I. *The New Key*

EVERY ACE in the history of philosophy has its own preoccupation. Its problems are peculiar to it, not for obvious practical reasons—political or social—but for deeper reasons of intellectual growth. If we look back on the slow formation and accumulation of doctrines which mark that history, we may see certain *groupings* of ideas within, it, not by subject-matter, but by a subtler common factor which may be called their "technique." It is the mode of handling problems, rather than what they are about, that assigns them to an age. Their subject-matter may be fortuitous, and depend on conquests, discoveries, plagues, or governments; their treatment derives from a steadier source.

The "technique," or treatment, of a problem begins with its first expression as a question. The way a question is asked limits and disposes the ways in which any answer to it—right or wrong—may be given. If we are asked: "Who made the world?" we may answer: "God made it," "Chance made it," "Love and hate made it," or what you will. We may be right or we may be wrong. But if we reply: "Nobody made it," we will be accused of trying to be cryptic, smart, or "unsympathetic." For in this last instance, we have only seemingly given an answer; in reality we have *rejected the question.* The questioner feels called upon to repeat his problem. "Then how did the world become as it is?" If now we answer: "It has not 'become' at all," he will be really disturbed. This "answer" clearly repudiates the very framework of his thinking, the orientation of his mind, the basic assumptions he has always entertained as common-sense notions about things in general. Everything has become what it is; everything has a cause; every change must be to some end; the world is a thing, and must have been made by some agency, out of some original stuff, for some reason. These are natural ways of thinking. Such implicit "ways" are not avowed by the average man, but simply followed. He is not conscious of assuming any basic principles. They are what a German would call his "Weltanschauung," his attitude of mind, rather than specific articles of faith. They constitute his outlook; they are deeper than facts he may note or propositions he may moot.

But, though they are not stated, they find expression in the *forms of his questions.* A question is really an ambiguous

proposition; the answer is its determination.[1] There can be only a certain number of alternatives that will complete its sense. In this way the intellectual treatment of any datum, any experience, any subject, is determined by the nature of our questions, and only carried out in the answers.

In philosophy this disposition of problems is the most important thing that a school, a movement, or an age contributes. This is the "genius" of a great philosophy; in its light, systems arise and rule and die. Therefore a philosophy *is* characterized more by the *formulation* of its problems than by its solution of them. Its answers establish an edifice of facts; but its questions make the frame in which its picture of facts is plotted. They make more than the frame; they give the angle of perspective, the palette, the style in which the picture is drawn—everything except the subject. In our questions lie our *principles of analysis,* and our answers may express whatever those principles are able to yield.

There is a passage in Whitehead's *Science and the Modern World,* setting forth this predetermination of thought, which is at once its scaffolding and its limit. "When you are criticizing the philosophy of an epoch," Professor Whitehead says, "do not chiefly direct your attention to those intellectual positions which its exponents feel it necessary explicitly to defend. There will be some fundamental assumptions which adherents of all the variant systems within the epoch unconsciously presuppose. Such assumptions appear so obvious that people do not know what they are assuming because no other way of putting things has ever occurred to them. With these assumptions a certain limited number of types of philosophic systems are possible, and this group of systems constitutes the philosophy of the epoch." [2]

Some years ago, Professor C. D. Burns published an excellent little article called "The Sense of the Horizon," in which he made a somewhat wider application of the same principle; for here he pointed out that every civilization has its limits of knowledge—of perceptions, reactions, feelings, and ideas. To quote his own words, "The experience of any moment has its horizon. Today's experience, which is not tomorrow's, has in it some hints and implications which are tomorrow on the horizon of today. Each man's experience may be added to by the experience of other men, who are living in his day or have

1Cf. Felix Cohen. "What is a Question?" *The Monist,* XXXIX (1929), 3: 350-364.

2 From Chapter III: The Century of Genius. By permission of **The** Macmillan Company, publishers.

lived before; and so a common world of experience, larger than that of his own observation, can be lived in by each man. But however wide it may be, that common world also has its horizon; and on that horizon new experience is always appearing. . . ."[3]

"Philosophers in every age have attempted to give an account of as much experience as they could. Some have indeed pretended that what they could not explain did not exist; but all the great philosophers have allowed for more than they could explain, and have, therefore, signed beforehand, if not dated, the death-warrant of their philosophies."[4]

". . . The history of Western philosophy begins in a period in which the sense of the horizons lifts men's eyes from the myths and rituals, the current beliefs and customs of the Greek tradition in Asia Minor. . . . In a settled civilization, the *regularity* of natural phenomena and their connection over large areas of experience became significant. The myths were too disconnected; but behind them lay the conception of Fate. This perhaps provided Thales and the other early philosophers with the first hint of the new formulation, which was an attempt to allow for a larger scale of certainty in the current attitude toward the world. From this point of view the early philosophers are conceived to have been not so much disturbed by the contradictions in the tradition as attracted by certain factors on the horizon of experience, of which their tradition gave no adequate account. They began the new formulation in order to include the new factors, and they boldly said that 'all' was water or 'all' was in flux."[5]

The formulation of experience which is contained within the intellectual horizon of an age and a society is determined, I believe, not so much by events and desires, as by the *basic concepts* at people's disposal for analyzing and describing their adventures to their own understanding. Of course, such concepts arise as they are needed, to deal with political **or** domestic experience; but the same experiences could be seen in many different lights, so the light in which they do appear depends on the genius of a people as well as on the demands of the external occasion. Different minds will take the same events in very different ways. A tribe of Congo Negroes will react quite differently to (say) its first introduction to the story of Christ's passion, than did the equally untutored de-

3 *Philosophy,* VIII (1933), 31: 301-317. This preliminary essay was followed by his book, *The Horizon of Experience* (New York: W. W. Norton & Co., 1934). See p. 301.

4 "The Sense of the Horizon," pp. 303-304. *Ibid.,* pp. 306-307.

scendants of Norsemen, or the American Indians. Every society meets a new idea with its own concepts, its own tacit, fundamental way of seeing things; that is to say, *with its own questions, its peculiar curiosity.*

The horizon to which Professor Burns makes reference is the limit of clear and sensible questions that we can ask. When the Ionian philosophers, whom he cites as the innovators of Greek thought, asked what "all" was made of, or how "all" matter behaved, they were assuming a general notion, namely that of a parent substance, a final, universal *matter* to which all sorts of accidents could happen. This notion dictated the terms of their inquiries: what things were, and how they changed. Problems of right and wrong, of wealth and poverty, slavery and freedom, were beyond their scientific horizon. On these matters they undoubtedly adopted the wordless, unconscious attitudes dictated by social usage. The concepts that preoccupied them had no application in those realms, and therefore did not give rise to new, interesting, leading questions about social or moral affairs.

Professor Burns regards all Greek thought as one vast formulation of experience. "In spite of continual struggles with violent reversals in conventional habits and in the use of words," he says, "work upon the formulation of Greek experience culminated in the magnificent doctrines of Plato and Aristotle. Both had their source in Socrates. He had turned from the mere assertions of the earlier philosophers to the question of the validity of any assertion at all. Not what the world was but how one could know what it was, and therefore what one could know about one's self seemed to him to be the fundamental question. . . . The formulation begun by Thales was completed by Aristotle." [6]

I think the historical continuity and compactness of Hellenic civilization influences this judgment. Certainly between Thales and the Academy there is at least one further shift of the horizon, namely with the advent of the Sophists. The questions Socrates asked were as new to Greek thought in his day as those of Thales and Anaximenes had been to their earlier age. Socrates did not continue and complete Ionian thought; he cared very little about the speculative physics that was the very breath of life to the nature-philosophers, and his lifework did not further that ancient enterprise by even a step. He had not new answers, but new questions, and therewith he brought a new conceptual framework, an entirely different

6 *Ibid.,* p. 307.

perspective, into Greek philosophy. His problems had arisen in the law-courts and the Sophists' courses of oratory; they were, in the main, and in their significant features, irrelevant to the academic tradition. The validity of knowledge was only one of his new puzzles; the *value* of knowing, the *purpose* of science, of political life, practical arts, and finally of the course of nature, all became problematical to him. For he was operating with a new idea. Not prime matter and its disguises, its virtual products, its laws of change and its ultimate identity, constituted the terms of his discourse, but the notion of *value.* That everything had a value was too obvious to require statement. It was so obvious that the Ionians had not even given it one thought, and Socrates did not bother to state it: but his questions centered on what values things had—whether they were good or evil, in themselves or in their relations to other things, for all men or for few, or for the gods alone. In the light of that newly-enlisted old concept, *value,* a whole world of new questions opened up. The philosophical horizon widened in all directions at once, as horizons do with every upward step.

The limits of thought are not so much set from outside, by the fullness or poverty of experiences that meet the mind, as from within, by the power of conception, the wealth of formulative notions with which the mind meets experiences. Most new discoveries are suddenly-seen things that were always there. A new idea is a light that illuminates presences which simply had no form for us before the light fell on them. We turn the light here, there, and everywhere, and the limits of thought recede before it. A new science, a new art, or a young and vigorous system of philosophy, is generated by such a basic innovation. Such ideas as identity of matter and change of form, or as value, validity, virtue, or as outer world and inner consciousness, are not theories; they are the terms in which theories are conceived; they give rise to specific questions, and are articulated only in the form of these questions. Therefore one may call them *generative ideas* in the history of thought.

A tremendous philosophical vista opened when Thales, or perhaps one of his predecessors not known to us, asked: "What is the world made of?" For centuries men turned their eyes upon the changes of matter, the problem of growth and decay, the laws of transformation in nature. When the possibilities of that primitive science were exhausted, speculations deadlocked, and the many alternative answers were stored in

every learned mind to its confusion, Socrates propounded his simple and disconcerting questions—not, "Which answer is true?" but: "What is Truth?" "What is Knowledge, and why do we want to acquire it?" His questions were disconcerting because they contained the new principle of explanation, the notion of value. Not to describe the motion and matter of a thing, but to see its purpose, is to understand it. From this conception a host of new inquiries were born. What is the highest good of man? Of the universe? What are the proper principles of art, education, government, medicine? To what purpose do planets and heavens revolve, animals procreate, empires rise? Wherefore does man have hands and eyes and the gift of language?

To the physicists, eyes and hands were no more interesting than sticks and stones. They were all just varieties of Prime Matter. The Socratic conception of *purpose* went beyond the old physical notions in that *it gave importance to the differences* between men's hands and other "mixtures of elements." Socrates was ready to accept tradition on the subject of elements, but asked in his turn: *"Why* are we made of fire and water, earth and air? Why have we passions, and a dream of Truth? Why do we live? Why do we die?"—Plato's ideal commonwealth and Aristotle's science rose in reply. But no one stopped to explain what "ultimate good" or "purpose" *meant;* these were the generative ideas of all the new, vital, philosophical problems, the measures of explanation, and belonged to common sense.

The end of a philosophical epoch comes with the exhaustion of its motive concepts. When all answerable questions that can be formulated in its terms have been exploited, we are left with only those problems that are sometimes called "metaphysical" in a slurring sense — insoluble problems whose very statement harbors a paradox. The peculiarity of such pseudo-questions is that they are capable of two or more equally good answers, which defeat each other. An answer once propounded wins a certain number of adherents who subscribe to it despite the fact that other people have shown conclusively how wrong or inadequate it is; since its rival solutions suffer from the same defect, a choice among them really rests on temperamental grounds. They are not intellectual discoveries, like good answers to appropriate questions, but *doctrines.* At this point philosophy becomes academic; its watchword henceforth is Refutation, its life is argument rather than private thinking, fair-mindedness is deemed more important than single-mind-

edness, and the whole center of gravity shifts from actual philosophical isues to peripheral subjects — methodology, mental progress, the philosopher's place in society, and apologetics.

The eclectic period in Greco-Roman philosophy was just such a tag-end of an inspired epoch. People took sides on old questions instead of carrying suggested ideas on to their further implications. They sought a *reasoned belief,* not new things to think about. Doctrines seemed to lie around all ready-made, waiting to be adopted or rejected, or perhaps dissected and recombined in novel aggregates. The consolations of philosophy were more in the spirit of that time than the disturbing whispers of a Socratic daemon.

Yet the human mind is always active. When philosophy lies fallow, other fields bring abundance of fruit. The end of Hellenism was the beginning of Christianity, a period of deep" emotional life, military and political enterprise, rapid civilization of barbarous hordes, possession of new lands. Wild northern Europe was opened to the Mediterranean world. Of course the old cultural interests flagged, and old concepts paled, in the face of such activity, novelty, and bewildering challenge. A footloose, capricious modernity took the place of deep-rooted philosophical thought. All the strength of good minds was consumed by the practical and moral problems of the day, and metaphysics seemed a venerable but bootless refinement of rather sheltered, educated people, a peculiar and lonely amusment of old-fashioned scholars. It took several centuries before the great novelties became an established order, the emotional fires burned themselves out, the modern notions matured to something like permanent principles; then natural curiosity turned once more toward these principles of life, and sought their essence, their inward ramifications, and the grounds of their security. *Interpretations* of doctrines and commandments became more and more urgent. But interpretation of general propositions is nothing more nor less than philosophy; and so another vital age of Reason began.

The wonderful flights of imagination and feeling inspired by the rise and triumph of Christianity, the questions to which its profound revolutionary attitude gave rise, provided for nearly a thousand years of philosophical growth, beginning with the early Church Fathers and culminating in the great Scholastics. But, at last, its generative ideas—sin and salvation, nature and grace, unity, infinity, and kingdom—had done their work. Vast systems of thought had been formulated, and

all relevant problems had been mooted. Then came the unanswerable puzzles, the paradoxes that always mark the limit of what a generative idea, an intellectual vision, will do. The exhausted Christian mind rested its case, and philosophy became a reiteration and ever-weakening justification of faith.

Again "pure thought" appeared as a jejune and academic business. History teachers like to tell us that learned men in the Middle Ages would solemnly discuss how many angels could dance on the point of a needle. Of course that question, and others like it, had perfectly respectable deeper meanings—in this case the answer hinged on the material or immaterial nature of angels (if they were incorporeal, then an infinite number of them could occupy a dimensionless point). Yet such problems, ignorantly or maliciously misunderstood, undoubtedly furnished jokes in the banquet hall when they were still seriously propounded in the classroom. The fact that the average person who heard them did not try to understand them but regarded them as cryptic inventions of an academic class—"too deep for us," as our Man in the Street would say—shows that the issues of metaphysical speculation were no longer vital to the general literate public. Scholastic thought was gradually suffocating under the pressure of new interests, new emotions—the crowding modern ideas and artistic inspiration we call the Renaissance.

After several centuries of sterile tradition, logic-chopping, and partisanship in philosophy, the wealth of nameless, heretical, often inconsistent notions born of the Renaissance crystallized into general and ultimate problems. A new outlook on life challenged the human mind to make sense out of its bewildering world; and the *Cartesian age* of "natural and mental philosophy" succeeded to the realm.

This new epoch had a mighty and revolutionary generative idea: the dichotomy of all reality into *inner experience and outer world,* subject and object, private reality and public truth. The very language of what is now traditional epistemology betrays this basic notion; when we speak of the "given," of "sense-data," "the phenomenon," or "other selves," we take for granted the immediacy of an internal experience and the continuity of the external world. Our fundamental questions are framed in these terms: What is actually given to the mind? What guarantees the truth of sense-data? What lies behind the observable order of phenomena? What is the relation of the mind to the brain? How can we know other selves?—All these are familiar problems of today. Their answers have been

elaborated into whole systems of thought: empiricism, idealism, realism, phenomenology, *Existenz-Philosophie,* and logical positivism. The most complete and characteristic of all these doctrines are the earliest ones: empiricism and idealism. They are the full, unguarded, vigorous formulations of the new generative notion, *experience;* their proponents were the enthusiasts inspired by the Cartesian method, and their doctrines are the obvious implications derived by that principle, from such a starting-point. Each school in its turn took the intellectual world by storm. Not only the universities, but all literary circles, felt the liberation from time-worn, oppressive concepts, from baffling limits of inquiry, and hailed the new world-picture with a hope of truer orientation in life, art, and action.

After a while the confusions and shadows inherent in the new vision became apparent, and subsequent doctrines sought in various ways to escape between the horns of the dilemma created by the subject-object dichotomy, which Professor Whitehead has called "the bifurcation of nature." Since then, our theories have become more and more refined, circumspect, and clever; no one can be quite frankly an idealist, or go the whole way with empiricism; the early forms of realism are now known as the "naive" varieties, and have been superseded by "critical" or "new" realisms. Many philosophers vehemently deny any systematic *Weltanschauung,* and repudiate metaphysics in principle.

The springs of philosophical thought have run dry once more. For fifty years at least, we have witnessed all the characteristic symptoms that mark the end of an epoch—the incorporation of thought in more and more variegated "isms," the clamor of their respective adherents to be heard and judged side by side, the defense of philosophy as a respectable and important pursuit, the increase of congresses and symposia, and a flood of text-criticism, surveys, popularizations, and collaborative studies. The educated layman does not pounce upon a new philosophy book as people pounced upon *Leviathan* or the great *Critiques* or even *The World as Will and Idea.* He does not expect enough intellectual news from a college professor. What he expects is, rather, to be argued into accepting idealism or realism, pragmatism or irrationalism, as his own belief. We have arrived once more at that counsel of despair, to find a reasoned faith.

But the average person who has any faith does not really care whether it is reasoned or not. He uses reason only to satisfy his curiosity—and philosophy, at present, does not even

arouse, let alone satisfy, his curiosity. It only confuses him with impractical puzzles. The reason is not that he is dull, or really too busy (as he says he is) to enjoy philosophy. It is simply that the generative ideas of the seventeenth century—"the century of genius," Professor Whitehead calls it—have served their term. The difficulties inherent in their constitutive concepts balk us now; their paradoxes clog our thinking. If we would have new knowledge, we must get us a whole world of new questions.

Meanwhile, the dying philosophical epoch is eclipsed by a tremendously active age of science and technology. The roots of our scientific thinking reach far back, through the whole period of subjective philosophy, further back than any explicit empiricism, to the brilliant, extravert genius of the Renaissance. Modern science is often said to have sprung from empiricism; but Hobbes and Locke have given us no physics, and Bacon, who expressed the scientists' creed to perfection, was neither an active philosopher nor a scientist; he was essentially a man of letters and a critic of current thought. The only philosphy that rose directly out of a contemplation of science is *positivism,* and it is probably the least interesting of all doctrines, an appeal to commonsense against the difficulties of establishing metaphysical or logical "first principles."

Genuine empiricism is above all a reflection on the validity of sense-knowledge, a speculation on the ways our concepts and beliefs are built up out of the fleeting and disconnected reports our eyes and ears actually make to the mind. Positivism, the scientists' metaphysic, entertains no such doubts, and raises no epistemological problems; its belief in the veracity of sense is implicit and dogmatic. Therefore it is really out of the running with post-Cartesian philosophy. It repudiates the basic problems of epistemology, and creates nothing but elbow-room for laboratory work. The very fact that it rejects *problems,* not answers, shows that the growing physical sciences were geared to an entirely different outlook on reality. They had their own so-called "working notions"; and the strongest of these was the concept of *fact.*

This central concept effected the *rapprochement* between science and empiricism, despite the latter's subjective tendencies. No matter what problems may lurk in vision and hearing, there is something final about the guarantees of sense. Sheer observation is hard to contradict, for sense-data have an inalienable semblance of "fact." And such a court of last

appeal, where verdicts are quick and ultimate, was exactly what scientists needed if their vast and complicated work was to *go* forward. Epistemology might produce intriguing puzzles, but it could never furnish facts for conviction to rest upon. A naive faith in sense-evidence, on the other hand, provided just such terminals to thought. Facts are something we can all observe, identify, and hold in common; in the last resort, seeing is believing. And science, as against philosophy, even in that eager and active philosophical age, professed to look exclusively to the visible world for its unquestioned postulates.

The results were astounding enough to lend the new attitude full force. Despite the objections of philosophical thinkers, despite the outcry of moralists and theologians against the "crass materialism" and "sensationalism" of the scientists, physical science grew like Jack's beanstalk, and overshadowed everything else that human thought produced to rival it. A passion for observation displaced the scholarly love of learned dispute, and quickly developed the experimental technique that kept humanity supplied thrice over with facts. Practical applications of the new mechanical knowledge soon popularized and established it beyond the universities. Here the traditional interests of philosophy could not follow it any more; for they had become definitely relegated to that haven of unpopular lore, the schoolroom. No one really cared much about consistency or definition of terms, about precise conceptions, or formal deduction. The senses, long despised and attributed to the interesting but improper domain of the devil, were recognized as man's most valuable servants, and were rescued from their classical disgrace to wait on him in his new venture. They were so efficient that they not only supplied the human mind with an incredible amount of food for thought, but seemed presently to have most of its cognitive business in hand. Knowledge from sensory experience was deemed the only knowledge that carried any affidavit of truth; for truth became identified, for all vigorous modern minds, with empirical fact.

And so, a scientific culture succeeded to the exhausted philosophical vision. An undisputed and uncritical empiricism—not skeptical, but positivistic—became its official metaphysical creed, experiment its avowed method, a vast hoard of "data" its capital, and correct prediction of future occurrences its proof. The programmatic account of this great adventure, beautifully put forth in Bacon's *Novum Organum,* was fol-

lowed only a few centuries later by the complete, triumphant summary of all that was scientifically respectable, in J. S. Mill's Canons of Induction—a sort of methodological manifesto.

As the physical world-picture grew and technology advanced, those disciplines which rested squarely on "rational" instead of "empirical" principles were threatened with complete extinction, and were soon denied even the honorable name of science. Logic and metaphysics, aesthetics and ethics, seemed to have seen their day. One by one the various branches of philosophy—natural, mental, social, or religious—set up as autonomous sciences; the natural ones with miraculous success, the humanistic ones with more hope and fanfare than actual achievement. The physical sciences found their stride without much hesitation; psychology and sociology tried hard and seriously to "catch the tune and keep the step," but with mathematical laws they were never really handy. Psychologists have probably spent almost as much time and type avowing their empiricism, their factual premises, their experimental techniques, as recording experiments and making general inductions. They still tell us that their lack of laws and calculable results is due to the fact that psychology is but young. When physics was as old as psychology is now, it was a definite, systematic body of highly general facts, and the possibilities of its future expansion were clearly visible in every line of its natural progress. It could say of itself, like Topsy, "I wasn't made, I growed." But our scientific psychology is *made* in the laboratory, and especially in the methodological forum. A good deal has, indeed, been made; but the synthetic organism still does not grow like a wild plant; its technical triumphs are apt to be discoveries in physiology or chemistry instead of psychological "facts."

Theology, which could not possibly submit to scientific methods, has simply been crowded out of the intellectual arena and gone into retreat in the cloistered libraries of its seminaries. As for *logic,* once the very model and norm of science, its only salvation seemed to lie in repudiating its most precious stock-in-trade, the "clear and distinct ideas," and professing to argue only from empirical facts to equally factual implications. The logician, once an investor in the greatest enterprise of human thought, found himself reduced to a sort of railroad linesman, charged with the task of keeping the tracks and switches of scientific reasoning clear for sensory reports to make their proper connections. Logic, it seemed, could never

have a lite of its own; for it had no foundation of facts, except the psychological fact that we do think thus and so, that such-and-such forms of argument lead to correct or incorrect predictions of further experience, and so forth. Logic became a mere reflection on tried and useful methods of fact-finding, and an official warrant for that technically fallacious process of generalizing known as "induction."

Yes, the heyday of science has stifled and killed our rather worn-out philosophical interests, born three and a half centuries ago from that great generative idea, the bifurcation of nature into an inner and an outer world. To the generations of Comte, Mill, and Spencer, it certainly seemed as though all human knowledge could be cast in the new mold; certainly as though nothing in any other mold could hope to jell. And indeed, nothing much *has* jelled in any other mold; but neither have the non-physical disciplines been able to adopt and thrive on the scientific methods that did such wonders for physics and its obvious derivatives. The truth is that science has not really fructified and activated *all* human thought. If humanity has really passed the philosophical stage of learning, as Comte hopefully declared, and is evolving no more fantastic ideas, then we have certainly left many interesting brain-children stillborn along the way.

But the mind of man is always fertile, ever creating and discarding, like the earth. There is always new life under old decay. Last year's dead leaves hide not merely the seeds, but the full-fledged green plants of this year's spring, ready to bloom almost as soon as they are uncovered. It is the same with the seasons of civilization: under cover of a weary Greco-Roman eclecticism, a baffled cynicism, Christianity grew to its conquering force of conception and its clear interpretation of life; obscured by creed, canon, and curriculum, by learned disputation and demonstration, was born the great ideal of *personal experience,* the "rediscovery of the inner life," as Rudolph Eucken termed it, that was to inspire philosophy from Descartes's day to the end of German idealism. And beneath our rival "isms," our methodologies, conferences, and symposia, of course there is something brewing, too.

No one observed, amid the first passion of empirical fact-finding, that the ancient science of mathematics still went its undisturbed way of pure reason. It fell in so nicely with the needs of scientific thought, it fitted the observed world of fact so neatly, that those who learned and used it never stopped to accuse those who had invented and evolved it of being

mere reasoners, and lacking tangible data. Yet the few conscientious empiricists who thought that *factual* bases must be established for mathematics made a notoriously poor job of it. Few mathematicians have really held that numbers were discovered by observation, or even that geometrical relationships are known to us by inductive reasoning from many observed instances. Physicists may think of certain facts in place of constants and variables, but the same constants and variables will serve somewhere else to calculate other facts, and the mathematicians themselves give no set of data their preference. They deal only with items whose sensory qualities are quite irrelevant: their "data" are arbitrary sounds or marks called *symbols.*

Behind these symbols lie the boldest, purest, coolest abstractions mankind has ever made. No schoolman speculating on essences and attributes ever approached anything like the abstractness of algebra. Yet those same scientists who prided themselves on their concrete factual knowledge, who claimed to reject every proof except empirical evidence, never hesitated to accept the demonstrations and calculations, the bodiless, sometimes avowedly "fictitious" entities of the mathematicians. Zero and infinity, square roots of negative numbers, incommensurable lengths and fourth dimensions, all found unquestioned welcome in the laboratory, when the average thoughtful layman, who could still take an invisible soul-substance on faith, doubted their logical respectability.

What is the secret power of mathematics, to win hard-headed empiricists, against their most ardent beliefs, to its purely rational speculations and intangible "facts" ? Mathematicians are rarely practical people, or good observers of events. They are apt to be cloistered souls, like philosophers and theologians. Why are their abstractions taken not only seriously, but as indispensable, fundamental facts, by men who observe the stars or experiment with chemical compounds ?

The secret lies in the fact that a mathematician does not profess to say anything about the existence, reality, or efficacy of *things* at all. His concern is the possibility of *symbolizing things,* and of symbolizing the relations into which they might enter with each other. His "entities" are not "data," but *concepts.* That is why such elements as "imaginary numbers" and "infinite decimals" are tolerated by scientists to whom invisible agents, powers, and "principles" are anathema. Mathematical constructions are only symbols; they have meanings in terms of relationships, not of substance; something in reality an-

swers to them, but they are not supposed to be items in that reality. To the true mathematician, numbers do not "inhere in" denumerable things, nor do circular objects "contain" degrees. Numbers and degrees and all their ilk only *mean* the real properties of real objects. It is entirely at the discretion of the scientist to say, "Let *x* mean this, let *y* mean that." All that mathematics determines is that *then x* and *y* must be related thus and thus. If experience belies the conclusion, then the formula does not express the relation of *this x* and *that y;* then *x* and *y* may not mean this thing and that. But no mathematician in his professional capacity will ever tell us that *this is x,* and has therefore such and such properties.

The faith of scientists in the power and truth of mathematics is so implicit that their work has gradually become less and less observation, and more and more calculation. The promiscuous collection and tabulation of data have given way to a process of assigning possible meanings, merely supposed real entities, to mathematical terms, working out the logical results, and then staging certain crucial experiments to check the hypothesis against the actual, empirical results. But the facts which are accepted by virtue of these tests are not actually *observed* at all. With the advance of mathematical technique in physics, the tangible results of experiment have become less and less spectacular; on the other hand, their *significance* has grown in inverse proportion. The men in the laboratory have departed so far from the old forms of experimentation—typified by Galileo's weights and Franklin's kite—that they cannot be said to observe the actual objects of their curiosity at all; instead, they are watching index needles, revolving drums, and sensitive plates. No psychology of "association" of sense-experiences can relate these data to the objects they signify, for in most cases the objects have never been experienced. Observation has become almost entirely indirect; and *readings* take the place of genuine witness. The sense-data on which the propositions of modern science rest are, for the most part, little photographic spots and blurs, or inky curved lines on paper. These data are empirical enough, but of course they are not themselves the phenomena in question; the actual phenomena stand behind them as their supposed causes. Instead of watching the process that interests us, that is to be verified—say, a course of celestial events, or the behavior of such objects as molecules and ether-waves—we really see only the fluctuations of a tiny arrow, the trailing path of a stylus, or the appearance of a speck of light, and *calculate to the*

"facts" of our science. What is directly observable is only a sign of the "physical fact"; it requires interpretation to yield scientific propositions. Not simply seeing is believing, but s*eeing and calculating, seeing and translating.*

This is bad, of course, for a thoroughgoing empiricism. Sense-data certainly do not make up the whole, or even the major part, of a scientist's material. The events that are given for his inspection could be "faked" in a dozen ways—that is, the same visible events could be made to occur, but with a different significance. We may at any time be wrong about their significance, even where no one is duping us; we may be nature's fools. Yet if we did not attribute an elaborate, purely reasoned, and hypothetical history of causes to the little shivers and wiggles of our apparatus, we really could not record them as momentous results of experiment. The problem of observation is all but eclipsed by the problem of *meaning.* And the triumph of empiricism in science is jeopardized by the surprising truth that our *sense-data are primarily symbols.*

Here, suddenly, it becomes apparent that the age of science has begotten a new philosophical issue, inestimably more profound than its original empiricism: for in all quietness, along purely rational lines, mathematics has developed just as brilliantly and vitally as any experimental technique, and, step by step, has kept abreast of discovery and observation; and ail at once, the edifice of human knowledge stands before us, not as a vast collection of sense reports, but as a structure of *facts that are symbols* and *laws that are their meanings.* A new philosophical theme has been set forth to a coming age: an epistemological theme, the comprehension of science. The power of symbolism is its cue, as the finality of sense-data was the cue of a former epoch.

In epistemology—really all that is left of a worn-out *philosophical* heritage—a new generative idea has dawned. Its power is hardly recognized yet, but if we look at the actual trend of thought—always the surest index to a general prospect—the growing preoccupation with that new theme is quite apparent. One needs only to look at the titles of some philosophical books that have appeared within the last fifteen or twenty years: *The Meaning of Meaning;* [7] *Symbolism and Truth;* [8] *Die Philosophie der symbolischen Formen:* [9] *Language, Truth and Logic;* [10] *Symbol und Existenz der Wissen-*

7 C. K. Osden and I. A. Richards (London. 1923).
8 Ralph Munroe Eaton (Cambridge, Mass.: Harvard Univ. Press. 1925).
9 Ernst Cassirer, 3 vols. (Berlin, 1923, 1924, 1929)
10 A. J. Ayer (London. 1936).

schaft;[11] *The Logical Syntax of Language;*[12] *Philosophy and Logical Syntax;* [13] *Meaning and Change of Meaning;* [14] *Symbolism: its Meaning and Effects;* [15] *Foundations of the Theory of Signs;*[10] *Seele als Äusserung:*[17] *La pensée concrete: essai sur le symbolisme intellectuel;* [18] *Zeichen, die Fundamente des Wissens;* [19] and recently, *Language and Reality.*[20] The list is not nearly exhaustive. There are many books whose titles do not betray a preoccupation with semantic, for instance Wittgenstein's *Tractatus Logico-Philosophicus,*[21] or Grudin's *A Primer of Aesthetics.*[22] And were we to take an inventory of articles, even on the symbolism of science alone, we would soon have a formidable bibliography.

But it is not only in philosophy proper that the new keynote has been struck. There are at least two limited and technical fields, which have suddenly been developed beyond all prediction, by the discovery of the all-importance of symbol-using or symbol-reading. They are widely separate fields, and their problems and procedures do not seem to belong together in any way at all: one is modern psychology, the other modern logic.

In the former we are disturbed—thrilled or irritated, according to our temperaments—by the advent of psycho-analysis. In the latter we witness the rise of a new technique known as symbolic logic. The coincidence of these two pursuits seems entirely fortuitous; one stems from medicine and the other from mathematics, and there is nothing whatever on which they would care to compare notes or hold debate. Yet I believe they both embody the same generative idea, which is to preoccupy and inspire our philosophical age: for each in its own fashion has discovered the power of symbolization.

They have different conceptions of symbolism and its functions. Symbolic logic is not "symbolic" in the sense of Freudian psychology, and *The Analysis of Dreams* makes no contribution to logical syntax. The emphasis on symbolism derives from entirely different interests, in their respective

[11] H. Noack, *Symbol und Existenz der Wissenschaft: Untersuchungen zur Grundlegung einer philosophischen Wissenschaftslehre* (Halle a/S., 1936).
12 Rudolf Carnap (London, 1935; German ed., Vienna, 1934).
13 Rudolf Carnap (London, 1935; German ed. 1934).
14 Gustav Stern (Göteborg, 1931).
15 A. N. Whitehead (New York: The Macmillan Co., 1927).
[16] Charles W. Morris (Chicago: Univ. of Chicago Press, 1938).
17 Paul Helwig (Leipzig-Berlin, 1936). 18 A. Spaier (Paris, 1927).
19 R. Gätschenberger (Stuttgart. 1932).
20 Wilbur M. Urban. *Language and Reality; the Philosophy of Language and the Principles of Symbolism* (London, 1939).
[21] Ludwig Wittgenstein (London, 1922; 2nd ed. New York: Harcourt, Brace & Co.,[22] 1933).
Louis Grudin (Xew York: Covici Friedr, 1930).

contexts. As yet, the cautious critic may well regard the one as a fantastic experiment of "mental philosophy," and the other as a mere fashion in logic and epistemology.

When we speak of fashions in thought, we are treating philosophy lightly. There is disparagement in the phrases, "a fashionable problem," "a fashionable term." Yet it is the most natural and appropriate thing in the world for a new problem or a new terminology to have a vogue that crowds out everything else for a little while. A word that everyone snaps up, or a question that has everybody excited, probably carries a generative idea—the germ of a complete reorientation in metaphysics, or at least the "Open Sesame" of some new positive science. The sudden vogue of such a key-idea is due to the fact that all sensitive and active minds turn at once to exploiting it; we try it in every connection, for every purpose, experiment with possible stretches of its strict meaning, with generalizations and derivatives. When we become familiar with the new idea our expectations do not outrun its actual uses quite so far, and then its unbalanced popularity is over. We settle down to the problems that it has really generated, and these become the characteristic issues of our time.

The rise of technology is the best possible proof that the basic concepts of physical science, which have ruled our thinking for nearly two centuries, are essentially sound. They have begotten knowledge, practice, and systematic understanding; no wonder they have given us a very confident and definite. *Weltanschauung,* They have delivered all physical nature into our hands. But strangely enough, the so-called "mental sciences" have gained very little from the great adventure. One attempt after another has failed to apply the concept of causality to logic and aesthetics, or even sociology and psychology. Causes and effects could be found, of course, and could be correlated, tabulated, and studied; but even in psychology, where the study of stimulus and reaction has been carried to elaborate lengths, no true science has resulted. No prospects of really great achievement have opened before us in the laboratory. If we follow the methods of natural science our psychology tends to run into physiology, histology, and genetics; we move further and further away from those problems which we ought to be approaching. That signifies that the generative idea which gave rise to physics and chemistry and all their progeny —technology, medicine, biology—does not contain any vivifying concept for the humanistic sciences. The physicist's scheme, so faithfully emulated by generations of psychologists,

epistemologists, and aestheticians, is probably blocking their progress, defeating possible insights by its prejudicial force. The scheme is not false—it is perfectly reasonable - but it is bootless for the study of mental phenomena. It does not engender leading questions and excite a constructive imagination, as it does in physical researches. Instead of a method, it inspires a militant methodology.

Now, in those very regions of human interest where the age of empiricism has caused no revolution, the preoccupation with symbols has come into fashion. It has not sprung directly from any canon of science. It runs at least two distinct and apparently incompatible courses. Yet each course is a river of life in its own field, each fructifies its own harvest; and instead of finding mere contradiction in the wide difference of forms and uses to which this new generative idea is put, I see **in** it a promise of power and versatility, and a commanding philosophical problem. One conception of symbolism leads to logic, and meets the new problems in theory of knowledge; and so it inspires an evalution of science and a quest for certainty. The other takes us in the opposite direction—to psychiatry, the study of emotions, religion, fantasy, and everything but knowledge. Yet in both we have a central theme: the *human response,* as a constructive, not a passive thing. Epistemologists and psychologists agree that symbolization is the key to that constructive process, though they may be ready to kill each other over the issue of what a symbol is and how it functions. One studies the structure of science, the other of dreams; each has his own assumptions—that is all they are—regarding the nature of symbolism itself. Assumptions, generative ideas, are what we fight for. Our conclusions we are usually content to demonstrate by peaceable means. Yet the assumptions are philosophically our most interesting stock-in-trade.

In the fundamental notion of symbolization—mystical, practical, or mathematical, it makes no difference—we have the keynote of all humanistic problems. In it lies a new conception of "mentality," that may illumine questions of life and consciousness, instead of obscuring them as traditional "scientific methods" have done. If it is indeed a generative idea, it will beget tangible methods of its own, to free the deadlocked paradoxes of mind and body, reason and impulse, autonomy and law, and will overcome the checkmated arguments of an earlier age by discarding their very idiom and shaping their equivalents in more significant phrase. The philosophical study of symbols is not a technique borrowed from other disciplines,

not even from mathematics; it has arisen in the fields that the great advance of learning has left fallow. Perhaps it holds the seed of a new intellectual harvest, to be reaped in the next season of the human understanding.

2. *Symbolic Transformation*

> The vitality and energies of the imagination do not operate at will; they are fountains, not machinery.
> D. G. JAMES, *Skepticism and Poetry.*

A CHANGED APPROACH to the theory of knowledge naturally has its effect upon psychology, too. As long as sense was supposed to be the chief factor in knowledge, psychologists took a prime interest in the organs that were the windows of the mind, and in the details of their functioning; other things were accorded a sketchier and sometimes vaguer treatment. If scientists demanded, and philosophers dutifully admitted, that all true belief must be based on sense-evidence, then the activity of the mind had to be conceived purely as a matter of recording and combining; then intelligence had to be a product of impression, memory, and association. But now, an epistemological insight has uncovered a more potent, howbeit more difficult, factor in scientific procedure—the use of symbols to attain, as well as to organize, belief. Of course, this alters our conception of intelligence at a stroke. Not higher sensitivity, not longer memory or even quicker association sets man so far above other animal$ that he can regard them as denizens of a lower world: no, it is the power of using symbols—the power of *speech*—that makes him lord of the earth. So our interest in the mind has shifted more and more from the acquisition of experience, the domain of sense, to the *uses* of sense-data, the realm of conception and expression.

The importance of symbol-using, once admitted, soon becomes paramount in the study of intelligence. It has lent a new orientation especially to genetic psychology, which traces the growth of the mind; for this growth is paralleled, in large measure, by the observable uses of language, from the first words in infancy to the complete self-expression of maturity, and perhaps the relapse into meaningless verbiage that accompanies senile decline. Such researches have even been extended from the development of individuals to the evolution of mental traits in nations and races. There is an increasing