

experience—the ability, that is, to solve the problems of present behavior in the light of, or by reference to, both the past and the future; it involves both memory and foresight. And the process of exercising intelligence is the process of delaying, organizing, and selecting a response or reaction to the stimuli of the given environmental situation. The process is made possible by the mechanism of the central nervous system, which permits the individual's taking of the attitude of the other toward himself, and thus becoming an object to himself. This is the most effective means of adjustment to the social environment, and indeed to the environment in general, that the individual has at his disposal.

An attitude of any sort represents the beginning, or potential initiation, of some composite act or other, a social act in which, along with other individuals, the individual taking the given attitude is involved or implicated. The traditional supposition has been that the purposive element in behavior must ultimately be an idea, a conscious motive, and hence must imply or depend upon the presence of a mind. But the study of the nature of the central nervous system shows that in the form of physio-

logical attitudes (expressed in specific physiological sets) different possible completions to the given act are there in advance of its actual completion, and that through them the earlier parts of the given act are affected or influenced (in present conduct) by its later phases; so that the purposive element in behavior has a physiological seat, a behavioristic basis, and is not fundamentally nor necessarily conscious or psychical.

Notes

1. Intelligence and knowledge are inside the process of conduct. Thinking is an elaborate process of . . . presenting the world so that it will be favorable for conduct, so that the ends of the life of the form may be reached (MS).
Thinking is pointing out—to think about a thing is to point it out before acting (1924).
2. It is an advantage to have these responses ready before we get to the object. If our world were right on top of us, in contact with us, we would have no time for deliberation. There would be only one way of responding to that world.
Through his distance organs and his capacity for delayed responses the individual lives in the future with the possibility of planning his life with reference to that future (1931).

The Nature of Scientific Knowledge

We have reached certain points in the implications of the method of experimental science which may be summarily restated. In the first place, the scientist's knowing is a search for the unknown, a discovery, but it is a search for what has disappeared in the conflicts of conduct, that is, for objects which will remove the antagonism—it is a search for the solution of a problem. This dissipates the Platonic puzzle of how we can seek to know what is unknown.

It is interesting to note that Plato's solution of the puzzle is found in the form of ignorance as a problem, that of recollecting what has been forgotten. Unfortunately this theory could not apply to the discovery of new types of objects which were foreign to the world of past experience.

In the second place, experimental science implies a real world uninfected by the problem, which can be used to test the discoveries

which science makes. If knowledge is discovery of the unknown, this world is not known—it is simply there.

In the third place, as the world that is there is not known and may not therefore as non-known have ascribed to it the sort of logical necessity that does obtain in the logical structure of hypotheses, experimental science finds nothing contradictory in the later appearance of a problem in any portion of the world which has been used to test the solution of a former problem. That a contradiction should appear in the hypothesis is proof of its faulty and, in that sense, unreal, character, but that the sun ceases to be an object revolving about the earth in no way invalidates the world by which we test the hypothesis of the revolution of the earth on its axis by the shifting of the path of the pendulum's swing. Logical necessity obtains in the field of reflective thinking. To transfer it to the world that is there, and within which thought is occupied in the solution of problems, would be to dismiss experimental science as a meaningless and pernicious discipline and to return to the science of dogma.

In the fourth place, in observation and in experiment, science finds a field that belongs both to the world that is there and to the reflective thought of discovery, that is, of knowledge. The problem does not exist *in vacuo*. It is in the world that is there, but a certain portion of the world that is there has disappeared. The disease that is conveyed by contact disappears in the evidence of sporadic cases, notwithstanding its epidemic character. But the scourge is all the more tragically there. The instances of the disease are now observed and recorded by physicians and health officers who are seeking to discover the mechanism of the spread of the infection. These data embodied in various hypotheses exist in the minds of the investigators. As the observations of competent investigators of the actual epidemic, they are there as parts of the experiences of these individuals, and the records of them are parts of their biographies. The test case of the heroic scientist, who has remained immune to the fever after wearing the clothes of those who were sick of it and sleeping in their beds,

and who succumbs to it when stung by the mosquito, begins in the field of scientific data and personal biographies and ends in the impersonal world to which belongs the two-chaptered history of the yellow-fever parasite. In so far as these data are imbedded in the lives of these individuals, they are personal but hard facts. So long as they are tentatively suggestive of objects that would harmonize conflicting ways of cataloguing and treating the disease, they are in the minds of men as part of the structure of their ideas.

We must distinguish here between what belongs to the experience of the individual qua individual and what is in his mind and may be termed "subjective." In the former sense the observation may be called private because the investigator alone observes it. Indeed it may be such an instance that he alone can observe it, if, for example, it is his own ache or pain, or if no one else has seen it, and it is an instance that is not repeated. This circumstance does not abstract it from the world that is there, since these men are there in that world together with the events that take place in their lives. But, in so far as the experience suggests what is known of the relation of the mosquito to malaria and a possible parasitic organism that may be the cause of yellow fever, we are in the presence of an idea and of what we will call "subjective." Such an object is not as yet there and may never be there. It is an ideal object. Such objects, as before remarked, have the same locus as erroneous objects after the error has been detected and are not to be confused, because they are placed in individuals' minds, with individuals' experiences, which are peculiar to them, but are objects in the world that is there. I am not, of course, ignoring the problems involved in this distinction. I am for the time being merely insisting that experimental science never takes the position so common in philosophy, which confuses the two. To the experimental scientist the data of observation and experiment never lose the actuality of the unquestioned world because they can happen for the time being only in the lives of particular individuals, or because they are fitted to serve in the mental processes of

discovery. They are solid realities that can bridge the gaps between discredited theories and the discoveries of science.

It is the position of the positivist that what is observed is, as a fact of experience, there in a sense in which it never can be false. He recognizes that there may be false inferences drawn from the observation or the experiment, but as a fact of immediate experience it simply is and therefore is not open to possible question. This assumption does not answer to the procedure of science, for whatever may be the theory of sensation, the scientist's observation always carries a content or character in what is observed that may conceivably be shown under other conditions to be erroneous, though the probability of this be very slight. In psychological terms, an observation is never a mere determination of a sensation (if there is any such thing in adult experience) but is a perception, and, whether all perceptions involve judgments or not, they are frequently illusory, as, for example, in the perceptions of mirrored objects, and can never be free from the possibility of analogous errors.

What gives to the observation or experiment its validity is its position in the world that is there, that is not questioned. It is indeed carefully isolated from what has fallen into question, and this meticulous cleansing from all implications of the abandoned doctrine, and all as yet hypothetical interpretations, creates the impression of an experience which may not be subjected to any further question; but, as we know, there is no part or portion of the world that may not conceivably be the field of a scientific problem.

In the so-called exact sciences we seem to approach an object which is nearly free from all possibility of contingency—the physical particles. These particles are approximations to that which is unextended in space and time, but they carry a character—that of mass or of electrical energy—which does not approach zero, however minute it may become, and it is a character which is reached from numberless observations and not a little speculative theory. Furthermore, the procedures in our laboratories and observatories by which these

characters are reached involve perceptual objects of the most complex nature, subject under other conditions to all sorts of conceivable questions. In other words, while the methods of mathematical analysis and extensive abstraction constitute a body of doctrines which in themselves are necessary, as long as the terms carry the same references, their applications are dependent upon their functioning within the problematic situations which arise in research science and appeal for their validity in practice to the court of observation and experiment.

The scientist's attitude is that of a man in a going concern which requires at various points readjustments and reconstructions. The success of the readjustments and reconstructions is found in the triumph over the difficulty, as evidenced by the fact that the concern continues to operate. He finds his tests in the parts of the whole which still operate. This does not imply that readjustments may not be called for later at these very points to which he now appeals for confirmation of the success of his solutions of the immediate problems before him. Surrounding the most profound analysis of the structure of matter, and the widest survey of the galaxies of the heavens, lies the field of things within which experiment and observation take place without question, and which gives its validity to cosmologies and electronic theories of matter. It may seem a misnomer to speak of the world within which lie the observation and experiment as surrounding such hypothetical constructions as the electrical theory of matter, or the galactic form of the universe, since these hypothetical constructions so far transcend, in the subatomic world or in the indefinite stretches of the heavens, all the world of objects which includes our observations and experiments. We seem rather to be islanded in a very minute region occupied by perceptual objects that are in their constitution vague, indeterminate, and incurably contingent, surrounded from within and from without by a universe, which science presents, that is occupied by objects that approximate exactness of definition and necessity in their forms and changes. And yet

the scientist, when he times microscopic oil drops as they move toward or away from charged plates, or when he measures the distances of photographed stars from one another before and during an eclipse, has not at all the attitude of a man perched insecurely upon obscure and adventitious data. The world that is there has taken up into itself all the order, definition, and necessity of earlier scientific advance. It is not there as hypothesis, in so far as the hypotheses have justified themselves in experiment, nor is it there as analyzed relations, events, and particles. These characters have passed into things, and for the time being at any rate, they are there unanalyzed, with the same authority as that of the so-called sensible experience. It is only necessary to emphasize again the distinction of the data as parts of the mental process of anticipating hypothetical objects, and as imbedded in the world of unquestioned reality in the experience of the individuals to whom the problem has come and who are trying to solve it, as well as in the impersonal world within which these individuals exist.

What renders such a statement of the world (not as known but as there) somewhat bizarre is that we enter the world of the scientist by the process of learning. In schools and institutions of higher learning we are taught the doctrines of modern science. Most of us take no part in the work of discovering what is there found out, but we acquire it by a process of learning, in which we may retrace some of the steps which research has followed, while in the main we accept it largely on faith in the men and their methods, especially faith in the checking-up of the results of certain individuals by all the others in the field. Scientific journalism as well as the daily press keeps us informed of the latest advances, and, having learned these facts, we say that we now know them. The world that stretches so far beyond our experience seems in this sense a world of knowledge.

It is true that all acquirement of information, in so far as it is more than a mere parrot-like facility in repeating what is read or heard, is a reflective process in which a problematic

situation is met with discovery, though the hypotheses and their tests are those of others. Our own hypotheses and tests have to do largely with the competence of the sources upon which we draw. Admitting, however, all the criticism that the layman can bring to his education, this world of knowledge is evidently of quite a different character from the world that is there, the world that is seen and felt, whose reality is the touchstone of our discoveries and inventions, and very different from the discoveries and inventions themselves, which are the knowledge par excellence of research science.

It is in the acquirement of information that the copy theory finds its explanation. There, what is known must answer feature for feature to its prototype. This field of so-called knowledge is that of the assimilation of the experience of others to one's own experience. There may be involved in it the discovery of these other experiences by the individual, and it is in so far knowledge, but the content of that which is said to be learned is not discovered in the sense in which the other has discovered it.

In its simplest form what takes place here is the indication to one individual by another of an object which is of moment in their co-operative activity. This gesture becomes symbolic when it arouses in the individuals the attitudes which reaction to the objects involves, together, generally, with some imagery of the result of that action. It becomes communication when the individual indicating the object takes also the attitude of the individual to whom he is indicating it plus that of his response, while the individual to whom the object is indicated takes the attitude of him who is indicating it. We call this taking of one another's attitudes consciousness of what we are doing and of what the other is doing, and we incorrectly apply the term "knowledge" to this. The mechanism and import of this social procedure will be discussed later. What I wish to point out at present is that this process in itself does not involve discovery, any more than does that of perception. When doubt and discrepancies arise in the process of communication, as they continually do arise, the

necessity of establishing agreement between the symbols mutually used, and that which they symbolize and the results of the conduct they imply, calls for a one to one correspondence between the symbols and those things and characters symbolized in the experiences of the different individuals, and this gives rise to the theory of knowledge as an agreement between the state of mind and that which is known. Such a determination of mutual agreement in co-operative conduct is indeed essential not only to this conduct but to what is called "thinking" in the individual, but it is not a discovery of that which needs to be known. It is at most a part of the technique by which the discovery is made. When the discrepancy arises, we must discover what the import of the symbols is, and here real knowledge takes place. We find out what the other person is referring to—in common parlance, what he means—but the process can go on without discrepancies. The other indicates to us what is there, and our so-called consciousness of this need not introduce any reflective attitude in our conduct. To call the correspondence between the attitudes involved in pointing out a savage dog and the conduct which takes place "knowledge," whether one points it out to one's self or to another, is to give to "knowledge" an entirely different value from that involved in discovery.

In any education that is worthy of the name, what is acquired does go toward the solution of the problems that we all carry with us, and is the subject of reflection, and leads to the fashioning of new hypotheses and the appearance of new objects; but this takes place after the communication which is the mutual indication of objects and characters by the use of gestures which are common symbols, that is, symbols with identical references. The correspondence theory of knowledge has grown up around the recognition of the relation between that which the symbol refers to in the object and the attitudes of response in others and in ourselves. There is here a one to one correspondence, but the relation of these objects and their characters to what we can infer from them in the discovery of the novel

element which meets our problematic situations is of an entirely different sort.

In this "meeting of minds" which takes place in conversation, learning, reading, and thinking, there are generally present problematic situations and discovery, though this is by no means always the case. If someone informs us that an expected acquaintance has arrived, there is no more of a problem, or discovery in the sense of a solution, than would be involved in the friend's appearing around the corner. The varied landscape and hurry of events that sweep us along in books of travel and adventure embrace no more of reflection than the travel and adventure in which we are involved. A great deal of learning is a direct following of indications, or a gradual taking-over of the form and technique of others that goes on without inference. A good deal of thinking even, notably much of reverie and also straight-away ordering of conduct in an unquestioned situation, may be free from dubitation and ratiocination. A field of concentrated inferential thought does include the common reference of symbols in conversation, writing, and thinking—in other words, that part of logic which has to do with the technique of communication either with others or with one's self—together with the epistemologies and metaphysics which have sprung from this and obscured it with their tangled and forest growth. Here lie the problems of successful reference to identical objects and characters through identical symbols mutually employed by different selves, and these problems are of peculiar interest and importance to those involved in the exact and mathematical sciences. These problems demand theories of definition and implication, in so far as this does not depend upon the concrete content of that to which reference is made.

The environment of living organisms is constantly changing, is constantly invaded with other and different things. The assimilation of what occurs and that which recurs with what is elapsing and what has elapsed is called "experience." Without anticipating a later discussion of the social nature of the self and of thinking, I shall claim that the analysis of

experimental science, including experimental psychology, never operates in a mind or an experience that is not social, and by the term "social" I imply that in the thought of the scientist the supposition of his mind and his self always involves other minds and selves as pre-suppositions and as standing upon the same level of existence and evidence. It may be that the scientist, in a self-centered moment, might think away all else but his self and its thinking, but even if in imagination he succeeded in annihilating all save the dot on the *i*, its having any thoughts at all would depend entirely upon its preserving its previous habits of conversing with others and so with himself; and, as this precious hoard of past experience wore away under incessant use and decay, the dot would follow the *i* into nonentity. The dividend that I wish to see declared on this social nature of mind and the self is the equal immediacy that may attach to the assimilation of others' experience with that of our own. We so inevitably utilize the attitude of the other, which is involved in addressing ourselves and in attending to him, that we give the same logical validity to what he relates of his experience as that which we give to what we relate to ourselves of our own past experience, unless on other grounds we are occupying the seat of the critic. It has, of course, only the validity that attaches to a relation, and is one remove from the assurance that attaches to the so-called memory image. But this validity at this remove is all that we can claim for most of our memory. Memory images constitute but a minute part of the past that stretches out behind us. For most of it we depend upon records, which come back to one form or another of language, and we refresh our memory as really in inquiring of a companion what took place on a certain occasion as in questioning ourselves. His testimony may not be as trustworthy as our own because of difference of interest and possible prejudice, but on other occasions for the same reason his testimony may outrank our own in reliability. While the actual image of the event has an evidential character that is peculiar, not infrequently it may be shown by the testimony of others to

have been the product of imagination or to have been shifted from its proper place in the record. But still more fundamentally, the building-up of a memory record involves, in the first place, a social world as definitely as the physical world, within which the events took place, and involves, in the second place, experience which was actually or potentially social in its nature to the extent that whatever happens or has happened to us has its character over against actual or possible audiences or observers whose selves are essential to the existence of our own selves, the mechanism of whose conversation is not only as immediate as our replies but, when imported into the inner forum, constitutes the mechanism of our own thought.

I am anticipating the detailed presentation of this doctrine of mind to make clear my distinction between information and knowledge as discovery through inference. Information is the experience arising from the direction of attention through the gestures of others to objects and their characters, and cannot be called "knowledge" if that term is denied to perception as immediate experience under the direction of the attention springing from the organic interest of the individual. Perception is not itself to be distinguished from information, in so far as one uses a social mechanism in pointing out objects and characters to himself as another. The perceptions of a self may be already in the form of information. Logically stated they exist in a universe of discourse. Knowledge, on the other hand, deliberately fashions hypothetical objects whose reality it tests by observation and experiment. The justification for this is found in the actual disappearance of objects and their characters in the problems that arise in conduct.

Actually so much both of perception and of information is shot through with reflective construction and reconstruction that it is difficult to disentangle them from each other. It is, however, a part of scientific technique to accomplish this disentanglement. Observations and experiments are always in the form of information, even while they are being made, but they are scrupulously teased out from the web

of inference and hypothesis. From this purity depart in varying degrees our perceptions as well as our information. It is a commonplace that one may be very well informed and do very little thinking, indeed be quite helpless over against a situation in which the information must be used to suggest or test hypotheses. The reliability itself of the observation or information, however, does call for a certain sort of verification, that of its repetition, either in the experience of the individual or in the mouths of other witnesses, and here, as above remarked, we find the source of the copy or correspondence theories of knowledge. Indeed, if information is knowledge, the copy theory of knowledge is entirely legitimate.

In presenting the world that is there as in some sense surrounding what is problematic, it was stated that what had in the past been approved by experiment and observation was taken up into this world and resided there as organized objects, things behaving toward one another in expected manners. Over against these unquestioned things lie the elements and relations of the working hypotheses of science. These are in a peculiar degree the objects of our knowledge. They are still lacking in complete verification. They are received only provisionally, and the objects which we constitute by means of them are complex hypotheses anticipating further tests in the use which we make of them. While they work, they pass as objects, but always with a proviso attached, which keeps the scientist's attention alive to possible departures from the result which the hypothesis implies. He is looking for such departures and eager to find them. In such far-reaching speculations as those regarding the structure of matter this field of knowledge is enormously extended, though it does not actually include the world within which the observation and experiment themselves take place, though the analysis which the investigation involves extends into the world of unquestioned things. For the purposes of our calculations we state the apparatus of our laboratories, for example, in the same terms which we use in our hypothetical constructions and thus seem to bring them within the scope of the investigation. But

the scientist is in no doubt in regard to the distinction between the finding of fact and the hypothetical form in which he has stated things which are there, irrespective of the validity of the expressions into which they have been translated. Such translations may be perhaps called "objects of knowledge," though with the recognition that the success or failure of the hypothesis, into the terms of which we have translated these unquestioned things and their processes, does not affect their reality in the observation or experiment. In this sense there is no limit to the field of knowledge, for we may state the whole universe in terms of such working hypotheses, if we only remember the limits of this formulation. But it is also necessary to recognize that the *raison d'être* for translation is found in the function of the apparatus of experimental science and not in the revelation of reality. What reveals this latter fact is the ineradicable difference between the immediate concrete event to which appeal is made in experiment and observation, and any formulation of this in terms of a current working hypothesis. The actual position of the spectral line, or of the photographic image on the plate, is the brute fact by which the hypothesis is tested, and there is no methodological relation between the exactly determined position of these and a resolution of them into, say, electrons. It is conceivable that this should be done. It would vastly confuse and delay the attainment of any knowledge from the measurement and would have no conceivable connection with getting that knowledge. To call such a translation "knowledge" is to depart from the significance which the term "knowledge" has in an experimental science.

The world, then, in which science operates has, at its core and in a certain sense surrounding its findings and speculations, the environment of immediate experience. At the point of its problems the immediate things are so analyzed that they may pass into the formulations of the scientist's hypothesis, while the finding of observation and experiment remains immediate experience, that is, is located in the surrounding borderland. It is these two aspects of the world of immediate experience that call for

especial attention. From the standpoint of the discovery of the new, from the standpoint of research, the world of immediate experience is a core and seems to be reduced to the island of vague, indeterminate, and contingent data that are contrasted with the clear-cut, sharply defined, and necessary elements and events of scientific theory; an apparently incongruous situation, for the acceptance of the clear-cut, sharply defined, and necessary world is dependent upon the findings in the island of vague, indeterminate, and contingent data, the field of observation and experiment. It is an apparent incongruity that has given birth to much philosophical speculation.

That the incongruity is only apparent is fairly evident, since the scientist, out of whose method and its achievements it has arisen, is not aware of it. If it were presented to him in the terms just used, he would presumably reply that one cannot both have his cake and eat it; that, if one is in search of definition and certainty at a point in experience at which they have disappeared, it is but natural that the definition of the problem should exhibit this fact of their disappearance and that the very data which will serve in the verification of a hypothetical order of defined and necessary things must be themselves infected with indeterminateness and contingency; that the home of experimental medicine is in the hospital; that the gospel of science summons not the logically righteous but sinners to repentance. He would likely add, however, that because, before the discovery of the germ of yellow fever, the clinical picture of the disease was indeterminate and its incidence contingent, there would have been no justification in ascribing the same indeterminateness and contingency to the clinical picture of diphtheria—in other words, that the form in which the data appear in any one problem is pertinent to that problem alone.

But while the statement of the problem, together with the observation and experiment that are involved in verification, constitutes a core of immediate experience whose analyzed elements are indeterminate and contingent as compared with defined elements and neces-

sary relations in a hypothetical scientific theory, these data do belong to objects in an immediate world that is a going concern, and as such is unquestioned. Such a world may be said to contain the problem within itself, and so to surround the problem. It has taken up into itself the solutions of past problems successfully solved. There is involved in it also a considerable apparatus of working hypothesis, which is not always distinguished from the world that is there. The distinction lies in the fact that back of the working hypothesis there is always a question mark, and in the back of the scientist's mind in using the working hypothesis lies the problem implied in its being only a working hypothesis. The world that is there is the common world within which the intelligent community lives and moves and has its being. In physical diameter it may be a small world as compared with the scope of physical hypotheses which in a logical sense it surrounds. Its logical compass of the hypothesis is shown in the data of observation and experiment that must be brought to bear upon the hypothesis before it can be established.

This compass of the problem, and the hypothetical solution of it, is logical in so far as the analysis involved in the problem, the inference involved in the formation of the hypothesis, and the sufficiency of evidence involved in observation and experiment all rest upon a world of things that is there, not as known but as containing conditions of knowledge. But the world that is there includes and surrounds the problem in the sense that the problem is also there within the field of conduct, for, as has been indicated, the problem arises in the conduct of individuals and out of the conflict of acts which inhibit one another because the same object calls out mutually antagonistic responses. When these problems pass into the field of reflection, they are so formulated that they would occur in any experience, that is, they take on a universal form. Such a formulation is essential to the reflective process of their solution. Their actual occurrence, however, in the world that is there awaits the advent of the conflict of responses in the experience of some

individual; and the solution as well, inasmuch as it departs from the common or universal habits of the community, must be an individual achievement before it can become the attitude of all and be thus universalized. So located in its historical setting, the problem is evidently as completely surrounded by the world that is there as the hole left by a name that has been forgotten is surrounded by all the other names and things and happenings by which one attempts its recall. But while occurrence of the problem and of its solution must be in the field of conduct of some one individual, the things and events that constitute its border are matters of common and undisputed validity. The problem must happen to an individual, it can have no other locus than in his biography, but the terms in which he defines it and seeks its solution must be universal, that is, have common import.

This location of the problem in the experience of the individual in its historical setting dates not only the problem but also the world within which that problem arises. For a world within which an essential scientific problem has arisen is a different world from that within which this problem does not exist, that is, different from the world that is there when this problem has been solved. The world of Daltonian atoms and electricity (which was considered a form of motion), within which appeared the problem of the ion in electrolysis and the breakup of the atom in radioactive substances, is a different world from that whose ultimate elements are particles of electricity. Such worlds dated by the problems upon whose solutions they have appeared are social in the sense that they belong to the history of the human community, since reflective thought is a social undertaking, and since the individual in whose experience both the problem and its solution must arise presupposes the community out of which he springs.

It is the double aspect of these worlds that has been the occasion of so much philosophic speculation. On the one hand, they have provided the tests of reality for experimental science, and, on the other, they have successively lost their validity and have passed away into

the realm of ideas. I have already indicated the scientist's rejoinder to this apparent assault upon his method. His method implies not that there has been, is, or will be any one authentic world that constitutes the core and envelope of his problems, but that there always have been, and are, and will be facts, or data, which, stated in terms of these different worlds by the individuals in whose experience they have appeared, can be recognized as identical; and that every world in which problems appear and are attacked by the experimental method is in such a sense a going concern that it can test hypothetical solutions. I have further insisted that as a scientist his goal in the pursuit of knowledge is not a final world but the solution of his problem in the world that is there.

There have existed two different attitudes toward these so-called facts or data. Because it has been assumed that the observations of the old watchers of the heavens in the valley of Mesopotamia, and of Hipparchus, and of Tycho Brahe, and present astronomers possessed a certain identity, there has arisen a picture of the world made up of that which can be regarded as common to all, a picture made of abstractions. It is a picture through which we can look before and after, and determine the date of Thales when he predicted an eclipse, and what eclipses will take place a thousand years hence. If we assign a metaphysical reality to these facts, we reach a universe which has been the subject matter of popular and technical philosophies. If, on the other hand, we restrict ourselves to the determinations of experimental science, we have nothing but the common indication of things and characters in a world that is there, an indication that abstracts from all but that which is there when a problematic situation has robbed it of some object and concentrates attention upon those characters and things which are the stimuli to mutually inhibiting responses. As I have already insisted, it is only in the experience of the individual, at some moment in that experience, that such a conflict can take place. Non-problematic things are there for everyone. But while these observations took place in individual experiences, in the experiences of those

individuals for whom these problems arose, it is the assumption of experimental science that a like experience would have arisen for any other individual whose experience had been infected with the same problem and that, in so far as successive problems have involved identical problematic elements, it is possible to identify the same observation in the experience of different individuals.

The Mesopotamian soothsayer who had hit upon the succession of the eclipses and enshrined it in the Great Saros, and the Greek astronomer who by a scientific explanation of the eclipses had worked out the same succession, and the modern Copernican astronomer who substitutes the motion of the earth in its orbit for that of the sun about the earth and dates these eclipses still more accurately, were all observing the same phenomenon. For each there was a different world that was there, but in these worlds there were actual or identical observations of individuals which connect these worlds with one another and enable the later thinker to take up into his own the worlds that have preceded his. The common content

of these observations, by means of which different worlds are strung together in human history, depends upon the assumption that different individuals have had or would have the same experiences. So far as there is any universality in these contents, it goes back to an actual or implied indication of the same things and characters by different individuals, in the same or like situations, that is, it goes back to implications in regard to social behavior in inferential processes, especially to the social nature of the knowledge or evidential import of observation.

However, the experimental scientist, apart from some philosophic bias, is not a positivist. He has no inclination to build up a universe out of such scientific data, which in their abstraction can be identified as parts of many different worlds. The reference of his data is always to the solution of problems in the world that is there about him, the world that tests the validity of his hypothetical reconstructions. Nothing would more completely squeeze the interest out of his world than the resolution of it into the data of observation.

Play, the Game, and the Generalized Other

Another set of background factors in the genesis of the self is represented in the activities of play and the game.

Among primitive people, as I have said, the necessity of distinguishing the self and the organism was recognized in what we term the "double": the individual has a thing-like self that is affected by the individual as it affects other people and which is distinguished from the immediate organism in that it can leave the body and come back to it. This is the basis for the concept of the soul as a separate entity.

We find in children something that answers to this double, namely, the invisible, imaginary companions which a good many children produce in their own experience. They organize in this way the responses which they call out in other persons and call out also in themselves. Of course, this playing with an imaginary companion is only a peculiarly interesting phase of ordinary play. Play in this sense, especially the stage which precedes the organized games, is a play at something. A child plays at being a mother, at being a teacher, at