to the Intelligibles of Plotinus[32].[33] The natural slope of these two philosophies brings them back to the conclusions of ancient philosophy.

In sum, the resemblances between this new metaphysics and that of the ancients come from the fact that both suppose, ready-made—the ancient one above the sensible, the modern one within the sensible itself—a single and complete Science, with which everything real that the sensible contains would coincide. *For both, reality, like truth, would be wholly given in eternity.* Both are averse to the idea of a reality that would create itself as it goes along—that is, at bottom, to the idea of an absolute duration.

THE NUT AND THE MACHINE

Psychophysiology inherits a mutilated Spinozism; the brain is necessary to consciousness, not its equivalent.

That, moreover, the conclusions of this metaphysics, which issued from science, have rebounded into science itself by a kind of ricochet is something one could [383] easily show. All our so-called empiricism is still permeated by them. Physics and chemistry study only inert matter; biology, when it treats the

32 BERGSON'S NOTE. In a course on Plotinus given at the Collège de France in 1897–1898, we tried to bring out these resemblances. They are numerous and striking. The analogy extends even to the formulas used on either side.

33 In Plotinus the Intelligibles are the realities contained in Intellect (*nous*), each of which holds all the others within it.

living being physically and chemically, considers only its inert side. Mechanistic explanations therefore cover, despite their development, only a small part of reality. To suppose *a priori* that the whole of reality can be resolved into elements of this kind, or at least that mechanism could give a complete translation of what happens in the world, is to opt for a certain metaphysics—the very one whose principles a Spinoza and a Leibniz laid down and whose consequences they drew. Certainly a psychophysiologist who affirms the exact equivalence of the brain state and the psychological state, who pictures the possibility, for some superhuman intellect, of reading in the brain what is going on in consciousness, believes himself far removed from the metaphysicians of the seventeenth century and very close to experience. Yet experience pure and simple tells us nothing of the kind. It shows us the interdependence of the physical and the mental, the necessity of a certain cerebral substratum for the psychological state—nothing more. From the fact that one term is bound up with another, it does not follow that the two are equivalent. Because a certain nut is necessary to a certain machine, because the machine works when the nut is left in and stops when it is removed, we shall not say that the nut is the equivalent of the machine. For the correspondence to be an equivalence, any part whatever of the machine would have to correspond to a definite part of the nut—as in a literal translation, where each chapter renders a chapter, each sentence a sentence, each word a word. Now, the relation of the brain to consciousness [384] seems to be something quite different. Not only does the hypothesis of an equivalence between the psychological state and the brain state imply a real absurdity, as we have tried to prove in an earlier work, but the facts, examined without bias, do seem to indicate that the relation of the one to the other is precisely that of the machine to the nut. To speak of an equivalence between the two terms is simply to truncate the Spinozist or Leibnizian metaphysics—and to make it almost unintelligible in the process. One accepts this philosophy as it stands on the side of Extension, but mutilates it on the side of

Thought. With Spinoza, with Leibniz, one supposes the unifying synthesis of the phenomena of matter completed: everything in it would be explained mechanically. But for conscious facts the synthesis is no longer carried through to the end. One stops halfway. One supposes consciousness coextensive with this or that part of nature, and no longer with nature as a whole. One thus arrives sometimes at an "epiphenomenalism" that attaches consciousness to certain particular vibrations and places it here and there in the world, sporadically, and sometimes at a "monism" that scatters consciousness into as many little grains as there are atoms. But in either case it is to an incomplete Spinozism or Leibnizianism that one returns. Between this conception of nature and Cartesianism one could, moreover, find the historical intermediaries. The philosopher-physicians of the eighteenth century, with their narrowed Cartesianism, had a great deal to do with the genesis of present-day "epiphenomenalism" and "monism."[34]

KANT'S CRITIQUE

Kant limited dogmatism but kept the ideal of one science and never admitted a supra-intellectual intuition.

These doctrines thus turn out to lag behind the Kantian critique. Certainly Kant's philosophy too is imbued with the belief in a single, integral science [385] embracing the whole of reality. Indeed, seen from a certain angle, it is only a continuation of the metaphysics of the moderns and a transposition of ancient metaphysics. Spinoza and Leibniz, following Aristotle's example, had hypostatized the unity of knowledge in God. The Kantian critique, in one of its aspects at least, consisted in asking whether the whole of this hypothesis was necessary to modern science as it had been to ancient science, or whether part of the hypothesis alone would not suffice. For the ancients, in fact, science dealt with concepts, that is, with kinds of *things*. By com-

34 Such as Julien Offray de La Mettrie (1709–1751), author of *L'Homme machine*, and Pierre-Jean-Georges Cabanis (1757–1808).

pressing all concepts into one, they therefore necessarily arrived at a *being*, which could doubtless be called Thought, but which was thought-object rather than thought-subject: when Aristotle defined God as the νοήσεως νόησις, the "thinking of thinking," it was probably on νοήσεως ("of thinking"), and not on νόησις ("thinking"), that he placed the emphasis. God was here the synthesis of all concepts, the idea of ideas. But modern science turns on laws, that is, on relations. Now, a relation is a connection established by a mind between two or more terms. A relation is nothing outside the intellect that does the relating.[35] The universe, then, can be a system of laws only if phenomena pass through the filter of an intellect. No doubt this intellect could be that of a being infinitely superior to man, who would ground the materiality of things at the same time as he linked them together: such was the hypothesis of Leibniz and Spinoza. But it is not necessary to go so far; for the effect to be obtained here, the human intellect is enough: such is precisely the Kantian solution. Between the dogmatism of a Spinoza or a Leibniz and the critique of Kant there is exactly the same distance as between 386 "it must be that" and "it is enough that." Kant halts this dogmatism on the slope that was making it slide too far toward Greek metaphysics; he reduces to the strict minimum the hypothesis that must be made in order to suppose Galileo's physics indefinitely extensible. It is true that when he speaks of the human intellect, it is neither yours nor mine that is in question. The unity of nature would indeed come from the human understanding, which unifies, but the unifying function at work here is impersonal. It communicates itself to our individual consciousnesses, but it goes beyond them. It is much less than a substantial God; it is a little more, however, than the isolated work of one man, or even than the collective work of humanity. It is not exactly part of man; rather, it is man who is in it, as in an atmosphere of intellectuality that his consciousness would breathe. It is, if you like, a *formal God,* something that is not yet divine in Kant but that tends to become so. This became clear

35 Aristotle, *Metaphysics* XII (Λ) 9, 1074b34.

with Fichte. Be that as it may, its principal role in Kant is to give the whole of our science a relative and *human* character, though the character of a humanity already somewhat deified. Kant's critique, viewed from this angle, consisted chiefly in limiting the dogmatism of his predecessors, accepting their conception of science while reducing to a minimum the metaphysics it implied.

But it is otherwise with the Kantian distinction between the matter of knowledge and its form. By seeing in the intellect, above all, a faculty of establishing relations, Kant attributed an extra-intellectual origin to the terms between which the relations are established. He maintained, against his immediate predecessors, that knowledge cannot be entirely resolved into terms [387] of intellect. He reinstated in philosophy—but modifying it, transferring it to another plane—that essential element of Descartes's philosophy which had been abandoned by the Cartesians.

In this way he opened the path to a new philosophy, one that might have established itself in the extra-intellectual matter of knowledge by a higher effort of intuition. Coinciding with this matter, adopting the same rhythm and the same movement, could not consciousness, by two efforts in opposite directions, raising and lowering itself by turns, grasp from within, instead of perceiving from without, the two forms of reality, body and mind? Would not this twofold effort make us, as far as possible, live the absolute over again? Since, moreover, in the course of this operation we should see the intellect arise of itself, carving itself out within the whole of mind, intellectual knowledge would then appear as it is: limited, but no longer relative.

Such was the direction that Kantianism could have pointed out to a revivified Cartesianism. But Kant himself did not set out in this direction.

He would not set out in it because, while assigning an extra-intellectual matter to knowledge, he believed this matter to be either coextensive with the intellect or narrower than the intellect. Consequently he could no longer think of carving the intel-

lect out of it, nor, therefore, of retracing the genesis of the understanding and its categories. The frameworks of the understanding, and the understanding itself, had to be accepted as they were, ready-made. Between the matter presented to our intellect and this intellect itself there was no kinship. The agreement between the two came from the intellect imposing its form on matter. So not only was it necessary to posit the [388] intellectual form of knowledge as a kind of absolute and to give up tracing its genesis, but the very matter of this knowledge seemed too thoroughly ground up by the intellect for one to hope to reach it in its original purity. It was not the "thing in itself"; it was only its refraction through our atmosphere.

If now we ask why Kant did not believe that the matter of our knowledge overflows its form, this is what we find. The critique that Kant made of our knowledge of nature consisted in sorting out what our mind must be and what nature must be *if* the claims of our science are justified; but of these claims themselves Kant made no critique. I mean that he accepted without discussion the idea of a single science, capable of grasping all parts of the given with the same force and of coordinating them into a system equally solid at every point. He did not consider, in his *Critique of Pure Reason*, that science becomes less and less objective and more and more symbolic as it goes from the physical to the vital, and from the vital to the psychical. In his eyes experience does not move in two different and perhaps opposite directions, one in keeping with the direction of the intellect, the other contrary to it. For him there is only *one* experience, and the intellect covers its whole extent. This is what Kant expresses by saying that all our intuitions are sensible, or, in other words, infra-intellectual. And this is indeed what we should have to admit if our science were equally objective in all its parts. But suppose, on the contrary, that science is less and less objective, more and more symbolic, as it goes from the physical to the psychical by way of the vital. Then, since one must surely perceive a thing in [389] some fashion in order to come to symbolize it, there would be an intuition of the psychical, and more generally

of the vital, which the intellect would no doubt transpose and translate, but which would nonetheless go beyond the intellect. There would be, in other words, a supra-intellectual intuition. If this intuition exists, it is possible for the mind to take possession of itself, and no longer merely to have an external and phenomenal knowledge. More than that: if we have an intuition of this kind—I mean an ultra-intellectual one—then sensible intuition is no doubt continuous with it through certain intermediaries, as infrared is with ultraviolet. So sensible intuition itself will be raised up again. It will no longer attain merely the phantom of an ungraspable thing in itself. It is (provided certain indispensable corrections are made) into the absolute, once again, that it would lead us. As long as it was regarded as the sole matter of our science, something of the relativity that affects a scientific knowledge of mind reflected back on all science; and consequently the perception of bodies, which is the beginning of the science of bodies, itself appeared relative. Relative, then, sensible intuition seemed to be. But this is no longer so if we draw distinctions between the various sciences, and if we see in the scientific knowledge of mind (and therefore also of the vital) the more or less artificial extension of a certain way of knowing which, applied to bodies, was not symbolic at all. Let us go further: if there are thus two intuitions of different orders (the second, moreover, being obtained by reversing the direction of the first), and if it is toward the second that the intellect naturally inclines, there is no essential difference between the intellect and this intuition [390] itself. The barriers come down between the matter of sensible knowledge and its form, as they do between the "pure forms" of sensibility and the categories of the understanding. We see the matter and the form of intellectual knowledge (restricted to its proper object) engendering each other through mutual adaptation, the intellect modeling itself on corporeality and corporeality on the intellect.

But this duality of intuition Kant neither would nor could admit. To admit it, he would have had to see in duration the very stuff of reality, and consequently to distinguish between the

substantial duration of things and time scattered out in space. He would have had to see in space itself, and in the geometry immanent in it, an ideal limit in the direction of which material things develop, but in which they are not developed. Nothing could be more contrary to the letter, and perhaps also to the spirit, of the *Critique of Pure Reason*. No doubt knowledge is presented to us there as a list always open, and experience as a thrust of facts that goes on indefinitely. But, according to Kant, these facts spread out on a plane as they come; they are external to one another and external to the mind. Of a knowledge from within, which would grasp them in their very springing forth instead of taking them once they have sprung, which would thus dig beneath space and spatialized time, there is never any question. And yet it is indeed beneath this plane that our consciousness places us; there lies true duration.

In this respect too, Kant is fairly close to his predecessors. Between the timeless and time scattered into distinct moments he admits no middle ground. And since there is no intuition that carries us into the timeless, all [391] intuition thus turns out to be sensible, by definition. But between physical existence, which is scattered in space, and a timeless existence, which could only be a conceptual and logical existence like the one metaphysical dogmatism spoke of, is there not room for consciousness and for life? Yes, unquestionably. We see this as soon as we place ourselves in duration and go from there to the moments, instead of starting from the moments and linking them into duration.

AFTER KANT

Kant's successors sought a timeless intuition and kept mechanism's design, giving duration no real role.

Yet it was toward a timeless intuition that Kant's immediate successors turned in order to escape Kantian relativism. Certainly the ideas of becoming, of progress, of evolution seem to occupy a large place in their philosophy. But does duration really play a part in it? Real duration is that in which each form derives from

the previous forms while adding something to them, and is explained by them to the extent that it can be explained. But to deduce this form directly from the global Being it is supposed to manifest is to go back to Spinozism. It is, like Leibniz and Spinoza, to deny duration any effective action. Post-Kantian philosophy, however severe it may have been toward mechanistic theories, accepts from mechanism the idea of a single science, the same for every kind of reality. And it is closer to that doctrine than it imagines; for if, in considering matter, life and thought, it replaces the successive degrees of complexity that mechanism supposed with degrees of realization of an Idea or degrees of objectification of a Will, it still speaks of degrees, and these degrees are those of a scale that being would travel along in one direction only.[36] In short, it picks out in nature the same articulations that mechanism picked out; from [392] mechanism it keeps the whole design; it merely puts different colors on it. But it is the design itself, or at least half of the design, that has to be redone.

To do this, it is true, one would have to give up the method of construction, which was that of Kant's successors. One would have to appeal to experience—to a purified experience, I mean one freed, where necessary, from the frameworks that our intellect has built up as our action on things progressed. An experience of this kind is not a timeless experience. It merely seeks, beyond the spatialized time in which we think we perceive continual rearrangements among the parts, the concrete duration in which a radical recasting of the whole is ceaselessly going on. It follows the real in all its windings. It does not lead us, like the method of construction, to higher and higher generalities, stories piled one on another in a magnificent edifice. But at least it leaves no play between the explanations it suggests to us and the objects to be explained. It is the detail of the real that it claims to illuminate, and no longer only the whole.

36 The allusions are to Hegel (the self-realizing Idea) and Schopenhauer (the objectification of the Will).

SPENCER'S FALSE EVOLUTIONISM

Spencer rebuilds evolution out of fragments of the evolved, like a child assembling a puzzle.

That nineteenth-century thought called for a philosophy of this kind, free from arbitrariness and capable of descending to the detail of particular facts, is not in doubt. Unquestionably, too, it felt that this philosophy would have to take up its position in what we call concrete duration. The advent of the moral sciences, the progress of psychology, the growing importance of embryology among the biological sciences—all this was bound to suggest the idea of a reality that endures inwardly, that is duration itself. So when a thinker arose who announced a doctrine of evolution in which the progress of [393] matter toward perceptibility would be retraced together with the advance of mind toward rationality, in which the growing complexity of the correspondences between the external and the internal would be followed step by step, and in which change, finally, would become the very substance of things—toward him all eyes turned. This is the source of the powerful attraction that Spencerian evolutionism has exercised on contemporary thought. However far Spencer may seem to be from Kant, and however ignorant he may in fact have been of Kantianism, he nonetheless sensed, at his first contact with the biological sciences, in which direction philosophy could continue to advance while taking account of the Kantian critique.

But no sooner had he set out on the road than he turned off it. He had promised to retrace a genesis, and here he was doing something quite different. His doctrine did indeed bear the name of evolutionism; it claimed to travel up and down the course of universal becoming. In reality, there was no question in it either of becoming or of evolution.

We need not enter into a detailed examination of this philosophy. Let us simply say that *the usual device of Spencer's method consists in reconstructing evolution out of fragments of what has*

evolved. If I paste a picture on a card and then cut the card into pieces, I can reproduce the picture by arranging the little pieces of card correctly. And the child who works in this way with the pieces of a jigsaw puzzle, who puts together shapeless fragments of a picture and ends up with a fine colored drawing, no doubt imagines that he has *produced* drawing and color. Yet the act of drawing and painting has nothing to do with that of assembling the fragments of a picture already drawn, already painted. In the same way, by combining the simplest results of evolution with one another, you may imitate, after a fashion, its most complex [394] effects; but you will not have retraced the genesis of either, and this addition of the evolved to the evolved will not in the least resemble the movement of evolution itself.

Such, however, is Spencer's illusion. He takes reality in its present form; he breaks it up, scatters it in fragments that he throws to the wind; then he "integrates" these fragments and "dissipates their motion." Having imitated the Whole by a work of mosaic, he imagines that he has retraced its design and given its genesis.[37]

Is it a question of matter? The diffuse elements that he integrates into visible and tangible bodies look very much like the very particles of the chemical elements, which he first supposes scattered throughout space. They are, in any case, "material points," and therefore unchanging points, veritable little solids: as if solidity, being what is nearest to us and most easily handled by us, could lie at the very origin of materiality! The more physics progresses, the more it shows the impossibility of picturing the properties of the ether or of electricity, the probable basis of all bodies, on the model of the properties of the matter we perceive. But philosophy goes back even further than the ether, which is merely a schematic figure of the relations our senses grasp between phenomena. It knows well that what is visible and tangible in things represents our possible action on them. It is not by dividing the evolved that we shall reach the principle

37 Spencer, *First Principles* (1862), defines evolution as "an integration of matter and concomitant dissipation of motion."

of what evolves. It is not by recomposing the evolved with itself that we shall reproduce the evolution of which it is the end-point.

Is it a question of mind? By combining reflex with reflex, Spencer believes he generates instinct and then rational will. He does not see that the specialized [395] reflex, being a terminal point of evolution just as much as the consolidated will is, cannot be supposed at the start. That the first of the two terms reached its definitive form sooner than the other is very probable; but both are deposits of the evolutionary movement, and the evolutionary movement itself can no more be expressed as a function of the first alone than of the second alone. One would have to begin by mixing the reflex and the voluntary together. One would then have to go in search of the fluid reality that precipitates in this twofold form and that no doubt partakes of both without being either. At the lowest degree of the animal scale, in living beings that are reduced to an undifferentiated protoplasmic mass, the reaction to stimulation does not yet bring into play a definite mechanism, as in the reflex; nor does it yet have a choice among several definite mechanisms, as in the voluntary act; it is therefore neither voluntary nor reflex, and yet it heralds both. We experience in ourselves something of the true original activity when we carry out half-voluntary, half-automatic movements to escape a pressing danger; and even this is only a very imperfect imitation of the primitive procedure, for we are then dealing with a mixture of two activities already constituted, already localized in a brain and in a spinal cord, whereas the first activity is a simple thing, which diversifies itself through the very production of mechanisms like those of the spinal cord and the brain. But to all this Spencer shuts his eyes, because it is of the essence of his method to recompose the consolidated with the consolidated, instead of rediscovering the gradual work of consolidation, which is evolution itself.

[396] Is it, finally, a question of the correspondence between mind and matter? Spencer is right to define intellect by this correspondence. He is right to see in it the end-point of an evolu-

tion. But when he comes to retrace this evolution, he again integrates the evolved with the evolved, without noticing that he is thus taking useless pains: in granting himself the smallest fragment of what has now evolved, he posits the whole of what has evolved at present, and it is then in vain that he would claim to give its genesis.

For Spencer, in fact, the phenomena that succeed one another in nature project into the human mind images that represent them. To the relations between phenomena there correspond, symmetrically, relations between representations. And the most general laws of nature, in which the relations between phenomena are condensed, thus turn out to have generated the guiding principles of thought, in which the relations between representations have been integrated. Nature is thus reflected in mind. The inner structure of our thought corresponds, piece by piece, to the very framework of things. Granted; but for the human mind to be able to represent relations between phenomena, there must first be phenomena, that is, distinct facts, cut out of the continuity of becoming. And as soon as we grant ourselves this special mode of breaking up, as we perceive it today, we also grant ourselves the intellect as it is today, for it is in relation to the intellect, and to it alone, that reality breaks up in this way. Does anyone think that the mammal and the insect note the same aspects of nature, trace the same divisions in it, disjoint the whole in the same way? And yet the insect, insofar as it is intelligent, already has something of our intelligence. Each being breaks up the [397] material world along the very lines its action must follow there: it is these lines of *possible action* that, by intersecting, trace out the network of experience of which each mesh is a fact. No doubt a town is composed exclusively of houses, and the streets of the town are only the intervals between the houses: in the same way, one may say that nature contains only facts, and that, once the facts are posited, relations are simply the lines that run between the facts. But in a town it is the gradual dividing up of the land into lots that has determined at once the place of the houses, their shape, and the

direction of the streets; it is to this parceling out that we must go back in order to understand the particular mode of subdivision that makes each house be where it is and each street go where it goes. Now, Spencer's fundamental error is to grant himself experience already divided into lots, whereas the real problem is to find out how the division was made. I grant that the laws of thought are only the integration of relations between facts. But as soon as I posit the facts with the configuration they have for me today, I presuppose my faculties of perception and intellection as they are in me today, for it is they that divide the real into lots, they that cut the facts out of the whole of reality. Consequently, instead of saying that the relations between facts have generated the laws of thought, I may just as well claim that it is the form of thought that has determined the configuration of the facts perceived, and hence their relations to one another. The two ways of putting it are equally valid. At bottom they say the same thing. With the second, it is true, one gives up talking about evolution.

TRUE EVOLUTIONISM

Philosophy should follow the joint genesis of intellect and matter within real duration.

But with the first, one merely talks about it; one gives it no more thought for all that. For a true evolutionism would set out to discover by what gradually attained *modus vivendi* [398] the intellect adopted its plan of structure, and matter its mode of subdivision. This structure and this subdivision mesh with each other. They are complementary to each other. They must have progressed together. And whether we posit the present structure of mind or grant ourselves the present subdivision of matter, in either case we remain within the evolved: we are told nothing about what evolves, nothing about evolution.

Yet it is this evolution that we should have to rediscover. Already, in the domain of physics itself, the scientists who push their inquiry furthest are inclined to believe that one cannot

reason about the parts as one reasons about the whole, that the same principles do not apply at the start and at the end of a progression, and that neither creation nor annihilation, for example, is inadmissible where the constituent corpuscles of the atom are concerned. In this way they tend to place themselves in concrete duration, the only duration in which there is generation, and not merely composition of parts. It is true that the creation and annihilation they speak of concern motion or energy, and not the imponderable medium through which energy and motion are supposed to circulate. But what can remain of matter when one removes from it everything that determines it, that is, precisely, energy and motion? The philosopher must go further than the scientist. Making a clean sweep of what is only an imaginative symbol, he will see the material world dissolve into a simple flux, a continuity of flowing, a becoming. And he will thus prepare himself to rediscover real duration where it is still more useful to rediscover it, in the domain of life and consciousness. For as long as we are dealing with inert matter, we can neglect the flowing without serious error: matter, as we have [399] said, is weighted with geometry, and it endures—this reality that *descends*—only through its bond with what *ascends*. But life and consciousness are this very ascent. Once we have grasped them in their essence by adopting their movement, we understand how the rest of reality derives from them. Evolution appears, and, within this evolution, the progressive determination of materiality and intellectuality through the gradual consolidation of the one and the other. But then it is into the evolutionary movement that we insert ourselves, in order to follow it right up to its present results, instead of artificially recomposing these results out of fragments of themselves. Such, it seems to us, is the proper function of philosophy. So understood, philosophy is not only the return of mind to itself, the coincidence of human consciousness with the living principle from which it emanates, a making contact with the creative effort. It is the deepening of becoming in general, true evolutionism, and consequently the true continuation

of science—provided we understand by this last word a body of truths established by observation or demonstration, and not a certain new scholasticism that grew up during the second half of the nineteenth century around the physics of Galileo, as the old one grew up around Aristotle.