Chapter Three

The Reality of Nature

The Search for Reality

That our actions, our perceptions, and our judgments should be guided by criteria of reality is a postulate so elementary that its explicit proposition seems superfluous. If for once this reality is not taken for granted and if the attempt is made to analyze or to describe it, the inquiry concerning reality will prove to be a perplexing problem. However skillfully we adapt ourselves to reality in practice, a theoretical analysis of that principle of action and perception which is so familiar may yet prove of unanticipated difficulty. The perplexity arises because, committed as we are to a traditional view of our world, we are not free to consider the question concerning reality on its logical merits. Both by implication and by our vigorous assertion, all our action relies upon reality; consequently we are beholden both to the concept and to the experience that sustains it. That reality might be non-existent is a mere rhetorical possibility which deserves no serious consideration. The question 'Is there reality or is there no reality?' is empty. It is, however, meaningful to ask: 'Where is reality to be found?' 'How is it to be identified?' 'What are its characteristics?' Even these questions are asked only reluctantly, for whatever reality might be, we like to think of ourselves in possession of it. The sense of reality is so

integral a part of our mental function that an answer to the question about reality is always presupposed. The notion of reality enters into every judgment and inquiry; it implicitly accompanies every thought from the time thoughts first occupy mind. In retrospect it seems to us as if we had imbibed our notions of reality with our mother's milk; it is difficult for us not to accept them as part of our nature. The concept of reality seems to require no explanation. As a function, ~~reality~~ it is indispensable to the activity of mind. To deprive mind of its sense of reality is to destroy it. No wonder then that the question about reality poses a major challenge of analysis and exposition.

In spite of the fundamental position that reality occupies in the logical structure of our thought, or perhaps because of it, the question 'What is reality?' never arises in practical affairs. The banker, the businessman, the lawyer need not be concerned with it. Even the scientist may shrug it off, assuming that in essence reality had been determined once and for all. He sees his task not in determining its nature but in describing its specifications. The question about reality is raised most searchingly where it is least expected, in formulas that are both difficult to understand and to accept. The poet frequently asks about reality. His query is often our first intimation of

the problem, but he is able to provide neither a rational analysis of the question nor any indication where a comprehensive answer to it might be obtained. The poet asks about reality elliptically. Usually puzzled by experience, often isolated and forlorn, he searches for communication and expression. He does not pretend to have found an answer, he pleads only to have his question considered. Once the inquiry concerning reality is discovered in the work of the poet, it may be recognized implicit also in the creative efforts of the artist. The approximations of plastic and graphic art are even less accessible to logical analysis than the intuitions of the poet. They appeal to our experience directly without regard to the conceptual framework within which most of our intellectual activity takes place. The theologian also asks, 'What is reality?' and occasionally his question rings with eloquence. Yet, however fervently he asks and however confidently he answers, his thought is masked by the obscure and ill-understood tradition to which he owes allegiance. The questions of the poet, the designs of the artist, the declarations of the theologian may convince our intuition, but they cannot satisfy the requirements of critical thought. Each in his own way is isolated from the common conceptual world in which we live. It may well be that this remoteness and isolation alone make it possible for them even to ask about reality in the first place. Their abortive efforts suggest the need for a comprehensive and radical analysis of the concept reality.

The sense of reality is no mere figment of academic theory. Confirmation of its efficacy is provided by the distortion and decay to which the sense of reality is prone among the mentally ill. Of the intellectual deficits that they exhibit, a diminished or distorted sense of reality is among the most striking. The patient mentally ill frequently loses his grasp on the identity of persons and the integrity of objects. He is puzzled with the familiar instruments of his environment; he fails to recognize the persons who greet him; often he loses even the sense of his own identity. His feelings and his attentions become incomprehensible to his associates; probably his pattern of activity becomes meaningless even to the patient himself. Such deficits may be interpreted as a loss of contact with reality.

For all the vividness and depth of perspective which they may contribute to the problem, neither normal nor abnormal psychology ought to be expected to resolve the question about reality. Psychology itself cannot do so, nor for that matter can any of the other objective sciences. If the psychologist knows about reality, his knowledge is derived solely from his own mental activity. When he recognizes a loss of this sense of reality in his patient, the psychologist implicitly compares the manifest thought and action of the sick man with his own experience. The qualities of that sense of reality can be ascertained

by the investigator from an objective study of the sick no more than from the objective study of the mind in health. By observing the diseased mind, he may conclude merely that the sense of reality is not invulnerable, that it is susceptible to fluctuation, perversion, and destruction. Primarily, however, the quality of reality must be learned from subjective experience.

Reality can be ascertained by each mind only in the observation of its own function. If reality is to be discovered, each mind must determine it in the exercise of its own thought. Probably some understanding of reality can be communicated through demonstration and imitation. However, no logical summary, no definition, no analysis can adequately convey its characteristics. For these reasons the question about reality is significant in itself, and answers that tend to conceal the question will prove trivial. The mind invariably presupposes essential characteristics of reality. Whenever a question concerning reality is asked in an incisive way, the existing presuppositions about reality are at least temporarily shaken. That is why the mere question concerning reality has implications which may affect the most diverse functions of mind. It is a paradox that the question about reality becomes so very difficult to ask, when the answer, by contrast, would seem to

be everywhere apparent. Indeed the more proficient our minds become in the specification of reality in its most obscure characteristics, the more reluctant and awkward we become when we must ask the question.

Considerations such as these may serve to translate the question about reality from a hopeless quest for ultimate definition, natural or conceptual as the case might be, into a more fruitful study of the relationship between mind and its function, thought, and between thought and its object, nature. Interpreted in this light, the question about reality is no longer a suitable topic for natural sciences; and science, conversely, can no longer appear as the discipline to provide an answer. To be sure, in theory the study of reality might well be the task of science, but the particular history and tradition of the disciplines that we know as science preclude the forthright investigation of reality. Science as we know it is obliged to assume that the question about reality has already been answered. Yet reality constitutes a pre-scientific problem which each mind must solve for itself in the exercise of its own functions. The poet and the artist may suggest to us the quality of the question, but their work can provide only a starting point for our efforts. The very characteristics of poetry and art limit them to a more or less isolated realm of experience. These limitations the present investigation must deliberately seek to circumvent.

The question concerning reality is not novel, but it is elusive, and for this reason it is likely to suffer either from neglect or from over-statement. It is always in the background of psychological speculation, and on occasion, when a suitable formula for it is found, it is drawn into the limelight. Once the question concerning reality is phrased, it is usually exaggerated. The subject is difficult to discuss, and more often than not reality as a concept is misrepresented. On the surface it might seem that knowledge of reality should be prior to all other knowledge; but nothing could be further from the truth. Few thinkers have been explicit enough in disclaiming the arrogations of a science of reality. On the contrary, many of them have flattered themselves with the thought that the topic of their studies should necessarily precede all other knowledge. They have deluded themselves with the belief that it was impossible to arrive at certainty in any other discipline without first having determined the truth about reality or being. However, life and logic do not correspond. What is plausible or even necessary in logic will not necessarily be compelling in practice. Indeed one need not concern oneself at all with reality as a concept in order to be a good physician or a good lawyer; one need not even know about reality in order to become a good physicist, a good chemist or even a good historian. To be sure, these scientists investigate

the real world, but they have prejudged the quality of reality, and they have learned to proceed in their descriptions and in their analysis without doubting what to them is established fact. If the question about reality were misunderstood, the search for non-existent ~~and~~ first principles might easily spoil a mind otherwise willing and prepared for scientific investigation. If it is true in one sense that the question about reality should become the problem of every mind, then by the same token, the solution to this question should never be considered prerequisite for action or even for other thought. The question about reality is a sensitive one. This is a topic on which the sublime and the ridiculous meet. To advocate a science of reality is to misunderstand the problem. Ontology, or the science of being, is a dead-end street where many good minds in search of truth have been stranded. Thinkers who promote a science of being frequently become their own worst enemies. Their intentions are good; their vision of the problem is valid. Yet by fault of an intellectual clumsiness, they are unable to grasp their problem in its relevant relationship to other human activity. Invariably their discoveries collide with established conventions of thought. Frequently their language, attempting to surmount the prejudices of tradition, becomes fearfully obscure. They then become unable to express themselves except through dogmatic propositions to be memorized

and to be believed. At that point communication breaks down and misunderstandings arise on every side. The wisdom of one man ~~then~~ becomes the pretension of another and the deception of a third.

Traditionally, the explanation for reality has been sought among the concepts of language. The substance of reality has been called 'being', and the interminable question has become 'What is being?' This line of questioning exercises much power over our minds, dependent as thought is upon the constructions of language. But in the first place there was never a reason why language should be expected to provide an answer to the question about reality. We may be embarrassed to recognize to what extent language has proved to be a net in which our understanding of reality became entangled. Once the search for reality became enmeshed in the grammatical problems of the verb 'to be', the separation of reality from its linguistic specification became more and more difficult. Each attempt at resolution succeeded only in binding the threads of thought into a yet tighter knot. Even where the attempt to define reality was finally abandoned, the notion remained that reality must 'exist', that it must 'be' something somewhere and at some time. Much subsequent research and numerous inquiries have been directed toward the determination and definition of what reality

might 'be'. Such efforts are still in progress; they have borne little fruit, and their conclusions are obscure. The failures of theories of reality and being provide the logical foundations of the contemporary dogma of science.

The study about reality has traditionally been called ontology, the study of being. When the Greeks faced this topic they asked not what should be real or unreal. Their question was phrased in terms of what is or exists and what is not or does not exist. A purely linguistic permutation led to the assumption that insofar as a thing was real it must participate in being, and insofar as it was unreal it would participate in not-being. Thus arose the famous question of whether or not not-being could be. Most of the difficulties raised by such obscure theory are explained by the particular logical formulas in which they were expressed. We ought not to assume that the authors who invented such theories faced problems fundamentally different from those that we encounter today, or that they recognized them any less clearly. The error and confusion which we now attribute to their work probably arose only in subsequent successive interpretations of their teachings. Such errors appear when thought becomes dogma. The student who was unable to follow his master's thought hoped to acquire knowledge by memorizing its apparent conclusions. In the

resulting misunderstanding the problem of reality or being was buried under an avalanche of words. It was forgotten that the conclusions of an argument are never so final as they seem. Sentences that are accepted as proof often represent little more than temporary summaries of an intellectual exercise. One failed to understand that the dialectic style of Plato and the aporetic form of Aristotle's writings were an intrinsic and inseparable quality of their thought. Truth, if we may use this term, was to be found not in a summary of words but in the exercise of the mind of which the words were at best an incomplete reflection. It is small wonder that most of the commentaries on Plato and Aristotle seem superfluous and trivial to us. Yet our judgment of the Scholastic tradition responsible for these interpretations must not be excessively harsh, even if reality and its categories are represented there in unbearable tautology. The propositions of classical philosophy and their misinterpreted Scholastic modifications are the record of concern with problems such as ours, and we should respect them as such. By their very existence they may become the occasion for a new and more valid formulation of an old question. The simple fact that reality and being were once objects of so intensive a search should direct the contemporary investigator to a new study of an almost forgotten problem. That problem,

the question about reality, exists not by convention but by nature. It requires no traditional formulation, it needs no historical precedent. It is always there to be understood by the inquiring mind. The study of ontological tradition, misleading though that tradition be, is not entirely futile. Even a sentence misunderstood may become the starting point of meaningful thought. Our mind derives its power not from the concepts that it plucks from tradition, but from the experience with which it wrestles from moment to moment. The power that experience wields over mind ought not be underestimated. There is many an obscure and misunderstood, perhaps even utterly incomprehensible proposition upon which a powerful mind, through its own experience, has invented a significant interpretation.

Although we respect the tradition of ontologic thought, we must dissociate ourselves from it. An historical analysis of our own position in regard to other methods by which our problems have been treated is not incumbent upon us. It is one thing to investigate the problems that present themselves to us; it is quite a different matter to attempt to fit such inquiries into an historical framework. Even an investigation employing traditional formulas would not need to apologize for accepting the problems of ontology as cogent. However, the techniques by which we shall attempt to elucidate these problems will be

basically different. The reader who doubts the pertinence of such an investigation as ours to a modern view of the world, should ask himself if it is not true that wherever ontology seems to be dispensed with, ontological prejudices are in fact presupposed. To attempt to ignore tradition is to confess oneself bound by it. The modern reluctance to accept ontological problems does not mean that such problems do not exist. On the contrary, this reluctance may be taken to signify that the problems have not even been recognized in their actuality. For even when the attempt to define reality is abandoned, the notion that reality should 'exist', that it should 'be' something, somewhere remains. Where one inquiry concerning reality is spurned, another surreptitiously takes its place. Thus, even in modern science, efforts to discover 'reality' are still in progress. Deliberately or inadvertently as the case may be, the direction of much modern scientific thought has been determined by a search for reality.

When the question concerning reality becomes explicit, one is inclined to search for an adequate explanation simply by analyzing the concept reality as it is used in speech. One must not forget that the experience of reality is largely prior to its logical explication. Many men who are untheoretical, children who have not yet learned to think abstractly or even

to speak, indeed, even the irrational animals, seem to display a sense of reality, which, though in many instances rudimentary, nonetheless will not be divorced from the more inclusive concept that we have chosen to investigate. It is useful to analyze the way in which the term reality is used in language. Perhaps we may then anticipate some of the difficulties that the ambiguous implications of the term would otherwise provoke.

The concept reality plays an extraordinary role in thought and speech alike. The word reality, however, is in no way indispensable; many another term might effectively replace it in our diction. A word like 'truth', for example, might almost everywhere be substituted for 'reality', as might other terms such as 'actuality' or 'essence'. These words all seem to refer to matters of greatest significance: at the same time they are all in a sense vacuous. They are reduplications or intensifications of the intrinsic meaning of language itself. These terms bespeak the self-assertion of language; the concepts which they designate can best be understood as evidence of the self-assurance of thought. Within the realm of language concepts such as reality or truth frequently present themselves as tautologies. Often they appear as superfluous endorsement of language by itself. One is inclined to forget that the significance of language in all particular circumstances is precariously dependent

upon the intention of the speaker and upon the sensitivity of the hearer. Language possesses no substance except in the validity of the propositions that are affirmed by it. The frailty of such propositions as logical constructions is readily apparent. What meaning they have derives from their function in communication. Their significance springs from the intention in which they were formulated. Their power is effective only where they are understood. Whatever substance propositions in themselves might seem to possess is compromised by the approximation and uncertainty of communication. Nonetheless language invariably represents itself to be more than an instrument of intellectual community: it appears as an entity of itself. When it does so, language operates in a thinly concealed sphere of inadequacy, of substitution, distortion, and half-truth. Actually, language in itself is ephemeral, and for its meaning it must always point beyond itself. The reality which language suggests is always outside of its proper structure. Consistently interpreted, language points to a reality superior to it, and this reality toward which language points will invariably disparage all arrogations of language to reality.

The difficulty of the interpretation of language arises from the circumstance that language is unwilling and unable to accept its limitations with respect to reality. It is the deceptive characteristic of our words to represent themselves to us as real. It is the paradox of our intellectual relationship to language, that we are incapable of defining this insufficiency. We are inhibited from designating clearly the limitations of language. The untrue statement will not permit its expression. Take, for an example, the assertion: 'This is untrue,' and consider the intrinsic paradox. Implicit in all our use of language is the assertion that our propositions are correct and that the objects to which they refer are real. Our language is incapable of reflecting the disparity between the proposition on the one hand and the reality encountered by experience on the other.

The verbal assertion of reality is our attempt to compensate for the failure of language to express degrees of unreality. Consequently we find it necessary to assert as the occasion demands, expressly and doubly, the truthfulness of our propositions and the validity of the experience to which they refer. To this end, we employ terms such as truthfully or truly, actually, really, or in reality. Like italics or quotation marks, these forms of speech indicate the transference or elevation

of the specific proposition that they qualify into a realm presumably more trustworthy. The very use of such terms arouses suspicion in sensitive ears, because we are tempted to use them either to accentuate what does not need their support, or, tending to deceive ourselves with them, to rely upon such affirmation in those spheres of experience, in religious matters for example, where we most desire certainty but where we are most vulnerable to disappointment. Consequently, the term reality ought in no sense to be taken to announce the discovery or possession of an objective world to which it might properly be attributed.

Initially the concept reality presents itself to us not as a discovery of demonstrable phenomena, but as an indispensable hypothesis of the cogency and reliability of our intellectual efforts. We assume that reality, whatever it might be, should be impervious to the passage of time and unhampered by restrictions of space. We require such an assumption although it must always remain unproved and strictly speaking unjustified by experience. These characteristics which we attribute to reality without having experienced them suggest already a fundamental function of this concept: the notion of reality is complementary to the limitations of mind. We are limited by our individuality; reality is common to all men. Each one of us individually has

memory of only a brief span of time. Our perception is limited to a circumscribed space. What justification have we to hypothesize that reality should be everywhere identical and that it should unite, by virtue of its sameness, the fragments of our actual and potential experience into a single whole?

The content of our experience is not adequate to our ideal of reality. Experience is given: we cannot escape its limitations except in theory. The concept of reality is that invention of mind by which we overcome the limitations of experience. In practice we distinguish almost everywhere the intention of self from the presentation of world. We have learned to abstract from experience the quality of self. We have learned to construe that portion of experience in which we no longer recognize our personality as a fragment of reality. The totality of reality which is thus construed we call world. The distinction between self and world fluctuates in clarity, a circumstance not surprising inasmuch as experience itself varies in quality and intensity. Experience is not homogenous, and it must be selectively appraised. The scientific experiment, for example, is so designed as to eliminate the subjective element of perception and judgment to the greatest degree possible. Yet objectivity is never absolute, and to an extent greater or less, all experience is tinged with the consciousness of self. I am always aware

that it is I who am the subject of the perception. Whether it is a glass of wine that I taste, whether it is the intricately clear melody of the flute to which I listen, whether I read a poem, whether I look into the face of a beautiful woman, or for that matter whether I record my observations in a scientific experiment, in all circumstances I am aware of myself as a person rather than as an anonymous, vague, or indefinite subject. The degree of that awareness varies from moment to moment and from experience to experience. Such fluctuations of the awareness of self suggest to me that self and not-self might be fundamentally separable. Likewise, all experience in which self is involved is molded by the givenness of world. The wind, the flute, the wine, the vase, the objects of the experiment as I perceive them, all present themselves to me as independent of my consciousness. I consider them phenomena of the natural world. Again, the dominance of this givenness over experience is inconstant and uneven. On some occasions what we perceive seems more, on others less detached from us, to a greater or lesser extent impervious to our wishes and feelings. This fluctuation of the givenness of experience startles us and causes us to attribute to that which is other than self an integrity and structure of its own. The affirmation of that element of experience that I learn to separate from myself is summarized in the term 'world'.

Although the source of the distinction between self and world is evident in the quality of experience, ~~itself~~ yet the specific definition of the two exists by tradition. It is readily shown that when the conventions of thought and judgment are no longer relied upon as binding, the separation of self and world becomes problematic indeed, and the boundary between self and world can then no longer be distinctly drawn. Occasionally it will seem as if there were no genuine distinction: or again, the demarcation will seem enigmatic, because self and world appear not as contiguous but as generically different. Upon closer examination there is nothing about self that being described or designated in language does not become objective; nor is there anything about the natural world that having been perceived will not become part of the subjective experience and enter into the subjective structure of self. As we examine it more closely, the distinction between self and world loses its definiteness and appears a mere hypothesis explanatory of our experience. The human mind longs perpetually to discover itself personified, a subjective object. We harbor an indefatigable inclination to attribute qualities of objectivity to our selves. Conversely, what we call 'world' will prove to be constituted to a surprising extent by the excursions of our own mind and by the projections

of our own consciousness. Thus the decisive insights into the quality of self and into the attributes of world are comparable. Each of them presuming to be independent is on the contrary intimately interwoven with the other. Accordingly, neither self nor world may be construed as integral or independent. Our task will be to inquire not only how the two may be distinguished, but also in what sense each of them may be said to be real.

The Reality of the Objective World

The history of thought might well be written in terms of the logical balance that every author must strike between the claims to reality of self and of world respectively. So-called idealistic interpretations focus upon a certain element of experience which we may now recognize as being subjective. The aim of idealistic thought is to integrate the subjective qualities of experience into an objective framework. Idealism would attempt to place criteria derived from subjective experience at the head of the hierarchy of objective concepts. Evidently this purpose of idealism to objectify the qualities of self must surmount an intrinsic contradiction. However, when they are properly understood, idealistic theories will be found to have a basis in the structure of our thought, even though they express an interpretation remote from the modern point of view. In our day it is fashionable to deny categorically the import of all subjective experience, so obsessed are we with determining the function of an objective 'world'. To be sure, existentialist philosophy may be understood as a protest against such an objective cosmology. Existentialism, however, appears unable to engage the still victorious theories of rationalism and positivism on any specific issue or on any particular field of experience other than those of religion and art, areas that

seem by their nature impregnable to objective analysis. This inability on the part of existentialism to engage scientific theory on its own ground has greatly limited its effectiveness as theory.

It cannot be our task to intercede either on behalf of a subjective or of an objective view of experience. We should like to consider it our task to free ourselves from all these prejudices in order that we might impartially determine the roles that both self and world, subjectivity and objectivity, play in human experience. On the face of it, the reality of experience is not distinguishable into objective and subjective reality. Yet for purposes of analysis the question about objective reality and that about subjective reality may be strictly distinguished. Subjective reality deals with the question of self and its assertions of beauty, virtue, and deity. These concepts are frequently scorned in contemporary thought even where they receive token recognition. The question about subjective reality is seldom recognized as such, it being assumed that whatever is subjective should by virtue of that fact be unreal. Without endorsing this contemporary preconception, we shall in fact limit the discussion in the present chapter to objective reality. In other chapters the implications of subjective reality are considered in detail; to include

them here would be of no particular value and would serve only to obscure an already complicated exposition that deserves the benefit of every possible simplification. When the argument is completed, the distinction between subjective and objective reality will be seen to consist in a mere formality of presentation.

Objective reality, like its counterpart, comprises several conjugated questions that spring from a common root. The queries, 'What is knowledge?' 'What is nature?' 'What are things in themselves?' and 'What is reality?' are all interconvertible. To understand any one of them is to understand them all. These are the questions that we must analyze, and to do so effectively we must free ourselves of all the prejudices of common sense. We must suspend our judgment about 'world' and 'matter' and 'reality'. Then we may examine experience itself and trace its relationship to the symbols of objective reality. Unprejudiced we have no reason to assume that reality should be synonymous with nature or that nature should be equated with an objective world. In order to arrive at a balanced view of this problem it is helpful to remember that there was a time when reality was held to be synonymous with such theological concepts as 'God', or soul, or spirit. The modern concept of reality refers to the objective world as the instance of prime authority. Mathematics,

physics, chemistry, biology seem to hold the key to the revelation of that reality. It is expected to be the arbiter of all cognitive uncertainties. Against the dictates of reality no dissenting arguments are given a hearing. But only a little thought will show that to apply the concept reality to justify a particular interpretation of experience is circular. For it is only from the interpretation of experience in a certain way that 'reality' as a criterion derives its significance. When all is said and done, the question about reality will be found to coincide with the habitual interpretation of experience.

Ask a man what reality is, and he will likely as not answer you that, of course, the world is real. Common sense would hold that all the world is real, and that all real things constitute the world. Common sense assumes the absolute identity of reality and world. So long as the concept reality lacks further definition, it is consistent to assume that we are capable of apprehending reality, that we have knowledge of world, and that the two are identical. However, when we recognize that the characteristics of world are not self-evident or self-explanatory, and when we refuse to define reality apart from the specific experience in which we recognize it, then this identification of reality and world becomes questionable. Then it becomes plausible to re-examine the notion of world in

order to ascertain whether world and reality do in fact coincide or not. The concept 'world' has at least two implications. One of these implications concerns the objective quality of specific experiences. The other of these implications goes far beyond what we, in a short lifespan, can see or hear or know. Our image of world is an idealized one: it implies order, arrangement, and inclusiveness far beyond the narrow circle of our personal experiences. These connotations of the term world are most suggestively expressed in the Greek word kosmos. Consequently we must distinguish between the way in which world becomes apparent to our experience and between those postulates which the concept world makes upon our rational and imaginative faculties. To speak of world is to conjure into the narrow confines of our consciousness unlimited space and unending time. It is to summon up a wholeness and a completeness that is never even approximated in experience. 'World' includes not only that which actually enters into our experience in the present, but that as well which became part of it in the past. It takes account also of all that though presently unknown could conceivably contribute to experience in a future present: a totality incomparably in excess of the practical content of our lives. In other words, the concept world designates not only all that we have experienced or all that we might experience; it means simply all that exists, all that has existed and all that will

come to exist. Moreover, it implies not only structure but process as well. World includes the change by which all that exists comes to be, by which all that fails to exist is inhibited, the power by which nature is constituted, and the fault through which it perishes. Evidently all these circumstances are matters of conjecture for us; they are wholly removed from what we know at first hand, and such ideas as we have of them are pure speculation. Apart from the totality that is implied in our concept of world, there is also our expectation of orderliness. All segments of reality are presumed to exhibit both within themselves and in their external relationships, pattern and regularity. Objects are conceived of as having finite boundaries in space and as obeying necessary laws in time, both in their own mutation and in their interaction with one another.

As soon as the implications of our concept world are elaborated, a discrepancy between the world of our concepts and the reality of our experience becomes apparent. The world is far in excess of anything that may ever enter into our experience. This discrepancy between the image that we designate as world and the cogent quality of experience that we call reality, in itself suggests that the two may not be identified, and particularly, that the world to some extent at least must be called unreal. If experience is real, then that world to

which we alluded is relatively less real; but if that world is real, then experience is trivial. The dilemma which is thus created for our minds is a significant beacon in our search for a consistent theory of reality. To this dilemma there appears but one single solution: to postulate that world is not identical with reality but that it is a concept projected from experience. This postulate will be expanded into detail in a different context. At this point it is necessary only to conclude that reality and world are disparate, that our concept world cannot adequately explain what we mean by reality, and that reality implies both less and more than the concept world.

The sophisticated, scientifically minded man will be inclined to identify what is real with what is objective. He means by what is real the physical world, and by what is objective our knowledge of that physical world. By equating what is real with what is objective, he presumes at once that our knowledge should be sufficient to the reality it seeks to comprehend. However, to apply the term objective to that reality is either to underestimate the reality or to overestimate the knowledge. To call things in themselves objective is to deny the unavoidable distinction between what we know about an object at this time and the totality of what might be known about it in all time

both by ourselves and by all others. The equation between objectivity as a characteristic of knowledge and reality as a quality of nature is contrary to the most elementary experience. For the present, however, we may ignore this contradiction and proceed to inquire further into the characteristics of objectivity.

The acquisition and exercise of knowledge is invariably accompanied by an awareness of self as distinct from the object known. Some qualities of knowledge appear to be constant and independent of the observer; others are evidently variable and dependent upon him. The hypothesis of objectivity implies that those qualities are objective which are independent not only of any particular observer but of all observers in general. We define as objective what remains the same for different observers at different times. Clearly, the hypothesis of objective knowledge is fostered by the existence of an homogenously educated intellectual society and by the rapid reliable communication that creates and maintains the uniformity of intellectual attitudes. The individual living to himself should have much difficulty in determining the objectivity of phenomena, particularly if they were non-repetitive. The best he could do would be to observe and to record his observations, then to observe again and to compare the second observation with the record of the first one. However, when the observations are precarious and

the interval between them prolonged, it might well be difficult to arrive at a satisfactory standard of objectivity. The direct comparison of successive observations would be impossible. Inasmuch as objectivity is characterized by constancy and sameness, the question becomes unavoidable to what extent this reliability would be a function or a property of the natural object, and to what extent it should be recognized as nothing more than the projection into nature of the rigidity of our own thought and of the supportive conventions of our intellectual community.

The practical value of an objective scheme of reality in itself may be sufficient to convince us of its validity as one approach to the natural world. On the other hand, it must not be ignored that the criteria by which objectivity is elevated to reality are not consistent and cannot be consistently applied. However true it may be that the constellation of objective phenomena is more effective than the tentative compunctions of subjectivity, yet by the very token of criticism by which we distinguish between the two, any objective reality that we are able to know cannot deserve that appellation in the ultimate sense. Even that reality which presents itself as most genuinely objective is inadequate to the strict application of the rules by which objectivity itself is defined. To state it

bluntly: objectivity is relative. To some degree our knowledge is always dependent upon self; even at its best it is only relatively objective. Objectivity is relative in the first place on account of the hazard of communication. There is no way of making certain that comparisons of knowledge are valid, that what another man explains and what I understand should be identical. There is, furthermore, no certainty that knowledge is coincident with that of which it is knowledge. In practice the uncertainties of communication are ignored; there is a high degree of correlation between what knowledge leads us to expect of an object and what we actually encounter. Yet, however high the degree of uniformity that our knowledge possesses, still the certainty that we obtain is relative, and if we remain true to our initial postulates, unsatisfactory. Such considerations may lead us to conclude that the facile identification of reality with objectivity is meaningless. We shall return to a more detailed discussion of this problem in the chapter on knowledge.

If the question about reality is settled in public life by academic and intellectual convention, it continues to be an urgent dilemma for the individual. What is real must always be real for some individual at a particular time and in specific circumstances. All notions of independent reality separate

from the individual must be considered expansions of this personal experience. Yet by its very nature, reality tends to become a public concept; indeed its universality is such that it would demand to apply even to non-human experience. It is plausible therefore that the private problem of reality is frequently merged with the public one and seemingly solved thereby. The question about reality defines one of the most significant intersections of the private and the public world. One might well call it the central problem of philosophy. If philosophers no longer trust themselves to speak about reality, their reluctance should not be taken to imply that reality has already been defined, much less that the task of defining it had vanished from the proper sphere of philosophy. In our day every educated person presumes to know how and where reality is to be discovered: in the realm of natural science. And for this reason the question about reality seems to have become superfluous. We are no longer expected to ask it. Perhaps it has never seemed prudent to ask about reality; perhaps a 'working hypothesis' of some kind has always been accepted as a practical necessity. If it should seem to us now that the question concerning reality was given more thought in times past than it receives today, this impression may well be illusory. The 'working hypotheses' of past centuries have vanished; probably they were adequate only within a limited sphere of

experience. What remains are the writings of men who wrestled with the same problem that is before us now, who found it actual and unsolved. Almost surely their concern was no reflection of any wide-spread public interest. Probably the question concerning reality has never been a popular one. Today the physicists, chemists, and biologists, are thought to hold the key to the answer. If they have not yet unlocked the secret, we imagine them, as it were, on the threshold of discovery. Perhaps it is the excessive fascination with the technical achievements of our scientific culture that prevents us from recognizing reality for the problem that it is. The proper task of individual cognition as well as the burden of the common intellectual effort appear to have been preempted by science. As things stand it must seem presumptuous that any one individual should hope to speak with authority concerning reality. This problem, if indeed it were admitted as such, should be under the most intensive scrutiny of highly trained specialists. Its solution should be the goal of research occupying the keenest minds, not to speak of the economic resources of the most powerful nations on earth. This question will be answered by nature herself, and if she is reluctant to divulge her secrets, we are prepared to wrest them from her by tricky and intricate interrogation. Technical innovation and theoretical invention have already furnished us with powers

but recently undreamt of. Do they not also promise to provide this ultimate victory in the search for truth? Science jealously guards the enigma concerning reality as its own possession and demands that anyone approaching it be conversant with the manifold details of scientific theory. The question ~~concerning~~ about reality is concealed from rational inquiry by a maze of actual or imagined scientific fact. Who dares ask this question when he cannot possibly pretend to possess so vast an array of scientific information? The scientist , if he is willing to grant meaning to ~~this question~~ the problem at all, will take it for granted that the touchstone of reality is to be found in his particular branch of science. Otherwise, recognizing the question to be valid, he will rule upon it as if the answer were self-evident, denying to the uninitiated the right to think and the right to question. Proficiency in the intricate details of a particular science always seem prerequisite to the knowledge about reality. Whoever dared to search these questions for himself would be burdened with the most incredible labors, tasks of learning which like the impossible duties imposed in fairy tale and myth, a poor mortal should be able to fulfill only with the help of the fairies or the Gods. Meanwhile, secure in their technological empire, the scientists themselves propose theories of reality that reflect primarily the intricate instrumentation with which they measure and analyze natural phenomena. The

more complex such instruments become, the more incomprehensible the theory, the nearer they would have us think we had approached our goal. One may value scientific theory for what it is and for what it does, but one may doubt that it leads to an understanding of reality in the sense of our inquiry. The more intricate and obscure the theories become with which the scientists presume to reveal reality, the more they resemble those robes of the emperor that only the wise can see.

Meanwhile it is absurd to demand that a man be a specialist in physics or chemistry or biology before he is entitled to ask the question about what is real. However powerful an intellectual discipline science may be, it is not an exhaustive description of our experience. The information collected by various scientific disciplines accumulates faster than even the most agile mind can survey it. Specialization and sub-specialization cannot begin to cope with this profusion of facts. The division of knowledge is unsatisfactory to the individual coping with his own problems. A misapprehension concerning the quality of what is known tends to block the search for reality. It is of much practical import that the very process of acquiring technical knowledge, the training that makes the scientist, presupposes already a solution to such questions as we seek. The practical effect of scientific education is to make the question about

reality meaningless. That is why the scientist is perhaps fitted less well than anyone else to ask it. To be sure, in theory science always makes logical reservations that take account of its limitations. Scientific theory does presume to leave room for questions such as we ask. But the logical limitations of scientific theory are afterthoughts. They contradict the very assumptions that made the development of science possible. They are at variance with the discipline by which scientific knowledge is acquired. It is in the process of learning that the mind is molded, and no sceptical backward glance can shake the dogma implicit in the discipline of scientific education. In every case a definition of reality is concealed already in the rules of thought. In all his learning and in all its practical application, the scientist must already presuppose a usable resolution of the question about reality. It seems then that he cannot ask that question with sufficient vigor because the vows of his calling preclude the uninhibited research of the problem. The non-scientist is barred from asking the question because he is uninitiated and has not acquired proficiency in any or all of the scientific disciplines. In this way our intellectual conventions prevent the inquiry concerning reality. In the place of a deliberate examination, the question shall be silenced by default. ¶We have no reason to anticipate a definitive scientific solution to the enigma of reality at any time.

Granted, however, that a scientific answer might be forthcoming at some future date, what would it profit us? Reality cannot be made a problem of the future; the future is too remote, the question about reality is too pressing, fundamental as it is to our judgment and to our understanding. The question concerning reality will not be postponed. There is no thought that we entertain which does not require an implicit hypothesis about reality. Deprived of this reference, our minds should be paralyzed, our thought should become vacuous and irrelevant. Unconsciously our minds are continuously at work producing such hypotheses of reality and amending them as the occasion demands. We always entertain culturally determined presuppositions about reality as the inapparent basis of our intellectual activity. The purpose of this essay is to make these presuppositions explicit.

Experience is an individual phenomenon, thought is an individual act, and a judgment is an individual decision. Likewise reality is primarily the problem of each individual. It is the essence of his experience, it certifies his knowledge, and it guides his action. The individual inquiry about reality is urgent: it cannot wait. The answer that is not sought deliberately will be supplied by implication. Prevalent notions of reality are actually consequences of just such an

inconspicuous substitution of ideas. If the makeshift and improvised nature of these answers were recognized as such, they should much less likely become entrenched as dogma. The question about reality remains open: it presents itself as one of the most challenging intellectual problems of our own and of all time.

Intellectual effort in general may be construed as an inquiry into the existence of our world, both in its totality and in its parts. We are concerned to establish those objects that are; we wish to deny the existence of phantoms that might deceive us into falsely attributing existence to them. We need to separate actuality from fantasy. In our conduct of practical affairs it is of supreme importance that we arrange for ourselves clearly and unequivocally what exists. Our systems of natural science are the programmatic attempts to discover the dynamic interrelationship between the parts of our world. So long as such attempts are limited to practical matters, so long as judgment is everywhere confirmed or denied by immediate experience, no difficulties arise. There need be little question about the way this table or this chair or this typewriter exists. Our contact with them reassures us day by day that they are constant in their shape and mass and function. It is, however, quite a different matter to ask, for example, in what way heat

or electricity exist, viruses or enzymes, electrons or mesons, or the galaxies of the Milky Way. It is meaningless to attribute to them existence identical with that of a chair or table. To generalize, we may say that we have no difficulty in apprehending the existence of physical objects that are proximate to us, those objects whose size and duration make them accessible to our perception, particularly if we have designed and built these objects ourselves thus unequivocally understanding their origin and their purpose. If the size of the object becomes so great that we cannot survey it, or if its dimension becomes so small that we cannot perceive it, if the duration of its existence is so brief that it cannot impress our senses, or if it becomes physically so remote that they cannot grasp it, if the object becomes so intricate that we cannot identify its structure, its origin or its precise function, then for good reasons uncertainties about the reality or the existence of that object arise. Evidently difficulties about reality vary with the uncertainties of our relationships to objects concerned. It is an over-simplification to summarize and to presume to solve all of these difficulties in terms of a single concept: reality. However, if these essays succeed in becoming exercises in thought, it is possible that for specific problems solutions analogous to the general outline

presented here might be developed. If such application to specific problems proved feasible, the theory offered here would have accomplished more than ~~exceeded all functions that~~ might reasonably be demanded of it.

Whenever the question about reality confronts us, we orient ourselves by referring to those objects that because of their dimensions, duration, and accessibility are most familiar to us. When we consider the possible existence of an object remote from our experience, we call it real in comparison with the reality that this chair or this table holds for us. The scientific estimate of reality is similar. The light years or Angstrom units, the micromicroseconds or the billions of years which concern the scientist are projections or contractions of that same time or space that is familiar to the senses. The scientist relies upon models that implicitly reconcile the inaccessibility of the theoretical object with the compelling familiarity of things that he can see and touch with the unaided senses. Refinements of instrumentation and the complex abstractions of mathematics may obscure such habits of intuition, but the mind is limited and requires that objects of astronomical or infinitesimal size be compared with objects of more familiar dimensions. It may well be practical ~~and useful~~ to assume that objects familiar to us represent a suitable pattern

for reality of all dimensions, yet the usefulness of the assumption is not necessarily indicative of its intrinsic correctness. It is equally plausible to argue that any derivation of reality from physically proximate objects reflects specific limitations of the theory of reality or of our cognitive apprehension of the physical world, or of both.

Nonetheless, when we desire to know about reality, we reflect upon the quality of objects that we presume to be its familiar prototypes. We expect to understand the reality of world in terms of the actuality of this chair or table or of this tree. This customary procedure gives us cause to inquire into the quality of reality even of such familiar objects. We must then ask what characteristics this chair or this table should have that make them real. We ponder what should be implied if these objects were found in some sense at least to be unreal. To many a reader it may well be disturbing to postulate that the reality of these familiar physical objects should be open even to the shadow of a doubt. One might be tempted to indict the whole intellectual business that threatened to lead to so absurd a conclusion. We shall try to show that there is nothing subversive in the notion that even a familiar object, or at least the image that is its sole representation to the mind, might possess some degree of unreality.

We may summarize our argument about reality to this point. Everyone should like to think his view of reality to be determined by reason. Especially the scientist would like to assume that his view of reality is rational. But, if we are correct, reality as all of us have learned to believe in it, is the product of an intellectual tradition the grounds and recesses of which remain to be fully explored and analyzed. However educated and refined our views of nature have become, they continue to be grounded in unproved presuppositions. Seldom if ever are our notions of reality demonstrable in the contingencies of the here and now; they are projected upon the present constellation of experience from firmly established habits of thought. The sense of reality is a skill of judgment and of discrimination which mankind has learned in the course of centuries. Perhaps it should be considered like some magnificient invention, such as the discovery of fire or the contrivance of the wheel. In a similar way, the hypothesis of reality enables the intellect of man to cope more effectively and productively with the natural situation in which he finds himself from moment to moment. That our notions of reality should belie this origin, that they should appear to arise as unavoidable consequences of the specific situation that they explain and control is, if anything, a sign of the measure of their success. Closer inspection of any such

cognitive situation however, can leave no doubt that it does contain its own criteria of reality. Unless we approach the phenomena of world with preconceived notions, we are at a loss to interpret them. Our preconceptions about reality are highly specific. Implicit as they are, such assumptions concerning reality are difficult to demonstrate, and even more obscure are the inapparent habits of thought, based upon such preconceptions, that determine the direction of our judgment on each occasion of decision.

Reality of Time

Our notions of reality will be the more readily demonstrable, if we distinguish in them a spatial and a temporal dimension. Reality is both immediate and remote, and reality, especially in its remoteness is assumed to exist in space and time. The limits of space and time are inapparent. The ~~remote~~ distant regions of these dimensions of reality, are, in a practical sense at least, absolutely inaccessible to us. The further we proceed in our search for the physical limit of reality in time or space, the less hope do we have of ever attaining their boundaries. Qualitatively our apperceptions of time and space are always determined by the more proximate and tangible reality. We assume that what is immediate to our perception should serve as a structural pattern to be projected into the endlessness of space and time. From objects of a size comprehensible to us we extrapolate our ideas to dimensions so vast that we cannot survey them or so minute that we cannot perceive them. The logical mechanism for such projection is a numerical one. We multiply years or miles by astronomical or infinitesimal figures as it suits our purposes. As our scheme of reality extends in time, we shall refer to it as historical; to the extent that it is spatial, we may call it physical or geometrical.

The fact that it is convenient to examine spatial and a temporal dimension of our concepts of reality should not be taken to imply an uncritical acceptance of the absolute division of space and time. In our high school physics classes this distinction seemed impressive indeed, since it provided neat answers to many of the problems that were presented to us. Perhaps we then endorsed it with too much enthusiasm, because now we have reservations and find ourselves puzzled by the wholeheartedness of our previous assent. We see now that the spatial and temporal aspects of reality frequently overlap. To separate them is not to accept a natural distinction, but merely to employ a simplification which is permissible at least for purposes of exposition.

We have described our problem, and with its description the path to its solution is implied. Initially we should make explicit the notions of reality that we in fact entertain. Until this is accomplished, the notion of reality is likely to remain indistinct, expressed in habits of thought and formulas of decision that though immediate to our intuition are relatively inaccessible to logical analysis. Then we must compare these notions of reality with the evidence of the immediate apperception in which they are grounded. Discrepancies will become apparent, and from these discrepancies we may draw

reliable conclusions concerning reality both as a concept in abstract thought and as a function in practical decision. The immediate apperception of the physical world is self-evident throughout all moments of our waking lives. The deficiencies of this apperception will be shown to be compensated by our expansive notions of reality.

The customary division of the temporal sequence into past, present, and future is more problematic than we are accustomed to admit. Seldom if ever do we examine the distinction between these divisions of time. Our thought implies that past, present and future should each possess a separate duration. The moments of transition between past and present, between present and future are likewise taken for granted. We shall do well to reexamine them. When we have reviewed our actual experience of time, and when we have compared this with the traditional theory of history, we shall have made a good beginning of the analysis of reality.

As we use the term present in conversation or in exposition, the context of the argument defines its meaning. A general definition for the present is rather more difficult. There is no specific reason why we should not consider as present this minute, this hour, day, week, month, year, and with a

slight effort of imagination even this decade or this century. In conducting the affairs of our daily lives, we find such conventions highly useful. We may consider the present that period of time in which, for example, we keep our accounts open, for which we pay taxes or collect rent, concerning which we find it worthwhile, for example, to engage in political discussions. Yet it is almost superfluous to point out that in any strict sense, the political events with which we are concerned, the business affairs in which we find ourselves involved, though of the present, are also of the past, and unrecognized but ominously of the future. If we attribute them to the present, we do so not because they differ qualitatively from events in the distant past or the remote future, but because we find that our present conduct is contingent upon them and that they tend to determine the specific activity in which we discover ourselves engaged. This practical definition of the term present is obviously at variance with the stricter theoretical definition. Speaking literally, what happened an hour ago, or even a minute ago, is already history. It is as inaccessible to our experience as the events of a hundred or a thousand years past. Accurately considered, all that we call present in political or financial affairs is either already history or is still anticipated future. The

contents of our newspapers, of radio and of television broadcasts are not really accounts of the present. They are history and prophecy no less than the history and prophecy of ancient chronicles. What we call 'news' is the recollection of recent happenings and the anticipation of those in the immediate future. Insofar as such news refers to events that have already occurred, it is history. These events are as unalterable as those of the more distant past. News is never 'happening'; either it has already 'happened', or it is about to 'happen'. The notion that events are in process of happening is a psychological illusion. It requires time for the mind to assimilate new facts and to accustom itself to an altered situation. Events seem to be occurring in the present when we entertain some doubt concerning their finality and when we have not yet had time to become familiar with their implications. Similarly we do not recognize the prediction of events in the immediate future as prophecy, because when with so great regularity yesterday's prediction is confirmed tomorrow as fact, the uncertainty and suspense of the future seem obviated. The mind that is regularly confronted with predictions of great likelihood will tend to identify the prediction with the event, and will expand its present to include what should otherwise have remained in the future. Strictly speaking however, the term present requires a more limited definition; all events,

except the single act that now exhausts my attention, are either in the future or in the past. Perhaps our notion of the present can best be understood as a psychological accommodation to the mutations of reality that we could not otherwise comprehend.

For the practical present, if we may call it so, we discover only a relative definition. Its dimensions are determined in part by the speed and range of communication, by the breadth and quality of our concern for the particular event, and by the sensitivity and energy of mind itself. Insofar as the boundaries of the present are determined by the characteristics of attention, we may speak of a psychological present. We live in continuing relationships both of perception and action with the world. These processes of perception and action require duration; so long as we are confronted with a continuing stimulus, the duration of the present even remains inapparent to us. It becomes noticeable only when attention falters or when the object of perception changes. Then we become aware that what was recently present to our minds has been newly displaced. Of duration as such we are unaware; all our recognition of change is sudden. Indeed the awareness of change seems to be the main source of our concept of the instant. The instant designates our recognition that some particular aspect of our world has changed. It is readily demonstrable, moreover, that

the instant of change of which we become aware does not coincide chronologically with the physical event. The image of objects perceived lingers in our eyes for a brief yet measurable time. There is an interval during which our perception of a recent stimulus persists although the object responsible for it has vanished. There is likewise an interval before we become fully cognizant of the existence and of the significance of a new stimulus. Thus the present of perception is an ambiguous term. What we perceive of the outside world we perceive as enduring. It is only the awareness of change that is instantaneous, and if the present were to be defined as a moment of time, it could have only this subjective meaning.

The present of action is no less difficult to define. While our thought is dominated by our intentions, the action planned ~~intended~~ is yet in the future. Once the action has commenced, the moment of determination is already past. That segment of time in which the anticipation of future action is transformed into the memory of beginning, that initial instant of action, is not scrutable even to the most careful observation. Our actions enter into our consciousness through a perceptual process no different from that by which we recognize all other alteration in the world. Most of our actions we do not recognize until they are well underway. When recognition does come it

will be sudden, but in no sense simultaneous with the onset of action. The intervals of present perception and of present action are variable and inaccessible to introspection, but their duration may be measured objectively by psychological methods. Such studies will document the ambiguity of our notion of the present, but they cannot remove it.

These considerations only serve to demonstrate how difficult the present is to identify. A mathematical construction of time will be of no help: there the present becomes merely a boundary between past and future. Such a present, representing as it does a mathematical limit, is physically insubstantial and psychologically meaningless. The mathematical definition will be even less suitable a designation for the present than other interpretations. It is meaningless to seek reality in the future; it is incongruous to posit reality in the past. Thus only the present remains as the locus of reality, but as soon as we begin to examine it critically, the present slips from our grasp and we are unable to define it. In practice we assure ourselves of an objective present by reflecting upon events that are repetitive and upon objects that are constant. It is characteristic of constant objects that they offer us perceptual stimuli which although not identical one with another are at least so similar as to be indistinguishable.

Thus they provide us at least with the illusion of duration. It is a valid inference that subsequent perceptions differ from one another, if only slightly, so that no instant of perception is wholly identical with its successor. However, mind is unable to distinguish minute differences in perceptions, and this inability gives us both the illusion of the permanence of objects and the sense of duration of the present.

The primary organ of historical knowledge is memory. All other sources of history depend upon memory for their meaning. Memory is much more than the ability to repeat propositions once heard; it is more even than the ability to recognize and to reproduce familiar ideas. Memory in its broadest sense must be defined as the capacity of mind to recall its past dispositions. It is the ability of mind to revert to a previously acquired pattern; indeed it is the ability of mind to acquire and to retain pattern in the first place. In a particularly effective sense, memory is the capacity of mind to repeat action that it has once learned and to persist in habits that it has formed. The constancy of action, the persistence of habit, the endurance of once acquired ability are among the most effective qualities of mind. That nothing with which it has once been in contact should leave the mind unaffected is one of its basic physiologic properties. Thus mind preserves to an extent

greater or less a record of all that it has seen and all that it has done. Nor is this record of mind passive. Mind does not read the past as from the pages of a history book. Memory like the script of a play is a record that is re-enacted by the mind and that becomes intelligible only in its reproduction. When suitably similar circumstances arise, then the mind relapses into a state analogous to that which it once experienced, then with an appropriate qualitative distinction mind recapitulates the event that formerly occupied it. In this primary sense history is an expression of the mind's ability to re-enact the past, to become concerned once more with circumstances that are now only imaginary. History comes naturally to mind, because even in its present, mind lives in a world furnished largely by imagination. The things which it fears, the things which it loves, the things to which it is attracted, and the things from which it recoils are predominantely creatures of its own invention. The problems of academic historiography assume a new significance and a new charm when they are recognized as extensions and elaborations of the intellectual practice of daily life.

For a reason that is not difficult to understand, language plays an indispensable role in our reconstruction of the past. Language has the unique property of being the most adequate

reflection of our experience and at the same time one of the most powerful sources of it. Language can capture better than anything else the immediacy of experience, and language can control best the pattern of thought and of action. Language is an activity capable of being reproduced virtually at will; it creates, as it were, an artificial environment for mind, so convincing that it may displace, modify or substitute for the natural world that surrounds us. Because of its familiarity, speech is a most effective instrument for reawakening memory. The power of speech and the ability to recreate the past are closely linked. It is difficult to imagine a useful image of the past in the absence of language.

Customarily, the past is considered as nothing other than the present separated from us by elapsed time. We view the past as a river that continues to well from the spring of the present. Paradoxically, we also treat the present as if it had an historical fabric. The various explanations of present and past are inconsistent; they reflect particular limitations of our perceptual and cognitive abilities. The reality of the past must in no event be considered greater than the reality of the present.

Nor may the reality of the past be confused with history. History is an invention, a composition, a web of concepts which provides mind with the occasion for recapitulating past experience. History is concept, always in process of elaboration and modification, never definitive in form, never final or complete. This verbal account may give mind some intimation of the reality of the past but it cannot comprehend or exhaust that reality. The historical record must be distinguished on the one hand from the reality to which it refers, and on the other hand from the mind that invents it and relies upon it as pattern and as guide. The more we scrutinize it, the more the reality of past appears absolutely inaccessible to us.

The definition of history as the conceptual description of the past must be reconciled with an altogether different meaning of the term. In this sense history is used to designate merely an account or description without reference to elapsed time. We speak of natural history or of the history of animals, referring to descriptions applicable to any present and not necessarily to a specific past. It is assumed that the circumstances, for example, of natural life

remain fairly constant and may well be summarized by general descriptions, as is indeed the case. This simpler meaning of history implies some insensitivity toward the uniqueness, finality, and inaccessibility of events, an insensitivity akin to that of the child whose mind is yet dominated by the happenings of a recent past, who lives in them as if they were even now occurring. To such a mind the lapse of events into a past is equivalent to their being forgotten. The apprehension of the past as inaccessible appears to be a substantial intellectual achievement. We postulate an infinite regression of moments each of which once claimed the distinction of 'now'. This assumption defines the province to which we restrict the term history. It refers to the apprehension, recollection, and reconstruction of a chronological past.

History is the conceptual reconstruction of past. In its simplest form it is the story of my own experience, related by me. The events of which I speak now are, in a sense, experienced twice, once in the original circumstance, and now in my account of them. As the events which I describe are developed by my memory, they become real to me once more. I remember them with a vividness comparable to that of the original experience. Consequently my story possesses a dual reality. There is the present reality of the processes of memory and expression. There is

also the past reality of the events to which the story refers. Clearly, the two realities are not absolutely separable; the original experience left some impression on me which is now demonstrated in the historical account. Even in its origins, however, the primary experience was not unequivocally apprehended. A logical construction was present already at the occasion of original experience, and this logical construction is largely responsible for the memory of the experience as I come to possess it. Even then I was already summarizing impressions, drawing conclusions, and relating the particular happening to a larger conceptual framework. A different way of expressing the same notion is by pointing out that much, if indeed not all of our experience becomes real and meaningful to us within an intellectual framework that is essentially historical. If this were the case, then history and experience should be allied from the very beginning, and the distinction between them would always only be a relative one.

The verbal account of my experience may be committed to writing. Then it is no longer the exclusive property of my own memory. It becomes accessible to anyone who reads it; his understanding of it will have been prepared by a community of thought and of experience. Such primitive written history should be construed in the first place as a kind of diary, a

written reminder by the author to himself not to forget what he has experienced. Such a diary would be a source of knowledge to another reader only secondarily. Assuming that there were such a second reader, the diary would be meaningful to him only to the extent that he equated himself with me, attempting to recapitulate and to share my thoughts and my feelings, to reconstruct insofar as was possible the primary situation from which the particular historical description arose.

It is only a step, and not a very long one, from the description of what I myself experience to the account of circumstances and events in the world distinct and separable from me. It is as a matter of fact, not at all easy to draw a line between the events which belong to me, of which I was an essential part and which, in turn, should be essential to my being, and those other events that are 'outside of me' and have 'nothing to do with me'. It should be quite impossible for me to account for my own experience without including many events that are genuinely separate from me. Perhaps, for that matter, the distinction between private and public events may prove facetious. After all, everything that I see is in a sense mine, and that which is truly remote would be totally unknown to me. But whatever I describe, whether it be mine or whether it be remote, whether it be an event separable from me or not,

if I see it, I do so with my own eyes, and if I describe it I cannot but use my own interpretation. The discipline which a common intellectual environment exerts upon mind tends to make us oblivious of the dependence of all historical accounts upon the human mind. Although they are apparently clothed in objective terms, the fire, the storm, the battles, which I describe as spectator are nonetheless reflections of my own experience. To what extent can objectivity enter into the historical account in its origin? If the initial account is subjective, can objectivity ever be injected through a secondary or tertiary interpretation? It is the task of the historian to reconstruct from sources at his disposal as objective an account of past reality as he is able.

The modern discipline of history is far removed from the subjective chronicle that we have just described. History has developed into an elaborate system of concepts. One of its chief accomplishments is the systematic elimination of all subjective bias from the description of past events. History has succeeded in giving a description of the past that appears free from the limitations of any one individual's point of view. Thus it is a projection far beyond the simple account of what any one ~~individual~~ person might have experienced. It is a composite logical description from which the individual who understands it may deduce all manner of specific fact. One may argue plausibly

that through this disinterested universality of history our thought attains a degree of reality of which no individual experience is ever capable. This is a matter of definition, and a point about which we need not quibble. It is certainly convincing to argue that individual experience is so fragmentary and fallible that it is relatively unreal in comparison with the inclusive interpretative scheme of the past that history has to offer. From this point of view it would be correct to call the individual experience unreal in comparison with the reality of history. However, it is equally possible to take the opposite viewpoint, and to argue that our only access to reality is through our own experience. History is relevant as transformation, inference, combination, and interpretation of the experiences of concrete individuals at specific moments of the past. It cannot, however, recreate or represent such experience. As a conceptual synthesis it deserves much admiration, but its claim to reality is entirely beyond demonstration and beyond proof. History should be wholly incomprehensible if it were not capable of being reduced in its origins to the experience of a given individual at a given time and in a given place. The objectivity of history can never win for it a degree of reality greater than the reality of the archaic event as it entered into the experience of the original observer. In other words, if history is real, then it is most real where it is

simplest: namely in my account of the events to which I myself have been a witness. The complex expansion of history into a conceptual discipline possesses many theoretical and some practical uses, but the greater the conceptual completeness, the more remote history becomes from reality as we have chosen to define it.

History as Reality

One of the most characteristic difficulties of history as it is written is the problem of determining precisely what sorts of circumstances and what kinds of events should be included in the traditional disciplines. This, it turns out, is very much a matter of convention. To one generation, military history, the account of wars and of weapons seems most significant. Another generation values the history of governments, of kings and constitutions, so-called political history. In yet a third environment, social or economic history will be considered the most valuable object of study. The religious individual will be concerned with church history and with the biographies of gods and of saints. There may be histories of science, of art, of music, of literature, and even of philosophy. Finally, each individual will have his own personal history, significant to him as the reflection of his identity. This personal history will merge into the history of family, of clan, of community, of state and finally of nation. It is not difficult to show that most history may be construed as an expansion of such personal interest. One may then construct a system of values according to which the relative importance of the different historical topics would be judged.

Besides those events whose significance to the individual or to the community causes them to be included in the traditional historical disciplines, there is a much larger, indeed an almost infinite group of events and circumstances, of no practical importance to anyone, which nonetheless fall within the theoretical framework of history. These are trivial events, but their reality, if reality be consistently defined, is no less great than that of the most portentous. The selectivity of historical interest remains unjustified by rational considerations. The artificial and arbitrary limitation of history constitutes its most serious theoretical weakness. Since the number of events is infinite, and any event is of potential historical significance, history will always be incomplete. Conversely, a completed history should have to comprehend reality in its entirety. Assuming some immortal spirit would prepare such a cosmic chronology, of what use would it be to a mortal mind? Furthermore, the criteria of historical significance on which we rely are inconsistent. Who will set himself up to decide what is memorable and what deserves oblivion? How can history be written unless this distinction is made? From a sufficiently remote point of view, all criteria of significance will appear parochial and personal, in irreconcilable conflict with the postulates of completeness and universality.

Paradoxical as it will seem, the reality of events cannot be related to their historical importance. The tree that falls unseen in the depths of a forest falls just as surely as the tree that is cut down in front of my window. The avalanche that descends unrecorded in the mountains, descends just as surely as the avalanche that annihilates a village. An undetected storm may blow just as fiercely as the storm that wrecked the Spanish Armada. An unnoted earthquake is no less real than the one which wrecked Lisbon. The raindrops that fall unccunted and unmeasured over a meadow are just as real as the raindrops that, for example, extinguish a candle or make illegible an irreplaceable manuscript. The reality of an event, in other words, must be considered absolutely distinct from its magnitude and from its historical relationships, if only for the reason that historical significance is something that an event may acquire in retrospect, long after it has happened. Reality, if the term is to have meaning at all, must inhere in the situation and in the event. It is self-evident that subsequent interpretation can neither magnify reality nor detract from it.

It appears then that what is commonly called history is but a minute and arbitrary excerpt from a much larger sum of reality. Conversely, a responsible search for reality cannot

content itself with the haphazard and arbitrary selection by ~~historical~~ parochial prejudices. The history that we postulate includes prominent events and obscure ones without discrimination. In a genuinely theoretical consideration we have no cause to distinguish between the trivial and the significant historical events, because we have shown that such distinctions are relative. Consequently we need no longer refer for the selection of historical events to some particular point of view or to some established system of value. History, in the sense in which we now designate it is the potential totality of all events, significant and trivial alike. With this definition in mind, we turn now to examine the structure of history.

The fundamental task of history is to provide a rational explanation of the content of time. It accomplishes this task by designating a series of events and by providing appropriate rationalizations for them. Thus, for example, history teaches about such events as the Fall of Rome, the American Revolution, or the First World War. Events become meaningful in part through their chronological relationships. Every event has a date which defines its position with regard to every other event. Frequently only the year or the month in question are known; for other events, particularly for those of recent times we know the date and even the hour. Theoretically, as we shall

show, the number of events is infinite, and even the number of events of historical significance approaches infinity. They are commended to our attention as a hierarchy, the event of greatest consequence being superior to all others, events that presumably exercised a lesser or more uncertain influence upon the course of history being subordinate. Events, according to the implications of the theory, are instantaneous, and events in different places may happen simultaneously. In theory, therefore, the set of events might be everywhere dense both in space and in time. However, by the same token that events are instantaneous they are not themselves recognized except in their consequences, and it is by their consequences that events are judged. Our historical judgment is a systematic process of inference to events, which, as we shall show, are in themselves quite inscrutable to us. Frequently an event is recognized in its full significance only long after the happenings that presumably constituted it have transpired. Indeed, the events that acquire historical significance seem to differ not at all in their structure from events that are trivial and unnoticed or soon forgotten. We have already noted this fact, and we have suggested that the uncertain significance of events makes it imperative that a responsible theory of history should account not only for those particular events that seem meaningful to us now, but for all events whatsoever.

When we examine the events to which history ascribes great importance, we quickly recognize that they are not in fact instantaneous. We refer to them as events because in the perspective in which we consider them, they are conveniently considered as if they possessed no duration. If, however, we interpret such events by referring to their primary historical reality, even a superficial analysis will show that they were anything but instantaneous. The Fall of Rome implies for example a sequence of events lasting hours if not days. The American Revolution refers to a series of military actions and political decisions that span a full fourteen years. Other historical events are of shorter duration; for example the assassination of Julius Caesar transpired in but a few minutes; and the wrecking of the Spanish Armada may have taken only a few hours. The significant events that were presumably instantaneous are relatively few in number. We shall later analyze one of them in detail because of the unusual theoretical interest attaching to it.

In the frame of reference in which they appear, events are treated as the indivisible turning points of history. We speak, for example, of what happened before the Fall of Rome and what happened afterwards. We speak of economic conditions prior to the First World War, or of political conditions following it.

In this context it is possible to forget that the events cited possess duration and that the divisive position that is attributed to them is a conventional formula. The study of history convinces us that all events possess duration, that as events they are not so much elements in nature as conceptual conclusions of historical thought. Depending upon the point of view of the historian not only will the valuation placed upon events differ, but even the very structure of the event will be recognized as variable depending upon the purpose for which it is studied. Events may readily be subdivided into aggregates of lesser events; they may almost as readily be fused with contemporary or practically contiguous events to form a larger unity. Since the historian may fuse and dissolve events at his discretion, it is difficult to avoid the conclusion that the event is a concept of mind projected upon the past.

The constitution of events is determined by the need to explain their apparent consequences. Most commonly our attention is occupied by events whose results are of considerable magnitude. Almost without exception those events that command our attention and thought do so not on account of any intrinsic qualities, but because of the consequences that we attribute to them. Indeed, where consequences are of far-reaching import,

we frequently postulate an 'event' of which we have no knowledge whatsoever except the inferences that we make from presumptive effects. The value of events is determined by their consequences. At the same time these consequences are limited by our capacity to be interested in them, because as consequences they are ultimately consequences for us. Thus, the number of meaningful events is limited by our capacity for experience. It is limited also by the acuity and sensitivity of thought in tracing relationships from what is remote to what is immediate for us. But there are further considerations concerning events that make that meaning even more dubious. Consider the internal consistency of events: in the usual historical retrospect, the event appears as a unity, as a moment devoid of significant duration, possessing certain antecedents or causes and certain other effects or consequences. In order for this assumption to be tenable, the event requires to be viewed from a certain distance. When we view it in greater detail, as if we approached it, we see it to consist of an aggregate of lesser subordinate events, none of which individually should be able to fulfill the function of the primary event, but all of which together constitute it. In military history, for example, it is customary to consider a war an event. Yet the war consists of battles, and each battle consists of numerous skirmishes between individual soldiers. The significance of the battle, whether it is won or lost, is

not determined necessarily from the outcome of any one of these individual encounters or even by the sum of them. As a matter of fact, the outcome of the battle may frequently not be known for days or weeks afterwards. The battle as such is constituted only in retrospect by the commander assessing his next move, and most fully only by the historian in his study. It is there that the minor events are traced from their antecedents to their consequences, that the entire episode is given a name, a date, a description, and an evaluation and thus enters into the pages of the history books. ~~Practically all of the~~ Virtually all events readily lend themselves to a similar analysis, the election of a national president, for example, the enactment of a law, or the development of an economic catastrophe. It is a fundamental characteristic of the structure of history that events can inevitably be subdivided into lesser ones, and that they can be merged into more comprehensive ones, and that they are interpreted only in retrospect. This basic characteristic of events is mitigated and to some extent obscured both by the speed and completeness of modern communication no less than by our own highly developed sense of history that prompts us to record our actions both public and private in great detail when we conceive them to have historical significance at all.

As we review the events of which history seems to be composed we note a spectrum from the most consequential to the most trivial. The task of the historian is to select from the manifold events those of consequence and to construe them in their relationships to one another. This preoccupation of the historian with historical significances makes it easy if not necessary for him to ignore the theoretical implications of the multitude of lesser events. These are constituted of a virtual infinity of events and the historian refers to them only when it suits his purposes. And if we put the question to him bluntly and ask whether it was not true that the single event, the Fall of Rome, consisted in reality of an aggregate of lesser events, such as the separate acts of the individual barbarians who plundered the city, and if we ask him if the American Revolution did not consist of many individual acts and events too numerous to be recorded, not the least of which were the hoof-beats of Paul Revere's horse on the way to Lexington, would he not have to agree? Indeed, he might confess that all events with which he dealt were mere logical summaries of numerous physical events, such as ~~each~~ the individual actions of each human being. It is true that the events with which the pages of our history books are filled are those of great presumed consequence, but that is no reason why we should not, and indeed why we must not consider every motion and every change that we observe, no matter how

insignificant, to be an event; and not only what we observe, but also what we might reasonably expect to observe if we were everywhere present in all situations. When we follow this argument to its logical and necessary conclusion, we will appear to be lapsing into absurdity. It is precisely the fear of such absurdity that tends to block the argument in its search for clarity. It is characteristic of our thoughts that they are as it were encompassed by absurdity, which is avoided only by the conventional restraint that propriety imposes upon reason. Let us be courageous in the face of apparent absurdity, and pursue the argument nonetheless, confident that if the thought is correct, the absurdities will in the end cancel one another like unknown factors in the solution of a mathematical equation.

Accordingly, we shall have to postulate as events the settling of each snowflake and the falling of each raindrop and likewise each of the rapid beats of a humming bird's wings. And, of course, not only each word that we speak, but every oscillation of the air that occupies its interval in time and constitutes the sound wave. And from a scientific viewpoint, each of the electro-magnetic waves of radio or light must be classed as events. Finally, if all molecules, atoms, and sub-atomic particles are to be considered objects, then their motions and expecially their collisions must be interpreted as events. Thus indeed physical theory does interpret them, construing them as objects and events in a system of reality far beyond our actual experience.

There is a second ambiguity in the structure of historical description that deserves our attention. We spoke of the fact that the event appears as a turning point of history. We mentioned that the event as such possesses no functional duration; in the fabric of history it appears as a point. At the same time, we ~~pointed out~~ demonstrated that the individual event may be dissolved into an aggregate of smaller, lesser events, and indeed we showed that this consideration might be carried to an absurd conclusion. Yet time has extent; it possesses duration, and the divisive quality of events is inadequate to do justice to the duration of time. We may recognize an analogous situation in the relationship between the point and the line, a disproportion which is resolved through the notion of infinity. One might argue, that as an infinite number of points serve to explain a line, if indeed they do, so an infinite number of events succeeding one another would serve to explain and fulfill an interval in time. Even if it were theoretically valid, which it may or may not be, such an argument should be useless in a circumstance where our interest is attracted to a particular event, this being considered historically unique and dominant.

The indefinite extent of time is separated into specified durations by events. Insofar as each of these events is a point of division in an expanse of time, it is considered instantaneous, but insofar as it is real, each event is found

in turn to possess duration of its own, and consequently to be susceptible to division by other events. Furthermore, we must recognize that insofar as the continuity of time is bounded by two events, the segment of continuum that is separated by the two events is defined, and by virtue of this definition is capable of serving as an event in its own right. To be specific, a year is separated by the strokes of midnight on two successive New Year's Eves. These strokes of midnight, of course, are events par excellence, but the year that is determined by them, becomes by virtue of that determination also an event. Another telling example is that of the First World War, defined by its beginning and by its termination, a continuum that is then capable of serving as an event, if viewed from the proper distance and in an appropriate perspective.

The continuity of time in itself is undefined. It is the expanse in which events, significant and trivial alike may occur. Continuity of time is neutral; it is the unbiased recipient of negligible and monumental events alike. The continuity of time and events complement one another. Their qualities are contradictory. We conceive continuity to be homogenous; the event is incisive. Continuity possesses duration but no definition; the event has definition, but strictly speaking, no duration. To the extent that the event possesses duration, it contains

within it a lesser continuity, and this in turn may be subdivided by lesser events. The continuity is undefined; it is noticed only when an event shatters it. It may be measured as an interval between events, but when it is so measured, when, so to speak, a fragment of continuity is segregated, then by virtue of its separation and distinctness it loses certain of the qualities of the matrix and assumes some of the qualities of the determinant. In other words, when it is defined, continuity becomes event.

Though continuity in itself is unintelligible, there are two significant ways in which it participates in knowledge. We have already mentioned one of them: the continuity becomes knowable insofar as it is interpreted as the duration between two events. When it is thus described as an epoch or an interval, it assumes as we have noted some of the qualities of an event. The other aspect of the continuum that enters into knowledge concerns the existence of objects in time. The object that endures is the object which no accident, no event, befalls. It endures by virtue of the undivided continuity of time that sustains its existence. More than anything else it is the enduring of objects which makes the quality of continuity accessible and intelligible to us.

The theory of history stands or falls with the definition of the event. To the extent that the event is real, history is telling, to the extent that the event proves to be a relatively unreal conceptual synthesis, reality must be sought elsewhere than in history. We have already shown that the significance of events is attributed to them in historical retrospect. Furthermore, many events that are diffuse and protracted, are susceptible to destructive interpretation. When such events are analyzed, they will be seen to exist only by convention; constituted of a series of slighter, and in themselves relatively less significant events. But there are other events, and these must be dear to the historian's heart, which are virtually instantaneous in their physical occurrence. Such instances appear to provide natural examples of events, and whenever we refer to events in any context whatsoever, these physical events are the natural prototypes that make such discussion meaningful. We will complete our analysis of historical thought by examining such a natural event, to see what its characteristics might be, and to discover with what justification, if any, it should be construed as the prototype of historical events in general.

Our example shall be the explosion of an atomic bomb over the Japanese city Hiroshima. This event is most suitable for our purposes for several reasons: the historians have recorded

for us a profusion of detail concerning this memorable occasion. The history of the war to which it made an end is known to us. The history of science which made this physical development possible, is likewise familiar. Furthermore, the ~~records~~ details of the research that culminated in the production of this bomb are matters of record. We know about the test explosion of a bomb in the desert. The preparations that preceded this particular flight have been carefully recorded. We have information about the day and the hour, the altitude and the course on which the plane was flying, the weather, the explosive force of the bomb, the height at which it was detonated, the time of the explosion to the minute and to the second. The names of all the occupants of the plane are known to us. We have made thorough investigations into the pattern of the destruction, injury, and death that the explosion caused. And we now begin to have some understanding of the political and the social problems that are the consequences of the successful application of this invention. Few events in the history of man have been more arduously prepared, more accurately recorded, and few have had more significant consequences. Surely, if the reality of any event might be designated, it should be the reality of the event under consideration.

What was this event? Was it only the motion of the airman's hands that released the bomb? Was it the resulting fall of the bomb, was it the explosion? Or did it include both? Did this event also comprise the flight of the plane? Were pilot and navigator participants in it? And what about the technicians who assembled the bomb? What about the scientists who spent years in designing, building and testing it? Without all that preparation the simple motion of the man's arm should have been without consequence. If praise or blame were to be attached to the action, evidently many individuals would share in it. Logically there is of course no reason why the necessary expansion of the event should limit itself with any particular boundary. Indeed centuries hence, when all the details that interest us now seem insignificant, the event itself may seem to be the only occasion in the whole war or in the entire decade worthy of recognition. When we expand the event in this way, treating it as an entity that might have absorbed minutes, hours, or even days, then the event itself can no longer be considered as a single instant. Then this event will no longer represent the single present of one state of consciousness, either of the principal agent, or of any hypothetical observer. Then the event will have been expanded into a series of actions; it will no longer be a natural event; it will have become an historical one.

As there appears to be no logical limit to the natural expansion of the event, neither is their a logical limit to its division. We have been assuming that from the moment at which the airman began to move the lever that released the bomb until the heat and radiation of the explosion had wrought their destruction on the ground virtually no time had elapsed. This is the assumption that is fundamental to our postulate of all 'natural' events. However as soon as we make this postulate explicit, its ambiguities become apparent. Physically all instants are measurable, at least in theory. The event which seems instantaneous to us is the event which we do not care to measure. The internal measure of an event is meaningless to us when we presume the sequence of subordinate events defined therein to be unalterable and inevitable. Yet, if any series of events seems inevitable, it does so only in retrospect. Such an appearance of necessity must be attributed to the thoroughness and effectiveness of the preparation. Presumably this airman had been selected as a particularly reliable and stable fellow who could be trusted to carry out his mission according to orders and not to change his mind at the last moment. Prince Hamlet, obviously, would not have been the man for this job. If care had been taken to remove all chance of failure of mental processes, likewise the mechanism for the bomb's release had presumably been tried and tested and inspected to the point where accidental retention of

the bomb in its bay had become quite unlikely. The detonation of the atomic explosion itself had been prepared at great expense by many skilled and talented men over a period of many years. All these efforts had been expended precisely in order that the particular event in question should become integral, that the bomb should fulfill its intended function without fail. It appears that meticulous preparation had made this explosion possible, and when that preparation had advanced to a certain point, the event had become inevitable. Essentially then it is a tribute to the success of this planning that we now designate the entire sequence of effort with reference to but a single event.

It may be said that the apparent unity of the event is the interpretation with which we subsequently designate it. The lower limit of duration that we are able to recognize, the shortest instant that enters into our consciousness, is variable, depending upon the physiological and psychological disposition of our minds. Yet even beyond this limit, we have instruments that will record for us events of infinitesimal duration. Let us look again at these ten or fifteen or thirty seconds to inquire whether we might not rationally suppose that an accident might have intervened to destroy the unity of the event. If such an accident is conceivable, it might have made that event

entirely different. The outcome might well have been reversed; looking from the plane down onto the city, success should have been turned into failure; looking from the city up to the plane, the wrath of hell should have been averted by the act of a protecting deity.

The airman was presumably in the best of health and of sound mind. Even so, after his hand had begun to engage whatever levers were to be pulled or to touch whatever buttons had to be pressed, there was yet time for an accident of mind or body to interrupt these events that had already begun. The physicians have many explanations for sudden mental or physical failure: to list them here is not essential. Sudden, unexplained death, for example, is far more frequent than most people recognize. While the incidence of unheralded death is such as to make it unlikely within a specific short span of time, its occurrence is by no means incredible. It is conceivable that such an accident entirely unforeseen might have reversed the course of this event. For practical purposes it is impossible to designate that mathematical point in time to which the action should have had to proceed in order to become irreversible and irretrievable. Almost certainly that was a variable moment, affected by unpredictable local mechanical factors. We cannot discover that particular moment; we have no way of determining

the critical mathematical instant, and even if we did, the continuity of our motions should make such a moment, presumably defined in terms of millionths of a second, meaningless. Whatever we plan, we do it in such a way as to exceed that critical instant by a generous interval. Obviously, in practice the critical instant is never defined. Suffice it to ~~be said~~ say, that beyond a certain limit of accuracy, further precision in measuring the critical instant is of no psychological meaning, because of the grossness of our sensory and motor responses. Mathematically, the critical moment could be carried to an unending number of decimal places. Historically such calculation has no meaning.

Let us assume for purposes of discussion that the event might consistently be identified with some discrete interval in time, such as for instance the motion of the airman's arm, the time of the bomb's falling, or even so long an interval as the flight of the plane. We may also, for example, equate the event with the physical explosion of the bomb. In any case, the event so postulated is meaningless without reference to the historical framework ~~into~~ which it belongs. It obtains significance from its antecedents and from its consequences, and it will not stand unsupported without them. The historical significance of events is projected upon them. There is no physical or biological description of the particular motion

which will enable us to identify it as the crucial one. If we wish to understand the meaning of that event, we shall have to look afield from the simple physical movement of an arm, and even beyond the fact of the explosion of a thermonuclear device, to such remote considerations as the triumph of the physical science which made such an explosion possible, to the deaths of tens of thousands of human beings of which it was the immediate cause, and to the new age in human history of which it was the beginning.

As we contemplate events in general, we recognize that their structure is based on the assumption of the individual's presence. We construe events as if we ourselves were present at their occurrence. With this assumption the entire framework of historical thought receives definition and orientation. Indeed, it is probably one of the most consequential errors of our intellectual tradition to attempt to depersonalize the event and to construe it as having potential or actual existence apart from any observer. In other words, I judge the event as if it were happening now, as if I were its most intimate witness. I judge the event as if I participated in it, as if it were subject to the same necessity and as if it were expressive of the same freedom that characterize all my actions.

From all that we have said it will be evident that the event as we recognize it does not necessarily exist in nature, but that it can be consistently understood only as an interpretation imposed by our minds upon natural phenomena. This is not to deny that the event must possess an intimate dependence upon some natural necessity. But it is important to understand that the event does not exist in nature in any way comparable or approximate to the way in which it exists for the human mind. Hence we shall be forced to deny the natural reality of the event as such. We must postulate it to be an invention of the human mind for the same reason that we must subsequently deny the natural reality of the object and postulate the object as it is apperceived also to be an invention of mind. Our reason for assuming that the event as such does not exist in nature is analogous to our reason for assuming that the object as such does not exist in nature: the definitions both of the event and of the object are inconsistent, haphazard, and apparently arbitrary. The event appears to derive its characteristics from the intention with which it is postulated. It may be subdivided into lesser events; it may be merged into larger ones. The structure of the event, accordingly, is not predetermined by nature. It becomes explicable only as a product of our interpretation. The world of events no less than the world of objects is an interpreted world that exists for our minds. It is a world that our minds are continuingly creating from the raw givenness of experience.

We may now attempt to relate our discussion of history with our concern for reality. In view of our discussion of time, we may ask once more, what is reality? Specifically we must ask, what is the reality of history? All our analysis points to the fact that events should be real for us, inasmuch as they represent the sole organization of time that makes it significant. However, the inconsistency of events as we postulate them leads us to suspect that in themselves events are less than real, and since they are so demonstrably dependent upon our thought, they could hardly be intrinsic expressions of nature. On the other hand, the continuity or duration out of which events arise and into which they merge is relatively unreal to us, because it is inaccessible to our knowledge. Yet because of the constancy and effectiveness of this continuity, we might well postulate that it possessed reality in itself even though that reality were inaccessible to our minds. To our knowledge, this reality of the continuity of time would be a negative reality, a reality appearing to complement the fallibility of events. It would be an error to imply that the ambiguity and uncertainty of a logical understanding of time in any respect would disparage its reality. As we stated in the definition, if reality is to have meaning at all, this meaning must be derived from our experience. The analysis has shown that our

conceptual apprehension of the reality of time is not entirely sufficient. Yet we entertain no doubts that our experience of time is real. When the conceptual description is tested against the experience which it purports to describe and which it presumes to exhaust, then discrepancies become apparent, and these discrepancies are of great methodological importance. They are important not, as might be erroneously assumed, because they should disparage reality; their importance, is rather to demonstrate and to prove the absolute qualitative difference between reality and our concepts of it. By the same argument, it would also be an error to construe our concepts of time as entirely inadequate merely because irreconcilable conflicts between concept and experience have appeared.

We are able to arrive at certain conclusions concerning reality which it will be worthwhile to summarize. Nature, or the real world, is in process of change. Perhaps, we should express the negative of this recognition, to say that we have no reason to assume that nature remains constant. Very many objects close to us visibly participate in this process of change. Those that are apparently enduring will be found subject to the same alterations, provided they are given sufficient time and subjected to sufficiently minute scrutiny. We conclude also that the event is not real, because it is so evidently

subject to personal, almost arbitrary construction. We interpret the event as a psychological reaction to change which we cannot otherwise comprehend. Change appears as a genuine property of temporal duration. Paradoxically, we are able to recognize duration only as sameness; hence our recognition of continuity implies a certain deception. We recognize an object as being continuous, we recognize a process as continuing, when their change is so gradual as not to be recognized by us at all, or at least so gradual that our minds are able to compensate for the change. Such change as we recognize appears instantaneous. Inasmuch as it is a demonstrable habit of mind to deny gradual change, and inasmuch as we observe our recognition of change to be dependent upon its rate, we may infer that our historical construction of duration and event is an illusion imposed upon reality by the particular structure of our minds. At the same time, we may assume that our conceptual knowledge of time is a potent instrument that enables us to accommodate ourselves to the change, rapid or slow, in which we know nature to consist. In other words, even if our concepts of time are not adequate to its reality, nonetheless these concepts in themselves possess unique value in facilitating our constructive relationship to natural time.

By the same token, our inability to achieve a satisfactory logical representation of temporal events is a source of perplexity and of continuing anxiety for us. Time is real and happenings in time are real. We ourselves are born and die, and between birth and death, those two events that we understand least, we live out our lives for a duration which however accurately we may measure it with instruments, will nonetheless be both infinite and infinitesimal for us. We are at a loss to interpret the temporal significance and dimensions of our existence, of things that befall us, and of things that we cause to happen. We are dismayed by our inability to explain in a manner free of contradiction what happened before us in time, what happens with us, and what will happen after us; our minds seem incapable of formulating a clear and consistent picture, of giving a meaningful account of the events and duration that comprise the span of our lives. The reality that we experience in history exists indeed, but our logical analysis of history fails to exhaust it. The future, however inevitably it devolves upon us as the present, is forever closed to our knowledge. The past is lost to our direct cognition almost as soon as it appears. Hardly do we recognize our actions before they have vanished into a past where they are as inaccessible to us as are the dead. With the frailty of our

memory we desire to capture the fleeting hours, months, and years; in order to remind us tangibly we build monuments for ourselves and to ourselves. These monuments, whether of words or of stone, decay early or late. If it be not our own monuments that crumble before our eyes, it will be those that others have wishfully founded. As surely as we are witnesses to the corrosion of the monuments of our fathers, so our children shall be witnesses to the destruction of ours.

The Reality of Space

The analysis of our experience of space and the evaluation of its reality will be simpler because we may be guided by the analogy of space with the reality of time which we have just discussed. When one first considers both space and time, one entertains an overwhelming prejudice in favor of their unqualified reality. This reality appears to be certified by all the measurements to which time and space may be subjected and by the many formulas in which the relationships between them may be expressed. The notions of space and time are so firmly engrained in our habits of thought that we find it difficult to believe that space and time might not exist exactly as we have always imagined them. Our attitudes toward space and time are habits of mind; ~~they~~ space and time are not tangible and we distort them if we attempt to make them so. Under the circumstances we must resort to an indirect method of exposition, demonstrating the characteristics of these conceptions in a negative fashion, by examining in detail all their implications and by carrying ~~them~~ these to their logical conclusions. We have already shown that the distinction between the present and past in time is ambiguous. The future appears a mere chronological ~~aspect~~ projection of the present, the anticipation of all events that have not yet fully entered into consciousness. Perhaps equally important is the circumstance

that the record of time as we commonly view it, events interspersed by duration, is equivocal. Evidently dependent upon the individual's point of view as they are, events themselves may not be considered absolutely real. Duration as such is entirely inaccessible to us. We may choose to hypothesize that time is real, but we cannot escape the recognition that our apprehension of time does not attain to that reality. The discussion of space encounters similar anomalies.

When it is critically scrutinized, the distinction between space and time, usually accepted as the basis of all our thinking, scientific and non-scientific alike, may prove not wholly justified. Indeed, our notion of time will become clearer when it is recognized to be admixed with notions of space. We have shown the difficulty of defining the moment in any way except subjectively. Future and past are projections of the present. They are conceived of as possessing extension, and extension is an eminently spatial attribute. Conversely when we attempt to include the present of consciousness in this scheme of extended time, it becomes a mere point of division incapable of sustaining the fullness of experience. It appears that we cannot complete our experience of time without reference to space. Duration ~~Our concepts of time~~, possessing extension as it does ~~they do~~, already presupposes an experience of space.

Similarly, our understanding of space requires and implies a temporal sequence. For example, we obtain experience of a straight line by permitting our eyes to traverse the extent of the line from one end to the other. We consider that perception instantaneous only because the period of time involved is very small and difficult to recognize. It is only an ~~account~~ inference of our ~~the synthetic capacity of our perceptions that we believe~~ perceptual processes that induces us to assume space and time to be absolutely separable. Even the perception that requires a minimum of motion, e.g., the recognition of a point, requires an interval of time which we cannot subjectively perceive, ~~which may however be demonstrated by experimental observation~~ although we may demonstrate it by experiment. This apparent instantaneousness of perception on the one hand and the apparent endurance of extended objects, their constancy and immutability on the other, cause us to assume space and time to be separable. The distinction between space and time must be accepted not necessarily as a distinction in nature, but as an intellectual convention grounded in primary apperceptual experience. Space, on the other hand, designates a quality of our awareness of tactile and visual impressions. Thus space is characteristically recognized in the present. Space is not remembered; its reality is confirmed by continuing sensory experience. As soon as I shut my eyes, the impression of spaciousness is drastically modified. We assume that space is everywhere the

same because of the implicit comparisons that we are accustomed to make between our spatial experiences in one location and in another. We may ask whether this identity reflects the homogeneity of space or the inertia and consistency of mind.

Arguments concerning space have traditionally concerned themselves with the problem whether space is empty or filled with matter, whether a perfect vacuum is possible, in what way objects are able to act upon one another at a distance, and specifically, how light is transmitted through space. These problems remain unsolved, still sources of perplexity for the physicist. The significance of these questions becomes more apparent when they are traced back to the common hypothesis that space is the medium in which objects exist. It is presupposed that objects are primarily known to us, and it seems superfluous to inquire about their actuality. All problems concerning space will assume an entirely new appearance if one asks not primarily what space is, but if one begins from the beginning to inquire what objects are. Evidently we do not recognize space as such; we discover space as our hypothesis of the relationship between objects. Consequently it is logical to begin an examination of the reality of space by taking a closer look at our perceptual experience of objects.

The description and analysis of objects are frequently pursued by investigating their parts. The processes by which our visual apperceptions distinguish entities in the world about us are extended, frequently with the aid of instruments that reveal microscopic structure. However, the range of the microscope is in turn increased by rational inference and postulate, so much so that modern science conceives of nature predominantly on a microscopic or sub-microscopic scale. For example, we think of the human body as consisting of organs, tissues, cells, fibers, nuclei, molecules, and ultimately atoms and sub-atomic particles. Comparably analytic schemes have been elaborated for vegetable and inorganic objects.

If one traces the analysis of an object into its minutest parts, one may observe that with each subdivision an element of specificity will be lost. By the same token that the whole is more than its parts, the differential between the sum of the parts and the whole may be construed as an opportunity for mind to construct a functionally effective conceptual framework for explaining and predicting the function of the larger entity. The analysis of objects has great functional effectiveness, but the parts cannot be considered real equivalents to the whole. Thus, when for example an organ is said to consist of tissues, and tissues of cells, the cells do not explain the tissue, and the tissues do not explain the organ. Likewise, the pencil lines do not explain the drawing, and the analysis of the vibration does not explain the quality of the tone. All such analyses are primarily conceptual; they aid our minds in understanding and controlling the natural processes before them. Likewise the microtheory of science must not be expected to demonstrate or to explain the reality of the object itself. If we wish to describe objects in their reality we cannot content ourselves with the analysis of objects into their parts, for whatever object is the point of our concern, that object must be comprehended of itself, and if such comprehension is faulty, no amount of division can save it.

The fact that the subdivision of objects is not the route to their reality will disconcert many students of modern science. It is, however, a discovery familiar to poets and artists whose efforts to describe reality have never gone so far afield from every-day experience as those of the scientist. When philosophers attempt to analyze the problem of reality, they frequently elicit smiles from their audiences, when they refer to objects so homely as chairs, tables, and beds and then proceed to discourse on chairness, or tableness, or bedness. The implication is that the objects which are familiar to us are indeed the prime examples of objective reality. If we hope to define reality, we shall presumably have to learn to do so in terms of just such objects. Nor can we escape the recognition that the objects of microscopy and microtheory not only offer no solutions to the problem of reality, but borrow their substance from the analogy with visible and tangible physical objects. If we cannot explain the reality of this stone or of this ball to our satisfaction, we shall be hard pressed to explain the reality of atoms and of galaxies.

The world as we naively recognize it is primarily a world of objects in space, because at any given moment our sensory impressions are much more powerful than our memories. What

I see before me in this instant is as a rule eminently more real to me than the memory of what I did or saw in another hour. The simple objects of which we have knowledge are those that surround us from moment to moment. Primary to us is the human body upon which our life depends. We recognize as object the food with which we nourish it, household furnishings, houses, implements and tools of various kinds. Many of the objects of which we are most pointedly aware are man-made; thus we possess a particularly valid functional knowledge of them, along with circumstantial notions concerning their origin. Although we are conversant with the natural history of such objects, knowing their origin and their transience, yet at the moment in which they provide for us an image of reality, we implicitly delude ourselves with the wish that they might be permanent. The child's sorrow over his broken toy may serve as a reminder of our natural, naive affection for physical objects. It is true that for most men the chagrin about the object lost has been obscured by superficiality or sophistication. But the poet knows that when a familiar object is lost, there is a temporary distortion of our view of reality and we are saddened. ~~However~~, ~~Tha~~t sadness is transient; There seems always a mitigating dullness to such experience, permitting us to forget our losses. The more mature we are emotionally, the more quickly we recover from ~~them~~ our losses and proceed to form new

attachments with other objects of which we become fond. We are readily reconciled with the loss of an object although at the time of its actuality it was an adequate and apparently indispensable representation of reality for us.

If our sense of reality depends more upon perceptions in space than upon memories in time, the primary assurance of reality seems to be derived from our acquaintance with familiar objects immediately about us, such as we use from day to day with affection and assurance. The number of such objects is great, and we have been provident that our relationships with them should be intimate, pleasant, and undisturbed. From the time of Homer, one of the chief tasks of poetry has been the description of such physical objects, to the end that our attention should be attracted to them and our appreciation of them enhanced. Not infrequently we become fond of such objects, demanding that they should remain near us, that we might know them in all their aspects. We require that they be constant and enduring, that they last through our lifetime and through that of our children. For these reasons we select the precious metals, silver and gold, impervious to rust as they are, and the hard and brilliant diamond as symbols of the reality of objects. In many respects the works of art with which we delight in surrounding ourselves are similar tokens of reality.

Familiar objects satisfy our desire for access and communion with an enduring reality. Although such objects are distinguished from the conceptual totality of the physical world through our familiarity with them, we harbor at the same time the rational inference that the reality of all other objects in the world should be comparable to the reality of these familiar things. The house and the garden in which we live represent to us the prototypes of all physical worlds that we may ever imagine. Our image of the physical world as the totality of all possible objects must be understood as a logical projection from this familiar microcosm of our immediate vicinity. Other than this we have no experience of world. World is not, in fact, a summary of what we have seen or heard or felt; world is the logical expansion and magnification of familiar experiences. This expansion relies upon such concepts as 'all', 'every', 'always', 'forever', 'infinite', 'endless', 'eternal', 'unending'. With these terms we refer to what is never directly accessible to our experience. The validity of an expansion of our thought into such cosmic dimensions depends at least in part upon the correctness of the familiar experience. If the experience of familiar objects did not stand scrutiny, then all meaningful expansion into ~~cosmic~~ remote dimensions would be precluded. We recognize a mutual reinforcement between familiar experiences and ~~cosmic fantasies~~ our imaginative projections of them. When we wish to estimate the ultimate validity of our knowledge, we should be well-advised to question them both.

We invariably assume that objects should be given in nature, but a critical review of our experience provides no evidence to this effect. It is true that a few of the familiar objects for which we care are in fact discrete, identical, and unchanging throughout the period of our association with them, thus fulfilling the requirements of objectivity that we have suggested. However the number of such objects is relatively small. Consider wind, fire, or light? Where is their boundary, their sameness, their constancy? Consider for that matter the human body itself, continuously in process of change. There is no chemical constituent in the body which is not known to be constantly absorbed, altered, and excreted. Although we assume that our material being ~~was~~ is of the same substance from day to day, ~~that~~ its imagined identity is no greater than the sameness of the river whose banks confine it to a more or less accustomed course. And literally, what object in our environment is it that in ten or twenty or ten thousand years will be the same as it is now? What can we hold in our hands that will not crumble or decay? Yet all this evidence of transience notwithstanding, is there any object of which our apperceptive faculties do not demand that it be permanent and unchanging? It is a fundamental postulate of our minds that an object should be one, limited in space, and enduring in time. How shall we reconcile our demands of reality with its evident inability to fulfill them?

We systematically ignore the transience of most of our physical environment. We do not lament the evaporation of water or the melting of snow; we accept the brief lifespan of animals, even our own as inevitable and necessary. Yet evidence of our concern is afforded by the quality of the objects which we especially prize, whose value depends largely upon their resistance to corrosion and decay. The inertness of precious metals, the hardness of the diamond that we prize suggest how vitally concerned we are with their imperviousness to time. As our historical awareness becomes more acute, and as we realize the comparison and competition of other times with our own, a different kind of judgment asserts itself, and we begin to value physical objects for their presumed historical uniqueness. The destruction wrought by history is qualitatively different from the physical destruction of objects, but it is no less real. History destroys by making irrelevant, by replacing with an equivalent or an improvement. Consequently we desire also that objects familiar to us should be historically unique, inasmuch as such historical uniqueness would appear to invest the object with a significance that certifies to its reality.

This implicit contradiction in our definition of the object, this perennial source of dissatisfaction and disappointment with the definition of matter, is no recent discovery. Indeed, it is one of the earliest and still one of the greatest discoveries of philosophical thought. One of the most monumental attempts of philosophy has been the separation of that portion or aspect of the object which perishes from that which appears to be permanent and enduring. We are so deeply committed to the preservation of the object as such that we are willing to transfer its reality to a conceptual sphere, assuming that there it should remain impervious to physical destruction. To this end we will not hesitate to condemn a physical object in its phenomenal appearance to nothingness. Such was the Platonic distinction between form and matter, and the tenacity with which this concept and its analogues persist in modern thought suggests the fundamental validity of this attempted solution. A primary consequence of the distinction between form and matter is the preservation in its integrity of the object apperceived. The form is that part of the object which is indestructible, unchangeable, unaffected by the hazards of time. Matter is the undefined quality that is conjoined with form when form becomes manifest in the specific object before our eyes. The logical difficulties implicit in this distinction have from the time of Aristotle made it unpopular

as an explicit physical theory. Nonetheless, attempts to separate a formal quality of the physical object distinct from an indeterminate, neutral substrate is still a guiding principle of modern thought. This is the attempt to isolate a physical or mathematical structure of the object and to explain its actuality in terms of that structure. In spite of the complexity of its mathematical apparatus and in spite of the sophistication of its instruments, the goal of modern physics remains essentially the same: the definition of laws as the formal characteristics of objects. We need only mention the significance attributed to the formal arrangement of the atoms in the chemical molecule; the bold plan to resolve all objects into systems of elementary particles arranged according to mathematical laws. If ever there was an attempt to expand and to apply an eidetic theory to actual phenomena, we discover it in modern thought.

This is a monument to the power of the human mind that the difficulties of reality should find an attempted solution in what appears on the surface to be a purely arbitrary and superfluous distinction. For, on the surface there is no cause for separating form from matter. In the concrete object they cannot be distinguished. Matter is unintelligible except it have form, and form is incapable of existing except it be sustained

by matter. Matterless form and formless matter both seem utterly beyond the bounds of experience. Not only does a theory of form provide explanation for the qualities of objects that are presumed eternal, but it is also a most suitable representation of our firmly engrained propensity for distinguishing objects by their shape. The remarkable implications of this ability are not usually recognized. Consider for example a tree in nature, a photograph of a tree, a drawing of a tree, a reproduction of the tree in stone or brass; vary the dimensions in whatever way you wish; enlarge the image or reduce it, yet even a child will tell you when you ask him what all these things are, that they are all trees. Indeed, the child might not be able to identify one as a picture of a tree and another as the sculpture of a tree and a third as the tree itself. He will call all of them trees, and he may have some difficulty in defining the logical differences between the various images. Functionally, of course, neither the drawing nor the sculpture nor the photograph have any similarities to trees whatsoever. Merely the shape or outline is reminiscent. Suppose there were an instrument that performed all the biochemical functions of a tree and that possessed the identical chemical structure. Without the appearance of the tree we should give it the name of tree only with some effort. We may conclude that the identification of objects depends not so much on our appraisal of

their internal structure or function, nor on our understanding of their history or of their destiny, but to a pre-eminent degree solely upon their appearance. To our way of thinking, it is the shape, the form, which is the sole determinant of the various objects that we call trees. This reliance upon the appearance and shape for identification of the tree should be construed as a consequence of our perceptual relationship to nature. Plato relied on this strong bond that comes to exist in our minds between the appearance and the reality of an object when he invented the bold hypothesis that there must somewhere be an archetype, an idea, a pure form of the tree by virtue of participation in which all examples of trees derive their 'treeness'. The Platonic hypothesis expresses the inference that there must be something about this object which is indestructible, which will survive the individual catastrophies to which all physical objects are manifestly susceptible.

If one proceeds from the definition of form, and then desiring to apply this definition to experience, attempts to discern its concrete characteristics, he will encounter much difficulty in identifying form with any particular part of the object or with any particular function of it. When, however, one looks at this question more directly, simply following the pattern of linguistic usage, the assumption readily presents

itself that form and shape should be identified with one another. A philological approach to the problem would surely suggest such an identification: form derives its meaning from the notions of shape and appearance. This interpretation of form as appearance agrees with the original Platonic derivation of form from image. Our primary perceptual relationship to physical objects consists in our appraisal of their external shape or appearance. We recognize, we know, we remember objects by recalling to our minds how they appeared on prior occasions. Indeed, to most objects in the world of our experience we have no other relationship than that of perceiving their shape or form.

The conceptual distinction of form from the totality of the object provides a rational basis upon which generalizations concerning the world may be attempted. Implicit in all theory of form is the assumption that the specific presentation of an object in a given instance is not unique or exhaustive of it. It is implied that the laws which the object obeys and the generic qualities of which it partakes may be abstracted from the particular case. These, having been discovered and identified on this occasion, may subsequently be applied to a large and as yet undefined group of objects of the same class. This definition of form anticipates the purpose of all modern scientific research. While the form of an object is most commonly

equated with its shape or appearance, there is no reason why other constant characteristics to the particular object by which it comes to be recognized should not be considered formal. This is particularly the case as we turn from phenomena in which we experience nature through momentary confrontation to conceptual constructions, which however useful they may be to our understanding and accommodation to nature, must yet be considered relatively less real and accordingly, not entirely appropriate for inclusion within the framework of the present analysis.

Perhaps it is appropriate to state here explicitly what we have intimated all along: the hypothesis of our exposition is that the momentary experience, which we call also the confrontation with reality, should be substantially more real than the conceptual interpretation which we construct upon it. To be sure, the moment and what it can reveal to us is limited, the experience is circumscribed. By way of contrast, the conceptual interpretations upon it are bounded only by the ingenuity and energy of mind. The validity of this our referral of reality to the experience in the present moment is one of those fundamental questions which the reader has the right and the duty to judge for himself. The individual momentary experience is fragmentary and as a first principle leaves much to be desired. Yet aside from it, we are at a loss for a point of beginning from

which to proceed. For, however valid another point of beginning we might discover, we could find none that should not be required to submit itself to the judgment of the present moment in experience. Consequently our consciousness in the present would be required to pass critically upon all other principles of thought. Hence the present of consciousness appears as the decisive actuality of mind.

Thereupon the question arises concerning the origin or source of form. What is the origin of the unity of the object? As we approach these questions we shall do well to examine them in the context of the simplest of objects. For example, if we have before us a series of points located on a line, then if we examine these dots closely, they will be seen as individual objects, separated from one another by space. If, however, we withdraw from the dots in question, they will either disappear or fuse into a line. Indeed, the visual function appears to be composed of such limiting processes. There is nothing whatever the structure of which will not appear changed when it is magnified or greatly diminished. Our view of the world determines its form and this form depends at least in part upon the dimension and distance from which we view it. These considerations may lead us to a conclusion as follows: the particular configuration which we

recognize as an object or unity depends both upon our powers of apperception and upon the givenness of the object apperceived. No object that we recognize is absolutely given, but every object is designated as such through a synthetic function of our minds. This synthesis depends upon the capacities of the apperceptive faculties: it is also dependent upon a particular constitution of reality. The apperception is the conceptual interpretation of that reality. This conceptual interpretation depends upon the acuity of the apperceptive organ. It depends also upon factors more or less accidental, such as position and illumination. The process of apperception is repetitive and cumulative, subject to improvement and correction. While the process of apperception can never comprehend nor exhaust the reality of that which is apprehended, it can and does circumscribe, limit, and control that which is apperceived. At the same time, there is never any a priori assurance that any apperception of an object is valid. In all cases, the validity is relative, and the process of obtaining knowledge about the physical world is always only partially successful. The degree of success obtained cannot be measured except in pragmatic terms. A particular apperception is always only relatively correct. It is correct to the extent that it agrees with and fits constructively into a larger pattern of apperception. It is incorrect, insofar as it is incongruous and contradicted by the weight of other evidence.

The concept form$_2$ by which we identify an object$_1$ should be trivial if it were absolutely equivalent with that object. The object is more than its form. Those characteristics of the object not included in the form are designated as matter. In other words, the object is thought to consist of form and matter; take away the form and matter will be left. The difficulty of defining matter has been recognized from the time that the notion of form was first introduced to explain our cognition of objects. We note that in spite of its indispensable role in our identification of the object, the form is redundant so far as the specific appearance of this object is concerned. For at the moment at which I view the object its form appears identical with it; or if object and form be distinguished, then form will be tautologous. Less apparent, but no less real a difficulty is the apparent uselessness of matter. Incomprehensible and undefined, matter presents itself as an embarrassing by-product of the theory.

However, apart from the specific instance in which form appears to coincide with the object, so that matter seems negligible, the very limitations of form that we have discussed will tend to lend to matter an increased significance. In any particular instance our definition of the object is limited. We may be sure that the object

itself, whatever it be, will by virtue of this limitation of form always exceed any form that we are able to discover about it either now or in the future. The measure by which the object itself exceeds the form that we have defined for it, we call matter. Invariably our notion of form will fail to suffice to the reality of the object which it presumes to exhaust. Many characteristics of great consequence, especially those relevant to the object's capacity for change, do not readily follow from our notion of form. There are many unknown and unpredictable phases of an object that belong to it no less surely than its formal appearances. These qualities of the object are unknown on the occasion of its recognition: they are summarized as such with the term matter. Accordingly matter may be defined as that part of the object which remains when form is removed. If form is taken to represent the totality of that which we know about an object, then matter must comprise the totality of that which we do not know about the object. In sofar as some of the unknown characteristics of the object subsequently become known, matter becomes accessible to us, and as it does so it becomes transmuted into form. The concept matter expresses our premonition of the potential reality of which we are as yet ignorant. By this definition the import of materialism in science becomes more apparent. Materialistic, would be that quality of science that does not trust theory.

Materialistic is the science that says: I do not make hypotheses. Materialistic is the open, uncommitted approach to nature, that attitude which ignores the form, the conceptualizations that represent our knowledge of the object.

Without doubt materialism in this sense tends to be inimical to some of the most cherished aspirations of the human mind and offensive to some of its most pampered sensitivities. The mind desires knowledge and it cannot but be offended by the rebuffs of an epistemological negativism. That is why materialism so frequently appears insulting to human nature. For the same reason it is paradoxical to construct a theory of materialism; materialism is the denial of theory. Nor will it ever be possible for the materialistic scientist to remain wholly true to the anti-theoretical presuppositions of materialism. For he, like ourselves, cannot comprehend nature without relying upon such forms as his eye and his mind are capable of perceiving in the natural world. Theory, as the elevation of form to the conceptual realm, will always remain a betrayal of the materialistic postulates. It will represent a reversion to the formalism against which materialism was so justified and so fruitful a protest in the first place. For this reason materialism can never become the self-sufficient doctrine that it aspires to be. Yet, if materialism is an impractical intel-

lectual attitude, and if it is incapable of being consistently applied, at the same time it was the most successful of our attempts to escape from the tautology and triviality into which a formalistic view of world will inevitably lapse.

We may now examine once more the original question and ask again "What is the reality of objects?" "In what way, to what extent are objects real?" To the extent that the reality of objects inheres in their matter, this reality is determined by nature herself, and is inaccessible to us. To the extent that the objects possess form, their reality is a reflection of the physiologic characteristics of our perceptions and of our intelligence. The constancy and reliability that we demand of physical objects is probably almost entirely a projection of subjective mental necessity. Objects are real to us as we comprehend their forms, because form is the actuality of our apperception of the natural world. The relationship of form to the natural world is analogous to the relationship of the event to the natural world in time. Likewise there appears an analogy between duration and matter. As duration is the matrix required by all events that are stipulated by mind, so matter is the substrate required of all objects whose form enters into consciousness. As duration presumably contains within itself the potentiality of uncounted events, so matter

appears to conceal the potentialities of unnumbered forms. At the same time it appears vacuous to speak of matter or of duration themselves. By our own admission, matter and duration are purely negative elements in our scheme of cognition. As complements of our world view they express nothing so eloquently as the limitation of our knowledge.

The difficulties inherent in the problem of reality have taken us through a long argument. While it might have been possible to summarize this argument by stating its conclusions, such a summary would most likely have remained unconvincing. Before the answer becomes meaningful, the problem in its complexity requires to be recognized. Reality is an indispensable concept. It is expressive of the ability of our minds to think effectively and cogently, to recognize and to correct the inevitable shortcomings of thought. Conversely, reality as a concept implies its opposite, the susceptibility of our minds to error and deception. If we ~~choose~~ chose as a hypothetical point of view a position altogether outside the framework of our experience, a position such as the one that we would ascribe to deity, then all that existed, ~~our~~ human recognition of that existence and ~~our~~ human ignorance of it as the case might be, would ~~all~~ be real, and unreality would have no meaning. The term reality should be tautologous.

By a similar argument one may conclude that reality becomes a problem for us to the extent that we are cognizant of the limitations of our knowledge. Those persons who are very ignorant and who live only from the impression of one moment to the next have no use for the concept reality; to them everything is real. Likewise those who are convinced that their intellectual techniques have set them onto the track of truth can dispense with the concept reality. However, to ~~whatever~~ the extent we become dissatisfied with our comprehension of nature, to whatever degree we recognize the relative unreality of that which we apprehend, to that degree the concept of reality becomes meaningful. Thus it becomes, like the pole star, a celestial guide for the earth-bound wanderer. Although mind will never reach it, the concept reality remains an indispensable reference for all responsible thought.

In order to demonstrate the problem concerning reality, we examined the reality of our world as it appears in time and space. Neither the event nor the object may be construed as real independent of our characteristic ways of knowing. When the intrinsic limitations of the definition of event and of object are recognized, these limitations will preclude their being considered absolutely real. Perhaps not only the conclusion but even the intermediate steps of the argument have

some general interest. If the belief is correct that the event is not so significant ~~in~~ a constituent of nature as ~~for~~ of our understanding, perhaps we should be less insistent and more flexible in our attempts to define some of the presumed events of biological, chemical, and physical phenomena. If, again, it is true that objects as such exist less by nature than by our need for their decisive comprehension, some of the problems of atomism may become more sharply focused and easier to analyze. If there is no absolute justification for speaking of this pencil or this paper as object, because they do not in fact possess the absolute integrity that the term object necessarily implies, then we might reconsider our understanding of molecules, atoms, protons or mesons, for example, or of the enzymes of biochemistry, of sub-microscopic particles and of astronomical dimensions alike.

These implied criticisms of the form of our knowledge must not be misinterpreted as being criticisms of its effectiveness. On the contrary, if we are able to maintain a more flexible and less dogmatic attitude toward these forms, their effectiveness in our thought may become even greater. If we look carefully, we will see that science has been successful whenever its concepts have been plastic and mobile enough to adapt themselves to new situations. The recognition of the limitations of our knowledge has never inhibited what we in fact know, but it has freed us from prejudice and superstition about that concerning which we are ignorant.

Consequently it will no longer appear a paradox that our knowledge becomes more effective when it contents itself with being instrumental, and when it no longer pretends to be a reduplication of reality. Then it will not be incongruous to conclude that reality itself should be quite impervious to our knowledge, even though we are constantly in contact with it. Undoubtedly there is a parallelism between reality and the effectiveness of what we know. Our knowledge may be considered effective to the extent that it conforms but ineffective to the extent that it conflicts with reality. If the construction of an image of reality prevented our thought from conforming to reality itself, then the construction of that image would in fact have impeded our progress and compromised the effectiveness of our thought. The hypothesis that reality should ultimately be inscrutable to us and that the images that our minds possess should never comprehend reality is not a denial of reason but its assertion. The consequence of such a self-limitation by mind to its proper sphere represents not a disparagement of knowledge but the prerequisite to its ever more effective application.

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