In 1898 the editors of *Mind* (the English philosophical quarterly) asked Hugh MacColl to review *A Treatise on Universal Algebra*. It was Whitehead's first book. (Bertrand Russell, eleven years his junior, had already produced two.) No articles had prepared a way for it: here, suddenly, was a book of five hundred and eighty-six pages, quarto. As for MacColl, he was an esteemed logician. For twenty years he had been putting out papers on symbolic logic; independently of Peirce and even of Boole, he had invented a calculus of propositions similar to Peirce's; and he was shortly to produce another algebra of logic distinguished by the general features of C. I. Lewis' system of "strict implication." Surely, he was the man to review a treatise on universal algebra.

MacColl wrote the review. It opens with a statement which
is often a routine one:

In consenting to review this important volume for the readers of Mind I fear that I have undertaken a task for which I am but indifferently qualified.

After some explanations, he considers the progress of Whitehead's book.

His opening chapter, "On the Nature of a Calculus," is very interesting, and may be understood by anyone of ordinary education and intelligence.

To be sure,

If the reader knows something of common algebra he will grasp the author's meaning more easily; but, for much of this chapter, even this modicum of preliminary knowledge is not absolutely indispensable.

When, however, we enter upon the second chapter, which treats of Manifolds, we find ourselves on very different territory. A reader previously unacquainted with the subject cannot read this straight through, as he would a novel or a paragraph in a newspaper; he will have to make frequent halts, and sometimes very long halts, in order to reflect.

The next sentence falls inevitably in place.

This is not altogether the author's fault.

He was grappling with a subject at once formidable and elusive:

The truth is that the subject of manifolds is extremely difficult to understand, and still more difficult to explain. The meaning of the word manifold, as defined by its inventor, Riemann, is so very general, not to say vague and attenuated, that it may be called the ether of mathematical conceptions.

But could we not have been let off a little easier?

Mr. Whitehead might, I think, with advantage have restricted his discussion to the general characteristics of the manifolds
which enter into his compared algebras, and he should have illustrated these more copiously with simple and concrete examples.

Nevertheless, the task which the author set himself,

I consider him to have accomplished with rare ability.

To this conclusion a qualification is attached, namely: “judging of the whole from my knowledge of a part.” For, of course, MacColl had been able to read but one fifth of the *Universal Algebra*. He had not anticipated a large mathematical treatise, but a manageable book on the general principles of symbolic reasoning, “with occasional appeals to mathematics and geometrical diagrams by way of illustrations.”

How many later voices do we hear in this first of Whitehead reviews! Voices of other logicians, of professional philosophers, professional mathematicians, professional physicists, professional historians; of teachers of philosophy, literary critics, gentlemen and scholars: their surprise, their bewilderment, their irritation, their admission of partial incompetence, and their admiration—all are here.

Alfred North Whitehead was a mathematician during most of his professional life; it was not until he was in his sixties that he undertook to write “philosophy,” and became known almost overnight as the leading original thinker in metaphysics. He was then teaching at Harvard, and I remember how he used to walk through the Yard: a little apple-cheeked man, his shoulders much bent, an umbrella often held across his back; his head down, but his clear blue eyes up. I cannot describe his face or recall any printed photograph or sketch that does justice to it. I can only confirm what Edmund Wilson wrote when he introduced Whitehead (as “Professor Grosbeake”) into his early novel, *I Thought of Daisy*: that when you looked at him you felt that you were seeing a real face, in comparison with which others looked like mere masks. The general impression given by Whitehead’s presence, I should say, was one of kindness, wisdom, and a perfectly
disciplined vigor. Both his conversation and his writings showed a wonderful combination of urbanity and zest, rather like the tone of Plato's dialogues. (Whitehead wrote nothing in dialogue form. The insuperable task of showing his conversation to readers who never met him was attempted, and done about as well as is humanly possible, by Lucien Price in *Dialogues of Alfred North Whitehead.* He loved to follow the minds of young people, and when you came to him to talk about his philosophy, the meeting always began with the eager question, “Tell me what you’ve been doing.”

He was born February 15, 1861, at Ramsgate, a village in the Isle of Thanet on the east coast of Kent. The Whiteheads were schoolmasters and Anglican clergymen; as a boy Alfred often accompanied his father (Vicar of St. Peter’s Parish) on visits to the parochial schools which the father headed. At fourteen he went to Sherborne in Dorsetshire, one of England’s oldest schools, and received a perfect “classical” education. Then came Trinity College, Cambridge—Isaac Newton’s college. There Whitehead took courses in mathematics only. He stayed on to become a Fellow of Trinity and to teach mathematics for a quarter of a century. This was followed by thirteen years in the same field at the University of London. Finally came thirteen years at Harvard. After his retirement in 1937 he continued to serve his adopted university as a Senior Fellow. He died in his small apartment near the Harvard Yard on December 30, 1947. It sounds a most unexciting life, so unexciting as to rouse a suspicion that the emphasis on *adventure* in his philosophy must have been a professor’s compensatory gesture.

The adventure was real. In 1910 Whitehead’s reputation was considerable; he had been for seven years a Fellow of the Royal Society, and the first two volumes of *Principia Mathematica* by Whitehead and Russell were in the press. A great intellectual adventure was drawing to a close. Yet Whitehead, feeling a need for a new environment with fresh perspectives, moved from Cambridge to London—without securing a position there, or getting an academic appointment until a year
later. London was a different world, where he was in the thick of "the problem of higher education in a modern industrial civilization." His interest in this problem drew him into administrative connections with several technical schools as well as into positions of high responsibility at the University of London, where he became Dean of the Faculty of Science. (Some day, I hope, a historian of education will try to estimate Whitehead's effect on the development of that institution after its remodeling by Lord Haldane.) When the time for his retirement approached, he moved across the Atlantic to enter a third world.

If the bare facts about the formal education he received and the subjects he taught in England suggest extreme narrowness and removal from real life, that appearance is wholly illusory. The classical training at Sherborne was in truth highly relevant to the future lives of English boys of the Victorian period. At Cambridge the students covered everything in their reading and conversation—religion, history, poetry, philosophy, politics—and they did this well. (This doubtless reflects in part the fact that they came from the upper middle class which at that time was practically the sole governing class in England; but it also exhibits the absurdity of the assumption, habitually made by twentieth-century Americans, that to discuss anything you must first take a course in it.) Alfred North Whitehead belonged to a famous discussion club at Cambridge, "The Apostles." F. D. Maurice and others had founded it in the 1820s; Tennyson was an early member. When Whitehead was an undergraduate he seems to have been the only mathematician in the group, perhaps because he was the only mathematician interested in general ideas. Throughout his life he kept up the habit of this kind of conversation, receiving and giving facts and ideas with all kinds of people: a Lord Chancellor of England, and

\[\text{LLP-W p. 12; in ESP p. 12. The phrase is from Whitehead's brief "Autobiographical Notes." My account of Whitehead's life is based upon those Notes, unless other sources are mentioned.}

\[\text{Lucien Price, reporting Whitehead's reminiscences, in Dialogues of Alfred North Whitehead (Boston, 1954), Dialogue XL.}\]
the Boston reporter who wrote *Ward Eight*; a geneticist, and a
translator of Cicero’s letters; a physiologist, and a great
French historian of early nineteenth-century England; Felix
Frankfurter, and the medievalist Henry Osborn Taylor; and
nonprofessional people. If anyone supposes that during White­
head’s long collaboration with Bertrand Russell logic and
mathematics monopolized the conversation, Russell will correct
him. They “talked about everything under the sun.”

I do not mean to give the impression that Whitehead
habitually learned from conversation *rather* than from reading.
Russell’s biographer, Alan Wood, wrote, “Russell probably
read more widely than any other contemporary philosopher,
with the possible exception of Whitehead.” Russell himself
has told how Whitehead’s knowledge of history used to amaze
him. “Whatever historical subjects came up he could always
supply some illuminating fact, such, for example, as . . . the
relation of the Hussite heresy to the Bohemian silver
mines. No one ever mentioned this to me again until a few years
ago, when I was sent a learned monograph on the subject.”

It seems to me highly probable, though I do not know it
for a fact, that Whitehead very early developed a lifelong
habit of responding to everything he read with some specific
reflection on its general—which is to say, its philosophic­
significance. However, one more thing is needed as prepara­
tion for the writing of a philosophy: firsthand experience of
life—what some would call an “existential” participation
in it, of the sort that George Santayana lacked. Whitehead
was always alive, not aloof. He never stood for parliament,
and he loathed publicity. But he did a good deal of political

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8 Letter from Lord Russell to the present author, September 26, 1959.
In granting permission to quote, Russell added that this statement “is
unduly limited, since we also talked about extra-galactic nebulae” (letter
of July 12, 1960).

6 Wood in: Bertrand Russell, *My Philosophical Development* (London,


8 Lucien Price reports Whitehead as saying (August 30, 1941), “As a
matter of fact, I have not read” “a great quantity of books; but I think
about what I read, and it sticks” (op. cit., Dialogue XXII).
speaking in his Cambridge years. "Rotten eggs and oranges were effective party weapons, and I have often been covered with them." 9

Stability, which is as important as adventure for new achievements of thought, showed itself in Whitehead's long-term academic positions, in his constant devotion to his students, and in his family life. (He insisted that his wife had a fundamental effect upon his outlook on the world, especially on that part of it which had to do with the importance of beauty, moral and aesthetic. 10) And there was tragedy. A whole generation of his English pupils was nearly wiped out in the First World War; his younger son Eric, an aviator, was killed at nineteen.

At present, published knowledge of Whitehead's life is slight. I cannot conceive, however, that any account will ever convey so much so briefly and vividly as do his own descriptions of his English environment and education. These are to be found in the "Autobiographical Notes" and in the articles, "The Education of an Englishman," "England and the Narrow Seas," and "Memories." 11 To supplement the "Autobiographical Notes," there is the admirable Prologue in Lucien Price's book. And do not miss the chapter on Whitehead in Bertrand Russell's Portraits from Memory (1956).

II

As a mathematician, Whitehead had not been trying to make direct additions to the superstructure of this science so much as to construct new foundations for its advance, by finding ideas broad enough to include as special cases the concepts of arithmetic, geometry, and mechanics which had

10 LLP-W p. 8; in ESP p. 8.
11 See n. 3, above. The articles were published in the Atlantic Monthly, August, 1926, June, 1927, June, 1936, and reprinted in ESP and AESP.
been considered irreducibly basic. When he brought out the *Universal Algebra* he wrote in the Preface that his object was not completeness in details, but unity of idea. Soon thereafter he joined forces with his most brilliant pupil, Russell, to produce, after a decade of work, the tremendous three-volume *Principia Mathematica*. This, published in 1910-1913, is always called “epoch-making,” because the authors enlarged the very meaning of mathematics, and did so not by one more discussion of it but by chains of demonstrations, expressed in precise symbols. The whole familiar apparatus of special indefinable mathematical concepts and premises concerning numbers and quantities was done away with; these were instead deduced from a general theory of logical classes and relations, itself ultimately derived from a few axioms concerning logical relations between propositions. An exact formulation was given to deductive logic, and pure mathematics exhibited as an extension of it. This grand unification of two sciences was incomplete; Whitehead never finished the fourth volume, on geometry, which he alone was to write. Also, the treatment of the logical foundations of arithmetic was complicated by the need to introduce certain dubitable hypotheses. Experts have since devoted much ingenuity to their improvement or elimination, with but partial success; and in 1931 Kurt Gödel proved that no set of axioms can embrace the whole of arithmetic. Still, *Principia Mathematica* is universally, and rightly, admired. Concerning the science of logic, it is not too much to say that Whitehead and Russell made the greatest single contribution to it in the more than two thousand years since Aristotle.

Shortly before this work was done, the principles of physics had become disorganized. Two centuries of repeated success in predicting natural phenomena justified the assurance of educated men that the Newtonian framework was—in Whitehead’s words, as reported in Lucien Price’s Prologue—“fixed as the Everlasting Seat.” The few recently discovered phenomena which, late in the nineteenth century, had still to be fitted in, never were fitted into the framework. It broke
down completely. This is something that Whitehead, who as a young man shared that assurance, never forgot. Men of lesser wisdom assumed that certainty lay elsewhere, or just around the corner. Whitehead reflected that all of our best generalizations are subject to qualifications of which we are ignorant, and that a continuing approximation to truth is the most that can be expected of our finite intellects.

In a memoir published in 1906 he had used the symbolism of *Principia* to restate the Newtonian theory of the basic relations between space, time, and matter, and to propose alternative theories; but his point of view then was purely mathematical or logical. With the collapse of the Newtonian scheme it became evident that the pressing question for physics was: Precisely what new conceptual frame can best explain the experimental facts? Whitehead studied Einstein's great contribution, and concluded that it was a brilliant mathematical theory erected upon basic empirical meanings that were too narrowly restricted to laboratory operations plus conventional stipulations. His own adventure, in the latter half of his stay in London, was the ambitious one of replacing the Newtonian concepts with new ones which would both express the general character (basic for all natural sciences alike) of our experience of space, time, and matter, and accommodate results of the most delicate astronomical and physical observations. In three books, published in 1919, 1920, and 1922, he expounded these concepts and offered his reinterpretation of physical relativity, with new formulas for the laws of motion, gravitation, and electromagnetism. Although the great majority of mathematical physicists by-passed Whitehead's work at the time, there was some renewal of interest in it in the 1950s.\(^{12}\) I do not know whether it has a future.

These three books were thus philosophical as well as mathem-

\(^{12}\) See Robert M. Palter, *Whitehead's Philosophy of Science* (Chicago, 1960), Chap. IX and Appendix IV. It might be added that J. L. Synge, after working with Whitehead's theories, returned to Einstein's; this appears from the fact that he subsequently devoted a book to Einstein's special theory and another to his general theory.
matical, though the philosophy was limited to what natural science required by way of general empirical foundation. Still, the known facts of the extraordinary breadth of their author’s intellectual interests, and of his familiarity with Plato and Hume and Kant, made it appropriate that he, who had never heard a lecture in philosophy, should be invited to come to Harvard as a professor in that department. Throughout his forty years as a mathematician, in his conversations and reflections he had been touching on the various conditions involved in human existence. The exchange of a mathematical for a philosophical professorship was Whitehead’s opportunity to formulate the results and devise a new world view: to transfer his habitual pursuit of maximum generality to the widest field there is.

In the Lowell Lectures which he gave within a few months of his arrival—they were expanded and published in 1925 as Science and the Modern World—Whitehead showed why it was important for all of us that the criticism and replacement of the Newtonian concepts should be carried beyond the immediate concerns of physical science. Newton’s success had established the reign of what Whitehead called “scientific materialism”—the mechanistic view of nature which resulted from the work of the great seventeenth-century scientists. Dualism was its immediate result: the material world fitted this scheme of ideas, values were outside it. But as the application of the scheme increased, scientific materialism became a dominant force affecting morals, politics, poetry, the entire civilization of the occident. Whitehead sketched its career as the exciting story of an idea that mankind had got hold of and “could neither live with nor live without.” Idealistic philosophers did not dethrone it; like the orthodox theologians, they assumed that this was the final scientific truth about nature, and then strove to mitigate it by arguing that nature presupposed something beyond nature. That did not hinder materialism, backed by the power and prestige of science, from controlling human affairs; while philosophy, like religion, became merely consoling. In the twentieth century,
however, scientific materialism broke up from the inside: “What is the sense of talking about a mechanical explanation when you do not know what you mean by mechanics?” wrote Whitehead. “The only way of mitigating mechanism is by the discovery that it is not mechanism” (SMW pp. 23, 107). The discovery appeared imminent. Could not the dualism be overcome at last by some new conception of the nature of things, which would express the aesthetic and purposive character of immediate experience at the same time that it provided a more adequate frame of reference, basically neither mechanistic nor materialistic, for natural science?

In the mid-twenties there was a fair expectation among educated, thoughtful Americans that this could be accomplished by a philosophical scientist of sufficient genius. So when Whitehead in Science and the Modern World combined a stunning historical criticism of scientific materialism with a sketch of such a new conception, the book was immediately hailed (by John Dewey among others), despite the fact that the sketch, like all of Whitehead’s first expositions of new ideas, was often perplexing. But the full statement which appeared four years later in Process and Reality: An Essay in Cosmology, was too intricate and many-faceted to be popular. Furthermore, the doctrine was becoming increasingly prevalent that the gap between matter and value can be bridged without cosmology by fearlessly applying the scientist’s experimental method of thinking to questions about values. While he was alive, Whitehead’s influence among Americans was by no means as great as Dewey’s. (This is now changing, but it would be foolish to expect a reversal in the foreseeable future.) In England, habits of philosophical discussion were such that almost no one was at home to receive Whitehead’s metaphysics. (New hosts have lately appeared, but they are still few.) In continental Europe and Latin America phenomenology, dialectical materialism and positivism all easily outdrew Whitehead—less because of their actual merits than by their dogmatic claims to be strictly scientific. Then came existentialism, with an opposite sort of appeal. But the
translations of many of Whitehead's philosophical books into Spanish, Italian, French, German, Korean, and Dutch are evidence of his growing influence abroad.13

Although *Science and the Modern World* was Whitehead's most influential exposition of his philosophy, *Process and Reality*, for technical reasons, is the indispensable one. He completed a kind of trilogy with the publication early in 1933 of another stout volume, *Adventures of Ideas*. There he discussed so many sides of human experience that, as with Plato's *Republic*, it is not easy to specify the subject of the book as a whole. I should say that the chief of its many topics is the sort of history which general ideas about the human race and about the universe have had and can have in Western civilization. A restatement of the main thought of *Process and Reality* provides a basis for the unforgettable conclusion of *Adventures* in a brief but profound analysis of the qualities which are essential to civilized life: truth, beauty, art, adventure, and peace—the peace of the soul.

Whitehead's next book, his last, was *Modes of Thought* (1938).14 Here he set aside his technical definitions, and wrote "the first chapter in philosophic approach"—"a free examination of some ultimate notions, as they occur naturally in daily life" (*MT* I, 1). This is what he usually did in his regular lectures at Harvard. Much of the book has an extraordinary valedictory beauty. Whitehead sometimes said that it was his own favorite, though at other times he preferred *Adventures of Ideas* or *Science and the Modern World*. Undoubtedly, the layman's best choice is either *Adventures* or *Modes of Thought*. One may, if he chooses, make a beginning with Whitehead by observing the character of his philosophic

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13 George L. Kline has compiled a list of translations and a bibliography of writings about Whitehead in languages other than English, through 1961. It will be found in a collection of essays in honor of Charles Hartshorne being edited by William L. Reese and Eugene Freeman, and scheduled for publication at La Salle, Ill., in 1963.

14 *Essays in Science and Philosophy*, published just before his death, is a collection of papers that first appeared in print between 1910 and 1941.
thought within a limited field, as this appeared in the wonderful *Aims of Education*, or in any of his three short books, *Religion in the Making*, *Symbolism: Its Meaning and Effect*, and *The Function of Reason*.

III

"Philosophy" is a word that we use a good deal; but the philosophies we talk about are fragmentary creations limited by the word of. We have our favorite philosophies of education, of government, of this, of that; but the wide integrating system which shall embrace the whole show is not in the habit of our thinkers. Whitehead stands out because he was up to doing the big job. The method and temper for which it calls are perfectly indicated in a fine passage from the Preface to *Process and Reality*.

In putting out these results, four strong impressions dominate my mind: First, that the movement of historical, and philosophical, criticism of detached questions, which on the whole has dominated the last two centuries, has done its work, and requires to be supplemented by a more sustained effort of constructive thought. Secondly, that the true method of philosophical construction is to frame a scheme of ideas, the best that one can, and unflinchingly to explore the interpretation of experience in terms of that scheme. Thirdly, that all constructive thought, on the various special topics of scientific interest, is dominated by some such scheme, unacknowledged, but no less influential in guiding the imagination. The importance of philosophy lies in its sustained effort to make such schemes explicit, and thereby capable of criticism and improvement.

There remains the final reflection, how shallow, puny, and imperfect are efforts to sound the depths in the nature of things. In philosophical discussion, the merest hint of dogmatic certainty as to finality of statement is an exhibition of folly.
The main reason why it is hard to understand Whitehead is that we naturally suppose we already have in our conscious possession all the fundamental ideas which are applicable to human experience, and the right words to express them. That is what he called The Fallacy of the Perfect Dictionary. The usages of language enshrine our old patterns of thought, so that language has to be given a novel twist if a new idea is to be accurately expressed. A genuinely new philosophy is the hardest thing in the world to read. Complaints against Whitehead on this score have been legion. He has become one of the most quoted and least accepted of twentieth-century thinkers.

His work is exciting because of the way in which he depicts reality; and because he depicts reality, not man alone. In this philosophy, the basic fact is everywhere some process of self-realization, which grows out of previous processes and itself adds a new pulse of individuality and a new value to the world. Nothing that exists is completely passive and inert. But Whitehead does not suppose that this is because everything is its own antithesis as well as itself. Nor is he playing the older, less dramatic game of pushing "matter" out of the way in order to give the prime place to eternal spirit. Like Dewey, George Boas, and all who are rightly called temporalists, he rejects the traditional doctrine which contemplates a being at once infinite and changeless as the sole repository of reality and value. Reality and value lie only in emergent pulsations of individuality.

But can you construct a system of the world on this basis? The amazing thing is that in *Process and Reality* Whitehead did just that.

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15 MT Epilogue. The name and the idea will recur in later chapters of the present volume.
In Chapter 2 the structure of the system will be shown. At this point an introductory view of Whitehead's metaphysics is in order.

Our first step, which was also his, is to give up completely the habit of picturing the material world as composed of enduring elements moving about in an otherwise empty space. Long before they split the atom, physicists had substituted vibratory entities for Newtonian corpuscles, and fields (electromagnetic and gravitational) for apparently empty space. Let us then think of the material world as basically not a shifting configuration of substantial things, but a nexus of events, or processes. We are to think of the existence of a mountain as a long process, and the existence of an individual atom in the mountain as a connected series of vibratory processes. And whether we notice much or little change, the present event is displaced by others. As Whitehead wrote in the first chapter of his book of 1919, the fundamental characteristic of nature is this "passage," or "creative advance." These words underscore the force of that rather colorless one, "process."

We used to picture a bit of matter as a certain mass which at any given instant was just where it was and nowhere else; now we realize that we cannot ascribe the existence of an atom to any shorter event than the period of its vibration, and that this vibration, though it has a central region, agitates all of space-time. And of course "mass" no longer means "permanent quantity of matter." As Whitehead says, it is "the name for a quantity of energy considered in relation to some of its dynamical effects"; and energy "is merely the name for the quantitative aspect of a structure of happenings." When a particular structure persists throughout a connected series of events, we speak of an enduring material "thing"; when the pattern of activity changes drastically we say, there's an end of that thing. The property of permanence, relative permanence that is, evidently belongs to the form of process;
and it is by this form, within the larger patterns of its environment, that we distinguish one atom from another, and both from a mountain or a frog. Through the ages new types of pattern evolve, and in Whitehead’s broad view there is none that may not be replaced by some other in the endless history of the universe.\textsuperscript{16}

As long as we thought in terms of things, it was natural to look upon the things that were substantial as those that were themselves under all circumstances. In the Newtonian physics a massy particle had its location altered by the other particles in the universe, but not its essential nature. In the popular mind, Daddy Warbucks was\textsuperscript{17} a real man because he was self-sufficient and unchanging. Many philosophers have produced definitions of Reality which glorify such independent existence. Language, with its separate words for separate things, strengthens this habit of thought. But the attitude becomes difficult once we shift our basic concept from things to process. Historical context is now emphasized; the primary constituents of every event are the threads which come to it from earlier events, and live anew in it.

As everyone knows, the process of nature, carefully examined, is not sheer continuity. It is individualized into natural units of process, each arising from established conditions as a determinate synthesis of available energies. As the world-process moves on to its next creation, that pulsation lapses, becomes mere material for the building of the future. Its sources and effects spread out to infinity; in its moment of life the event is a strictly limited individual fact.

If, with Whitehead, you turn from the physical world to consider the way in which your own immediate experiences occur, you will notice a similar rhythm of wide public origin, concentrated individuality, and spreading public effect. Your experience now, though you may not consciously separate it from those that immediately precede and follow, still has a unity of its own. In its short life—what psychologists call

\textsuperscript{16} Further, see Chap. 2, below, p. 12 and pp. 42–55, \textit{passim}.

\textsuperscript{17} Hopefully, I use the past tense here also.
“the specious present”—it arises as an integration of nerve impulses, and of conscious and subconscious emotions and attitudes. All these factors have a vector character; that is, intensity and forward direction. They derived their substance from innumerable earlier processes inside and outside of your body—both “physical” ones and “mental” ones (e.g., intentions). Your present experience, as a whole, is another process—a synthesizing process of feeling this wide environment, that is, of bringing its factors to a new head, self-enclosed and privately enjoyed. Its formation completed, this “drop of experience”—William James’s phrase, adopted by Whitehead—becomes a fact of history, part of the unalterable context of your future existence and your neighbor’s; in short, a cause with observable effects. The end of its life is the beginning of its career. That is how we experience the irreversibility of time.

If these appear obvious generalities, so much the better. Philosophers have no private information here. Their business, if they would think concretely, is to describe the common texture of these drops of experience, which are the immediate realities of our life. This texture we all enjoy, but do not think about because it is always right under our noses. So its true description, once achieved, is bound to appear obvious. The general account is what is so hard to draw up. There is a constant temptation to take a part for the whole: your sharp consciousness of sensations and images, if you are introspective or literary; a succession of causal reactions, if you run to behavior-science.

If you think of the drop of water at the faucet as wholly formed by external forces, then “pulse of experience” is a better metaphor for you. Experiencing is an active process. Whitehead is very insistent on this point. It is not only men of genius who entertain new possibilities in their consciousness and do new deeds. A capacity for the spontaneous introduction of something not present in the environment is part of the structure of every experience. Otherwise the present would be only the sum of what was given it by the past, and any
item, taken by itself, a mere re-enactment. Even when you are consciously entertaining no new idea and the environment seems to be supplying all the material for your experience, the question of exactly how this material, donated by the past, shall be absorbed and felt, what shall be neglected and what emphasized, is finally decided only by that nascent moment of existence. That unity of feeling never existed before. A pulse of existence does, in miniature, what a human being normally accomplishes in the course of his life: the world gives him his material, his many alternative potentialities, and of these he fashions his personality, which embodies the perspective and the feeling with which he now takes in the world. So does each pulse of experience create its own final unity, complete its own perspective of the world. It brings into being a slightly, sometimes substantially, novel pattern of integrated feeling.

This is an aesthetic achievement. “The mutual adaptation of the several factors in an occasion of experience” is beauty, in a primary sense of the word. In that sense, beauty is the unconscious aim of each moment of our existence—beauty of some sort, that is, for there are many modes of beauty, not mutually consistent. The intrinsic value of each pulse of experience is a function of its inclusions; of the exclusions which are equally essential to achievement; of the internal qualitative contrasts, complexity, intensity, and breadth of the pattern of feeling. This is Whitehead’s account of the essential value of sheer existence. Our discussions of human life are often based on the premise that “existence is good”; but we are so concerned with the fluctuations of fortune that we forget the perpetual aesthetic creation of each moment.

Finally, since, within limits imposed by the environment, every experience is self-creative, it is indirectly creative of the future. Directly, too, for every moment includes some anticipatory forward thrust, or purpose.
V

At this point our story is in danger of being permanently divided into a story of purposive, creative activity applicable to human experience but not to nature, and a story of external compulsions applicable to the things of nature but not completely to human experience. This separation has been the headache of philosophers for more than three centuries. If purposive activity does not occur in nonhuman nature, then a pragmatist does not solve the problem by defining the science of nature as an instrument for effecting human purposes. He produces another man-glorying dualism.

The older dualism, following the lead of Immanuel Kant, held that to the scientist every event, inanimate or human, is bound to appear mechanically caused in its entirety; yet the moralist is bound to think of right and wrong as freely done; and the two beliefs do not really conflict, they are merely asserted from different points of view. We have all heard the problem of science versus religion solved in a similar way. Whitehead believed that this is a bogus solution. Our life is one life; you cannot parcel it out to thinkers sworn not to interfere with each other. Causality and freedom, like all fundamental contrasts, are in existence itself. You cannot reconcile them by distinguishing points of view, but only by finding a way to think them together.

This particular contrast is but one feature of the gap between inanimate nature and human experience. That is the gap the philosopher must bridge, and Whitehead faced up to the fact that this requires general concepts which apply to both extremes. The physicist's concepts of physical existence won't do the job, because they omit altogether the existence of experiences. On the other hand it would be fantastic to generalize, as metaphysicians so often have, from what is peculiar to man or only fitfully exhibited by him—from such traits as his consciousness, sense-perception, or thought. But every quantic event in the universe may at least be thought
of as in itself a pulse of experience of a primitive sort, an individual feeling of and reaction to its environment; and this is Whitehead's bold hypothesis: here is his "pluralistic universe."  

Each of these pulses of experience occurs as an atom of process, integrative or convergent in shape. Causation, then, is the principle of transition from atoms of process achieved to an atom of process beginning, on which they impose their individual characters, just as your experiences of a second ago automatically become part of your present existence. And the internal principle, consciously or (in the great majority of cases) unconsciously operating in each atom of process, is its individual measure—slight or considerable—of self-creation, by which the process concludes in one way rather than another, and feels itself a new member of the universe. Causation means conditions, conditions imposed by the environment; but conditions do not unify themselves into a novel individual. Without the internal principle of self-creation, there would be no individual pulses of existence and no individual responsibility in our lives, but only a continuous flow of energy. There is no creation without creators, and every new actuality is here and now in some degree creative.

Whitehead did not put out a bare hypothesis, but a developed theory, the first of its kind. Into it he fitted the general ideas of physics: space-time, motion, causality, quantization, vibration, matter, energy flow, and energy transformation. His familiarity with natural science enabled him to follow the contours of nature, and to suggest how, within the framework of his hypothesis, we may distinguish molecules, stones, single living cells, trees, animals, and persons as different organizations—"societies," he calls them—of primitive or complex drops of experience. A considerable application of Whitehead's principles to biological theory may be found in "

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18 William James wrote a book with this phrase for its title, but he never said what the universe was a plurality of. The published and unpublished writings of his last five years, however, contain indications that he would have accepted Whitehead's hypothesis; see Chap. 9, n. 61, and Chap. 12, n. 11, below.
Contribution to the Theory of the Living Organism, by the Australian zoologist W. E. Agar. Among inanimate things the autonomous energy which, on Whitehead’s view, belongs in principle to every natural pulsation, generally conforms to established patterns (as many autonomies in human affairs do). For the science which is tracing a transmission of energy up to an observer in a laboratory, such autonomous energy is negligible, and an atom’s experience is nothing. However, once we recognize that the entities which are the subjects of physical theory are abstractions—and this cannot credibly be denied—then if we wish a general theory of existence we must consider what the more complete things are, from which our observations and our special sciences make their abstractions. Whitehead has offered an answer. It does not, I believe, contradict any confirmed result of science. There is an addition to what science says.

Without this addition, we slip back to a dualistic universe, and man himself becomes divided. With it, a unity of interpretation comes in at the ground floor. In other words, man’s union with organic nature is not just a scientific fact the reality of which no one could have felt before Darwin wrote; it is the basic fact of our existence, and it is perpetually evidenced by the feeling—“vague but insistent,” as Whitehead liked to say—that our experience derives from a natural world of “throbbing actualities” whose reality is of the same sort as our own. (We do not usually extend this feeling to such things as stones, but then a stone is not a true individual. The passive uniformity of its behavior, which is all that our eyes can perceive, is the result of an averaging-out process which masks the incessant activities of the individual atoms.)

Our reluctance to admit that any beings lower in nature’s scale than our animal pets may have experiences is not entirely due to unimaginativeness. Our elemental feeling of the living universe “begetting us” becomes submerged as the autonomous part of each pulse of our experience rises to dominance: that pulse feels the creativeness of nature here and now as its

19 See Chap. 3, n. 48, below.
own possession, and the wide universe comes to appear as a collection of things laid out in its immediate neighborhood for it to act upon. In the language of the existentialists, it calls itself "spirit," everything else "thing" or "object." This division is a real phenomenon of human consciousness, and it may take on a myriad fascinating forms. Fasten upon them, dismiss the universe, and you are ready to embrace some kind of existentialism.

Whitehead’s philosophy has never enjoyed the popularity which rewards narrowness. A new philosophy which is broad enough to reflect many facets of existence will have many enemies. How many people will go into a rage when they read of elemental feelings, "vague but insistent"! They cannot believe that what is clear in consciousness might be superficial in our existence, that what they are reading is anything but another mystical irrationalism designed to justify brutalities in action. And the scientist may jump to the conclusion that Whitehead’s cosmology is an attempt to dictate principles to him. But that is today the special privilege of dialectical materialism; Whitehead did not desire it. Natural science remains, in his view, the systematic study of the causal connections between events. But Whitehead has made it possible for thinking man once more to enjoy his organic relationship with nature: to be a Wordsworthian—Wordsworth probably influenced Whitehead as much as any philosopher did, Plato excepted—or to respond to D. H. Lawrence’s feeling for nature, without having to swallow Lawrence’s antiscientific extravagances. Whitehead’s offering is a frame of reference in which there is ample room for science, for poetry, and—as we must next observe—for religion.

VI

Our beliefs that individuality, interdependence, and growth are fundamental ideas find a reconciliation in Whitehead’s metaphysics. The members of his pluralistic universe are
organically connected by the fact that each is a growing together, a "concrescence," of components of earlier members into a new unity of existence. In *Process and Reality* Whitehead proposed general principles governing concrescence and a theory of the stages into which each one is analyzable. It is easy to put a halo on "growth," but this philosophy is a universal *theory* of growth-quantas as the cells in the process of the universe. We find this amazing because we are used to the timid assumption that only mechanical movement and causal connections can be analyzed.

Whitehead makes his principles of growth and of dependent individuality perfectly universal. His system includes a concept of God; but even God is dependent on the individual processes of the world for the perpetual completion of his being. He is not self-sufficient, and they are as real as he. Nor is God omnipotent. Whitehead was convinced that the finer religious insight sees the divine agency in the universe as persuasive, not coercive; persuading by the attraction of the ideals, the new possibilities of value, which it offers to the finite individuals of the world as each of them, rising into being, makes the final determination of its character, and so of what it offers to the future. In this way God, and the environment consisting of the totality of already completed finite processes, together make up the infinite background from which a new event emerges.

Upon its completion, this event becomes part of God's experience, thus acquiring a further unity with all the others that have ever been. They are now all included in an infinitely wide harmony of feeling which grows without fading. This doctrine reflects Whitehead's acceptance of a purified religious intuition of a kingdom of heaven. Those who embrace atheism or agnosticism may still agree with the estimate that this philosophical system incorporates the conviction that God is love better than any other has.  

20 Personal experience of tragedy—

something which threatens all loving souls—lies in the background of Whitehead’s metaphysics. He speaks profoundly to religious men in this destructive century. In particular: he speaks from a fine imaginative understanding of human existence, not from anxiety about it.

For Whitehead, the temporal world itself involves more than process. While “the flux of things is one ultimate generalization around which we must weave our philosophical system,” he also believes that “the alternative metaphysical doctrine, of reality devoid of process, would never have held the belief of great men, unless it expressed some fundamental aspect of our experience” (PR II x i; MT v 8). Whitehead fashions his adjustment of this antithesis by interpreting the creativeness of individual processes as a desire to embody ideal patterns which are ordered in God’s experience, and which as patterns do not change. Thus “the things which are temporal arise by their participation in the things which are eternal” (PR II i i). Without the latter, Whitehead thinks, definiteness and novelty in the temporal world would be inconceivable.

The contrasts with existentialism, and with nonmetaphysical philosophies of process (like John Dewey’s) are obvious. The most gifted systematic philosopher of our century was by second nature a Platonist—not of the unimaginative kind who by God tells you what the eternal truths are, but of the kind whose outlook is widened by the thought of countless ideal patterns in the background of actual existence. If their Platonism is a mistake, it is a mistake for which their own humility is half responsible. They cannot give themselves the whole credit for their creativeness; they say that they have merely drawn on a boundless realm of ideality, merely realized a value.

Whitehead’s Platonism did not lessen, it enhanced, his keen appreciation of change, of novelty, of the myriad qualities of transient experience. His writings are full of such phrases as “the final good of immediate joy.” And in his philosophy of education—a topic of lifelong concern, on which he wrote a fair number of articles after 1911—it was natural for him to
emphasize experimental activity and living in the present, which is "holy ground." Yet to Whitehead, "we learn by doing" was only half the truth. "Education," he said, "consists in the habitual vision of greatness." *Vision*—there you have the authentic Platonic note.

Plato was far and away Whitehead's favorite philosopher; rightly or wrongly, he believed that his own metaphysics was a systematic modern development of Plato's general point of view. But although he was convinced that the timeless Forms of Platonic philosophy are real, not invented, Whitehead refused to give them the kind of reality which Plato usually gave them—indeed, independent of and superior to changing things. Though the forms are undated, and eternally present to God's experience, they are there only as so many possibilities for realization in the flux of things—possible patterns of existence and possible ways of feeling the changing world. As we might expect, Whitehead was especially concerned that the realm of mathematical relationships should not be construed as an exception. "The modern concept of an infinite series," he noted, "is the concept of a form of transition"; he argued that the simple sentence, "twice-three is six," "considers a process and its issue." He called this, his final discussion of the subject (MT v 4, 5), "a belated reminder to Plato that his eternal mathematical forms are essentially referent to process." He concluded: "The discovery of mathematics, like all discoveries, both advanced human understanding, and also produced novel modes of error. Its error was the introduction of the doctrine of form, devoid of 'life and motion.'"

In Whitehead's philosophy, then, the temporal and the eternal are both there; neither is "illusion," but neither is sufficient unto itself. Each, to achieve full reality, needs the other. Never did a philosopher so interweave these opposites. In truth, this metaphysics generalizes perfectly, in the terms

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21 Accordingly, I shall not continue to capitalize "form."

22 Whitehead also had in mind the current expression of this error in the doctrine that mathematical propositions are tautologies, saying nothing. The phrase, "life and motion," which he cites with approval, is from Plato—Plato in another mood.
of the European philosophical tradition, the attitude of that rarest of men—he whose feet are on the ground while his eyes are turned upward.

VII

Whitehead's philosophizing was no mere intellectual game. In his view, every throb of existence has some value for itself, for others, and for the universe. Hence a morality founded on this metaphysics will enjoin respect for others—not (as in the Kantian and other idealistic philosophies) only for other men because they are men and man is unique in being more than a natural animal, but for all beings, and precisely because they are all individuals in a reconceived natural world. Whitehead's philosophy generates a moral attitude toward nature, by teaching that there is nothing in the universe that is really and completely dead, mere material, with which we may do as our whims dictate. Vegetarianism and kindness to bacteria do not follow; what follows is that all destruction requires justification. Whitehead hated violence. Yet he was not a pacifist, for he believed that no absolute rule is adequate to the conduct of life.

Whitehead also gives us basic reasons for looking upon the problem of achievement, both individual and social, as a problem in the co-ordination of living values. The human soul, like every being, is a synthesizer.

Its good resides in the realization of a strength of many feelings fortifying each other as they meet in the novel unity. Its evil lies in the clash of vivid feelings, denying to each other their proper expansion. Its triviality lies in the anesthesia by which evil is avoided. . . . Evil is the half-way house between perfection and triviality. It is the violence of strength against strength.—AI xix ii.

The problem of social life is to make possible a harmony of strong individuals. This "is the problem of the co-ordination
of [various grades of] activities, including the limits of such co-ordination” (AI iii i). Hegel and Marx were wrong; the conflict of unco-ordinated opposites is a disaster. The conditions of synthesis, in every form of existence, are aesthetic contrast rather than strife. High achievement requires a “zest” (one of Whitehead’s favorite words) for those contrasting novelties which can enrich human life. It equally requires preservation of those wider social co-ordinations on which the survival of society depends. Whitehead’s doctrine is that structures (like everything else in his world view) are interdependent; none can exist save as a part of a wider structure which sustains it. This is a general principle, on which bionomics in all its branches, as well as sociology, and all rational consideration of an individual’s possibilities, depend.

Complete preservation of established ways is never possible. Since everything, as it comes into existence, aims at a synthesis of what has been with what may be, the present alters the trend of the past—upward, or downward. The approach to sheer continuation is characteristic of sticks and stones: “The art of persistence is to be dead.” Besides, every process, individual or social, in taking on its character rejects a multitude of other characters; in realizing its ideal, it is changing within a limited range of possibilities, and when these are exhausted either staleness or transition to a new type of order, hitherto excluded, must set in. “The pure conservative is fighting against the essence of the Universe” (AI xix ii). This is not an apology for revolution. Development, not revolution, is the thing. And development has its optimum pace, which it takes statesmanship to discover.

Every new idea, in particular, is a danger to the existing order. In contrast to the compulsion which is exercised by what exists, the power of an idea is, in the first instance, persuasive. This is a special case, involving consciousness, of the functioning, in each pulse of existence, of “what may be.” Behind it is the creative purposiveness which each pulse possesses in some degree. But, says Whitehead, any impartial survey of life on earth shows us that individual purposes tend
to be anarchic. The general idea, capable of successive partial embodiments, introduces order into the persuasive element, and is the distinctively human agency in man’s checkered progress. Here is a typical paragraph from Adventures of Ideas showing Whitehead’s over-all judgment of this agency:

The history of ideas is a history of mistakes. But through all mistakes it is also the history of the gradual purification of conduct. When there is progress in the development of favourable order, we find conduct protected from relapse into brutalization by the increasing agency of ideas consciously entertained. In this way Plato is justified in his saying. The creation of the world—that is to say, the world of civilized order—is the victory of persuasion over force.—III viii.

Human experiences, however, are natural events, and their basis is emotional, not intellectual. Conscious thought, according to this philosophy, is a rare thing—the occasional flowering of experience, not its essence. Societies, too, are dominated by habitual modes of feeling, which are the basic facts for wise historians and statesmen. Whitehead had learned, as many thinkers have not, that man is only to a very slight degree a rational animal. But the possibility of rational guidance is there, and progress requires that it be exercised. Reason is no formal thing, but the occasional discipline, ardently to be desired, of life’s ubiquitous purposiveness.

Usually this discipline is confined to a pragmatic interest in the control and reconstruction of some limited aspect of the environment so as to improve life in the immediate future. So do we study forestry, electronics, bacteriology, the theory of games. This kind of intelligence begins as shrewdness in observation and manipulation, and blossoms out into a highly organized experimental method appropriate to particular interests. Yet the history of human thought and a glance at the morning paper both confirm Whitehead’s judgment:

The man with a method good for purposes of his dominant interests, is a pathological case in respect to his wider judgment on the co-ordination of this method with a more complete
experience. Priests and scientists, statesmen and men of business, philosophers and mathematicians, are all alike in this respect. . . . Some of the major disasters of mankind have been produced by the narrowness of men with a good methodology. Ulysses has no use for Plato, and the bones of his companions are strewn on many a reef and many an isle.—FR p. 8.

This is the justification of a wider type of reason, unlimited in its aim at generality—of the sort of thing that Whitehead did.