

CHAPTER VI

THE PATTERN OF INQUIRY

THE FIRST chapter set forth the fundamental thesis of this volume: Logical forms accrue to subject-matter when the latter is subjected to controlled inquiry. It also set forth some of the implications of this thesis for the nature of logical theory. The second and third chapters stated the independent grounds, biological and cultural, for holding that logic is a theory of experiential naturalistic subject-matter. The first of the next two chapters developed the theme with reference to the relations of the logic of common sense and science, while the second discussed Aristotelian logic as the organized formulation of the language of Greek life, when that language is regarded as the expression of the meanings of Greek culture and of the significance attributed to various forms of natural existence. It was held throughout these chapters that inquiry, in spite of the diverse subjects to which it applies, and the consequent diversity of its special techniques has a common structure or pattern: that this common structure is applied both in common sense and science, although because of the nature of the problems with which they are concerned, the emphasis upon the factors involved varies widely in the two modes. We now come to the consideration of the common pattern.

The fact that new formal properties accrue to subject-matter in virtue of its subjection to certain types of operation is familiar to us in certain fields, even though the idea corresponding to this fact is unfamiliar in logic. Two outstanding instances are provided by art and law. In music, the dance, painting, sculpture, literature and the other fine arts, subject-matters of everyday experience are *transformed* by the development of forms which render certain products of doing and making objects of fine art. The materials of legal regulations are transactions occurring in the ordinary

activities of human beings and groups of human beings; transactions of a sort that are engaged in apart from law. As certain aspects and phases of these transactions are legally formalized, conceptions such as misdemeanor, crime, torts, contracts and so on arise. These formal conceptions arise out of the ordinary transactions; they are not imposed upon them from on high or from any external and *a priori* source. But when they are formed they are also *formative*; they regulate the proper conduct of the activities out of which they develop.

All of these formal legal conceptions are operational in nature. They formulate and define *ways* of operation on the part of those engaged in the transactions into which a number of persons or groups enter as "parties," and the ways of operation followed by those who have jurisdiction in deciding whether established forms have been complied with, together with the existential consequences of failure of observation. The forms in question are not fixed and eternal. They change, though as a rule too slowly, with changes in the habitual transactions in which individuals and groups engage and the changes that occur in the consequences of these transactions. However hypothetical may be the conception that *logical* forms accrue to existential materials in virtue of the control exercised over inquiries in order that they may fulfil their end, the conception is descriptive of something that verifiably exists. The development of forms in consequence of operations is an established fact in some fields; it is not invented *ad hoc* in relation to logical forms.

The existence of inquiries is not a matter of doubt. They enter into every area of life and into every aspect of every area. In everyday living, men examine; they turn things over intellectually; they infer and judge as "naturally" as they reap and sow, produce and exchange commodities. As a mode of conduct, inquiry is as accessible to objective study as are these other modes of behavior. Because of the intimate and decisive way in which inquiry and its conclusions enter into the management of all affairs of life, no study of the latter is adequate save as it is noted how they are affected by the methods and instruments of inquiry that currently obtain. Quite apart, then, from the particular hypothesis about logical forms that is put forth, study of the objective facts of in-

quiry is a matter of tremendous import, practically and intellectually. These materials provide the theory of logical forms with a subject-matter that is not only objective but is objective in a fashion that enables logic to avoid the three mistakes most characteristic of its history.

1. In virtue of its concern with objectively observable subject-matter by reference to which reflective conclusions can be tried and tested, dependence upon subjective and "mentalist" states and processes is eliminated.

2. The distinctive existence and nature of forms is acknowledged. Logic is not compelled, as historic "empirical" logic felt compelled to do, to reduce logical forms to mere transcripts of the empirical materials that antecede the existence of the former. Just as art-forms and legal forms are capable of independent discussion and development, so are logical forms, even though the "independence" in question is intermediate, not final and complete. As in the case of these other forms, they originate *out of* experiential material, and when constituted introduce new ways of operating with prior materials, which ways modify the material out of which they develop.

3. Logical theory is liberated from the unobservable, transcendental and "intuitional."

When methods and results of inquiry are studied as objective data, the distinction that has often been drawn between noting and reporting the ways in which men *do* think, and prescribing the ways in which they *ought* to think, takes on a very different interpretation from that usually given. The usual interpretation is in terms of the difference between the psychological and the logical, the latter consisting of "norms" provided from some source wholly outside of and independent of "experience."

The way in which men *do* "think" denotes, as it is *here* interpreted, simply the ways in which men at a given time carry on their inquiries. So far as it is used to register a difference from the ways in which they *ought* to think, it denotes a difference like that between good and bad farming or good and bad medical practice.¹ Men think in ways they should not when they follow methods of inquiry that experience of past inquiries shows are not

¹ Cf. pp. 6 and 10 of Introduction.

competent to reach the intended end of the inquiries in question.

Everybody knows that today there are in vogue methods of farming generally followed in the past which compare very unfavorably in their results with those obtained by practices that have already been introduced and tested. When an expert tells a farmer he *should* do thus and so, he is not setting up for a bad farmer an ideal drawn from the blue. He is instructing him in methods that have been tried and that have proved successful in procuring results. In a similar way we are able to contrast various kinds of inquiry that are in use or that have been used in respect to their economy and efficiency in reaching warranted conclusions. We know that some methods of inquiry are better than others in just the same way in which we know that some methods of surgery, farming, road-making, navigating or what-not are better than others. It does not follow in any of these cases that the "better" methods are ideally perfect, or that they are regulative or "normative" because of conformity to some absolute form. They are the methods which experience up to the present time shows to be the best methods available for achieving certain results, while abstraction of these methods does supply a (relative) norm or standard for further undertakings.

The search for the pattern of inquiry is, accordingly, not one instituted in the dark or at large. It is checked and controlled by knowledge of the kinds of inquiry that have and that have not worked; methods which, as was pointed out earlier, can be so compared as to yield reasoned or rational conclusions. For, through comparison-contrast, we ascertain *how and why* certain means and agencies have provided warrantably assertible conclusions, while others have not and *cannot* do so in the sense in which "cannot" expresses an intrinsic incompatibility between means used and consequences attained.

We may now ask: What is the *definition* of Inquiry? That is, what is the most highly generalized conception of inquiry which can be justifiably formulated? The definition that will be expanded, directly in the present chapter and indirectly in the following chapters, is as follows: *Inquiry is the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent distinctions and relations as to con-*

vert the elements of the original situation into a unified whole.²

The original indeterminate situation is not only "open" to inquiry, but it is open in the sense that its constituents do not hang together. The determinate situation on the other hand, *qua* outcome of inquiry, is a closed and, as it were, finished situation or "universe of experience." "Controlled or directed" in the above formula refers to the fact that inquiry is competent in any given case in the degree in which the operations involved in it actually do terminate in the establishment of an objectively unified existential situation. In the intermediate course of transition and transformation of the indeterminate situation, *discourse* through use of symbols is employed as means. In received logical terminology, propositions, or terms and the relations between them, are intrinsically involved.

I. *The Antecedent Conditions of Inquiry: The Indeterminate Situation.* Inquiry and questioning, up to a certain point, are synonymous terms. We inquire when we question; and we inquire when we seek for whatever will provide an answer to a question asked. Thus it is of the very nature of the indeterminate situation which evokes inquiry to be *questionable*; or, in terms of actuality instead of potentiality, to be uncertain, unsettled, disturbed. The peculiar quality of what pervades the given materials, constituting them a situation, is not just uncertainty at large; it is a unique doubtfulness which makes that situation to be just and only the situation it is. It is this unique quality that not only evokes the particular inquiry engaged in but that exercises control over its special procedures. Otherwise, one procedure in inquiry would be as likely to occur and to be effective as any other. Unless a situation is uniquely qualified in its very indeterminateness, there is a condition of complete panic; response to it takes the form of blind and wild overt activities. Stating the matter from the personal side, we have "lost our heads." A variety of names serves to characterize indeterminate situations. They are disturbed, troubled, ambiguous, confused, full of conflicting tendencies, obscure, etc.

It is the *situation* that has these traits. *We* are doubtful because

² The word "situation" is to be understood in the sense already expounded, *ante*, pp. 66-7.

the situation is inherently doubtful. Personal states of doubt that are not evoked by and are not relative to some existential situation are pathological; when they are extreme they constitute the mania of doubting. Consequently, situations that are disturbed and troubled, confused or obscure, cannot be straightened out, cleared up and put in order, by manipulation of our personal states of mind. The attempt to settle them by such manipulations involves what psychiatrists call "withdrawal from reality." Such an attempt is pathological as far as it goes, and when it goes far it is the source of some form of actual insanity. The habit of disposing of the doubtful as if it belonged only to *us* rather than to the existential situation in which we are caught and implicated is an inheritance from subjectivistic psychology. The biological antecedent conditions of an unsettled situation are involved in that state of imbalance in organic-environmental interactions which has already been described.³ Restoration of integration can be effected, in one case as in the other, only by operations which actually modify existing conditions, not by merely "mental" processes.

It is, accordingly, a mistake to suppose that a situation is doubtful only in a "subjective" sense. The notion that in actual existence everything is completely determinate has been rendered questionable by the progress of physical science itself. Even if it had not been, complete determination would not hold of existences as an *environment*. For Nature is an environment only as it is involved in interaction with an organism, or self, or whatever name be used.⁴

Every such interaction is a temporal process, not a momentary cross-sectional occurrence. The situation in which it occurs is indeterminate, therefore, with respect to its *issue*. If we call it *confused*, then it is meant that its outcome cannot be anticipated. It is called *obscure* when its course of movement permits of final consequences that cannot be clearly made out. It is called *conflicting* when it tends to evoke discordant responses. Even were

³ See, *ante*, pp. 26-7.

⁴ Except of course a purely mentalistic name, like *consciousness*. The alleged problem of "interactionism" versus automatism, parallelism, etc., is a problem (and an insoluble one) because of the assumption involved in its statement—the assumption, namely, that the interaction in question is with something mental instead of with biological-cultural human beings.

existential conditions unqualifiedly determinate in and of themselves, they are indeterminate in *significance*: that is, in what they import and portend in their interaction with the organism. The organic responses that enter into the production of the state of affairs that is temporally later and sequential are just as existential as are envioning conditions.

The immediate *locus* of the problem concerns, then, what kind of responses the organism shall make. It concerns the interaction of organic responses and envioning conditions in their movement toward an existential issue. It is a commonplace that in any troubled state of affairs *things* will come out differently according to what is done. The farmer won't get grain unless he plants and tills; the general will win or lose the battle according to the way he conducts it, and so on. Neither the grain nor the tilling, neither the outcome of the battle nor the conduct of it, are "mental" events. Organic interaction becomes inquiry when existential consequences are anticipated; when envioning conditions are examined with reference to their potentialities; and when responsive activities are selected and ordered with reference to actualization of some of the potentialities, rather than others, in a final existential situation. Resolution of the indeterminate situation is active and operational. If the inquiry is adequately directed, the final issue is the unified situation that has been mentioned.

II. *Institution of a Problem.* The unsettled or indeterminate situation might have been called a *problematic* situation. This name would have been, however, proleptic and anticipatory. The indeterminate situation becomes problematic in the very process of being subjected to inquiry. The indeterminate situation comes into existence from existential causes, just as does, say, the organic imbalance of hunger. There is nothing intellectual or cognitive in the existence of such situations, although they are the necessary condition of cognitive operations or inquiry. In themselves they are precognitive. The first result of evocation of inquiry is that the situation is taken, adjudged, to be problematic. To see that a situation requires inquiry is the initial step in inquiry.⁵

⁵ If by "two-valued logic" is meant a logic that regards "true and false" as the sole logical values, then such a logic is necessarily so truncated that clearness and consistency in logical doctrine are impossible. Being the matter of a problem is a primary logical property.

Qualification of a situation as problematic does not, however, carry inquiry far. It is but an initial step in institution of a problem. A problem is not a task to be performed which a person puts upon himself or that is placed upon him by others—like a so-called arithmetical “problem” in school work. A problem represents the partial transformation by inquiry of a problematic situation into a determinate situation. It is a familiar and significant saying that a problem well put is half-solved. To find out *what* the problem and problems are which a problematic situation presents to be inquired into, is to be well along in inquiry. To mistake the problem involved is to cause subsequent inquiry to be irrelevant or to go astray. Without a problem, there is blind groping in the dark. The way in which the problem is conceived decides what specific suggestions are entertained and which are dismissed; what data are selected and which rejected; it is the criterion for relevancy and irrelevancy of hypotheses and conceptual structures. On the other hand, to set up a problem that does not grow out of an actual situation is to start on a course of dead work, nonetheless dead because the work is “busy work.” Problems that are self-set are mere excuses for seeming to do something intellectual, something that has the semblance but not the substance of scientific activity.

III. *The Determination of a Problem-Solution.* Statement of a problematic situation in terms of a problem has no meaning save as the problem instituted has, in the very terms of its statement, reference to a possible solution. Just because a problem well stated is on its way to solution, the determining of a genuine problem is a *progressive* inquiry; the cases in which a problem and its probable solution flash upon an inquirer are cases where much prior ingestion and digestion have occurred. If we assume, prematurely, that the problem involved is definite and clear, subsequent inquiry proceeds on the wrong track. Hence the question arises: How is the formation of a genuine problem so controlled that further inquiries will move toward a solution?

The first step in answering this question is to recognize that no situation which is *completely* indeterminate can possibly be converted into a problem having definite constituents. The first step then is to search out the *constituents* of a given situation

which, as constituents, are settled. When an alarm of fire is sounded in a crowded assembly hall, there is much that is indeterminate as regards the activities that may produce a favorable issue. One may get out safely or one may be trampled and burned. The fire is characterized, however, by some settled traits. It is, for example, located *somewhere*. Then the aisles and exits are at fixed places. Since they are settled or determinate in *existence*, the first step in institution of a problem is to settle them in *observation*. There are other factors which, while they are not as temporally and spatially fixed, are yet observable constituents; for example, the behavior and movements of other members of the audience. All of these observed conditions taken together constitute "the facts of the case." They constitute the terms of the problem, because they are conditions that must be reckoned with or taken account of in any relevant solution that is proposed.

A *possible* relevant solution is then suggested by the determination of factual conditions which are secured by observation. The possible solution presents itself, therefore, as an *idea*, just as the terms of the problem (which are facts) are instituted by observation. Ideas are anticipated consequences (forecasts) of what will happen when certain operations are executed under and with respect to observed conditions.⁶ Observation of facts and suggested meanings or ideas arise and develop in correspondence with each other. The more the facts of the case come to light in consequence of being subjected to observation, the clearer and more pertinent become the conceptions of the way the problem constituted by these facts is to be dealt with. On the other side, the clearer the idea, the more definite, as a truism, become the operations of observation and of execution that must be performed in order to resolve the situation.

An idea is first of all an anticipation of something that may happen; it marks a *possibility*. When it is said, as it sometimes is,

⁶ The theory of *ideas* that has been held in psychology and epistemology since the time of Locke's successors is completely irrelevant and obstructive in logical theory. For in treating them as copies of perceptions or "impressions," it ignores the prospective and anticipatory character that defines *being* an idea. Failure to define ideas functionally, in the reference they have to a solution of a problem, is one reason they have been treated as merely "mental." The notion, on the other hand, that ideas are fantasies is a derivative. Fantasies arise when the function an idea performs is ruled out when it is entertained and developed.

that science is *prediction*, the anticipation that constitutes every idea an idea is grounded in a set of controlled observations and of regulated conceptual ways of interpreting them. Because inquiry is a progressive determination of a problem and its possible solution, ideas differ in grade according to the stage of inquiry reached. At first, save in highly familiar matters, they are vague. They occur at first simply as suggestions; suggestions just spring up, flash upon us, occur to us. They may then become stimuli to direct an overt activity but they have as yet no logical status. Every idea originates as a suggestion, but not every suggestion is an idea. The suggestion becomes an idea when it is examined with reference to its functional fitness; its capacity as a means of resolving the given situation.

This examination takes the form of reasoning, as a result of which we are able to appraise better than we were at the outset, the pertinency and weight of the meaning now entertained with respect to its functional capacity. But the final test of its possession of these properties is determined when it actually functions—that is, when it is put into operation so as to institute by means of observations facts not previously observed, and is then used to organize them with other facts into a coherent whole.

Because suggestions and ideas are of that which is not present in given existence, the meanings which they involve must be embodied in some symbol. Without some kind of symbol no idea; a meaning that is completely disembodied can not be entertained or used. Since an existence (which *is* an existence) is the support and vehicle of a meaning and is a symbol instead of a merely physical existence only in this respect, embodied meanings or ideas are capable of objective survey and development. To “look at an idea” is not a mere literary figure of speech.

“Suggestions” have received scant courtesy in logical theory. It is true that when they just “pop into our heads,” because of the workings of the psycho-physical organism, they are not logical. But they are both the conditions and the primary stuff of logical ideas. The traditional empiristic theory reduced them, as has already been pointed out, to mental copies of physical things and assumed that they were *per se* identical with ideas. Consequently it ignored the function of ideas in directing observation and in

ascertaining relevant facts. The rationalistic school, on the other hand, saw clearly that "facts" apart from ideas are trivial, that they acquire import and significance only in relation to ideas. But at the same time it failed to attend to the operative and functional nature of the latter. Hence, it treated ideas as equivalent to the ultimate structure of "Reality." The Kantian formula that apart from each other "perceptions are blind and conceptions empty" marks a profound logical insight. The insight, however, was radically distorted because perceptual and conceptual contents were supposed to originate from different sources and thus required a third activity, that of synthetic understanding, to bring them together. In logical fact, perceptual and conceptual materials are instituted in functional correlativity with each other, in such a manner that the former locates and describes the problem while the latter represents a possible method of solution. Both are determinations in and by inquiry of the original problematic situation whose pervasive quality controls their institution and their contents. Both are finally checked by their capacity to work together to introduce a resolved unified situation. As distinctions they represent logical divisions of labor.

IV. *Reasoning*. The necessity of developing the meaning-contents of ideas in their relations to one another has been incidentally noted. This process, operating with symbols (constituting propositions) is reasoning in the sense of ratiocination or rational discourse.⁷ When a suggested meaning is immediately accepted, inquiry is cut short. Hence the conclusion reached is not grounded, even if it happens to be correct. The check upon immediate acceptance is the examination of the meaning as a meaning. This examination consists in noting what the meaning in question implies in relation to other meanings in the system of which it is a member, the formulated relation constituting a proposition. If such and such a relation of meanings is accepted, then we are committed to such and such other relations of meanings because of their membership in the same system. Through a series of intermediate meanings, a meaning is finally reached which

⁷"Reasoning" is sometimes used to designate *inference* as well as ratiocination. When so used in logic the tendency is to identify inference and implication and thereby seriously to confuse logical theory.

is more clearly *relevant* to the problem in hand than the originally suggested idea. It indicates operations which can be performed to test its applicability, whereas the original idea is usually too vague to determine crucial operations. In other words, the idea or meaning when developed in discourse directs the activities which, when executed, provide needed evidential material.

The point made can be most readily appreciated in connection with scientific reasoning. An hypothesis, once suggested and entertained, is developed in relation to other conceptual structures until it receives a form in which it can instigate and direct an experiment that will disclose precisely those conditions which have the maximum possible force in determining whether the hypothesis should be accepted or rejected. Or it may be that the experiment will indicate what modifications are required in the hypothesis so that it may be applicable, i.e., suited to interpret and organize the facts of the case. In many familiar situations, the meaning that is most relevant has been settled because of the eventuations of experiments in prior cases so that it is applicable almost immediately upon its occurrence. But, indirectly, if not directly, an idea or suggestion that is not developed in terms of the constellation of meanings to which it belongs can lead only to overt response. Since the latter terminates inquiry, there is then no adequate inquiry into the meaning that is used to settle the given situation,¹ and the conclusion is in so far logically ungrounded.

V. *The Operational Character of Facts-Meanings.* It was stated that the observed facts of the case and the ideational contents expressed in ideas are related to each other, as, respectively, a clarification of the problem involved and the proposal of some possible solution; that they are, accordingly, functional divisions in the work of inquiry. Observed facts in their office of locating and describing the problem are existential; ideational subject-matter is non-existential. How, then, do they cooperate with each other in the resolution of an existential situation? The problem is insoluble save as it is recognized that both observed facts and entertained ideas are operational. Ideas are operational in that they instigate and direct further operations of observation; they are proposals and plans for acting upon existing conditions

to bring new facts to light and to organize all the selected facts into a coherent whole.

What is meant by calling facts operational? Upon the negative side what is meant is that they are not self-sufficient and complete in themselves. They are selected and described, as we have seen, for a purpose, namely statement of the problem involved in such a way that its material both indicates a meaning relevant to resolution of the difficulty and serves to test its worth and validity. In regulated inquiry facts are selected and arranged with the express intent of fulfilling this office. They are not merely *results* of operations of observation which are executed with the aid of bodily organs and auxiliary instruments of art, but they are the particular facts and kinds of facts that will link up with one another in the definite ways that are required to produce a definite end. Those not found to connect with others in furtherance of this end are dropped and others are sought for. Being functional, they are necessarily operational. Their function is to serve as evidence and their evidential quality is judged on the basis of their capacity to form an ordered whole in response to operations prescribed by the ideas they occasion and support. If "the facts of the case" were final and complete in themselves, if they did not have a special operative force in resolution of the problematic situation, they could not serve as evidence.

The operative force of facts is apparent when we consider that no fact in isolation has evidential potency. Facts are evidential and are tests of an idea in so far as they are capable of being organized with one another. The organization can be achieved only as they *interact* with one another. When the problematic situation is such as to require extensive inquiries to effect its resolution, a series of interactions intervenes. Some observed facts point to an idea that stands for a possible solution. This idea evokes more observations. Some of the newly observed facts link up with those previously observed and are such as to rule out other observed things with respect to their evidential function. The new order of facts suggests a modified idea (or hypothesis) which occasions new observations whose result again determines a new order of facts, and so on until the existing order is both unified and complete. In the course of this serial process, the ideas that

represent possible solutions are tested or "proved."

Meantime, the orders of fact, which present themselves in consequence of the experimental observations the ideas call out and direct, are *trial* facts. They are provisional. They are "facts" if they are observed by sound organs and techniques. But they are not on that account the *facts of the case*. They are tested or "proved" with respect to their evidential function just as much as ideas (hypotheses) are tested with reference to their power to exercise the function of resolution. The operative force of both ideas and facts is thus practically recognized in the degree in which they are connected with *experiment*. Naming them "operational" is but a theoretical recognition of what is involved when inquiry satisfies the conditions imposed by the necessity for experiment.

I recur, in this connection, to what has been said about the necessity for symbols in inquiry. It is obvious, on the face of matters, that a possible mode of solution must be carried in symbolic form since it is a possibility, not an assured present existence. Observed facts, on the other hand, are existentially present. It might seem therefore, that symbols are not required for referring to them. But if they are not carried and treated by means of symbols, they lose their provisional character, and in losing this character they are categorically asserted and inquiry comes to an end. The carrying on of inquiry requires that the facts be taken as *representative* and not just as *pre-sented*. This demand is met by formulating them in propositions—that is, by means of symbols. Unless they are so represented they relapse into the total qualitative situation.

VI. *Common Sense and Scientific Inquiry*. The discussion up to this point has proceeded in general terms which recognizes no distinction between common sense and scientific inquiry. We have now reached a point where the community of pattern in these two distinctive modes of inquiry should receive explicit attention. It was said in earlier chapters that the difference between them resides in their respective subject-matters, not in their basic logical forms and relations; that the difference in subject-matters is due to the difference in the problems respectively involved; and, finally, that this difference sets up a difference in the ends or ob-

jective consequences they are concerned to achieve. Because common sense problems and inquiries have to do with the interactions into which living creatures enter in connection with enviroing conditions in order to establish objects of use and enjoyment, the symbols employed are those which have been determined in the habitual culture of a group. They form a system but the system is practical rather than intellectual. It is constituted by the traditions, occupations, techniques, interests, and established institutions of the group. The meanings that compose it are carried in the common everyday language of communication between members of the group. The meanings involved in this common language system determine what individuals of the group may and may not do in relation to physical objects and in relations to one another. They regulate *what* can be used and enjoyed and *how* use and enjoyment shall occur.

Because the symbol-meaning systems involved are connected directly with cultural life-activities and are related to each other in virtue of this connection, the specific meanings which are present have reference to the specific and limited enviroing conditions under which the group lives. Only those things of the environment that are taken, according to custom and tradition, as having connection with and bearing upon this life, enter into the meaning system. There is no such thing as disinterested intellectual concern with either physical or social matters. For, until the rise of science, there were no problems of common sense that called for such inquiry. Disinterestedness existed practically in the demand that group interests and concerns be put above private needs and interests. But there was no intellectual disinterestedness beyond the activities, interests and concerns of the group. In other words, there was no science as such, although, as was earlier pointed out, there did exist information and techniques which were available for the purposes of scientific inquiry and out of which the latter subsequently grew.

In scientific inquiry, then, meanings are related to one another on the ground of their character *as* meanings, freed from direct reference to the concerns of a limited group. Their intellectual abstractness is a product of this liberation, just as the "concrete" is practically identified by directness of connection with environ-

mental interactions. Consequently a new language, a new system of symbols related together on a new basis, comes into existence, and in this new language semantic coherence, as such, is the controlling consideration. To repeat what has already been said, connection with problems of use and enjoyment is the source of the dominant role of qualities, sensible and moral, and of ends in common sense.

In science, since meanings are determined on the ground of their relation as meanings to one another, *relations* become the objects of inquiry and qualities are relegated to a secondary status, playing a part only as far as they assist in institution of relations.) They are subordinate because they have an instrumental office, instead of being themselves, as in prescientific common sense, the matters of final importance. The enduring hold of common sense is testified to historically by the long time it took before it was seen that scientific objects are strictly relational. First tertiary qualities were eliminated; it was recognized that moral qualities are not agencies in determining the structure of nature. Then secondary qualities, the wet-dry, hot-cold, light-heavy, which were the explanatory principles of physical phenomena in Greek science, were ejected. But so-called primary qualities took their place, as with Newton and the Lockeian formulation of Newtonian existential postulates. It was not until the threshold of our time was reached that scientific inquiries perceived that their own problems and methods required an interpretation of "primary qualities" in terms of relations, such as position, motion and temporal span. In the structure of distinctively scientific objects these relations are indifferent to qualities.

The foregoing is intended to indicate that the different objectives of common sense and of scientific inquiry demand different subject-matters and that this difference in subject-matters is not incompatible with the existence of a common pattern in both types. There are, of course, secondary logical forms which reflect the distinction of properties involved in the change from qualitative and teleological subject-matter to non-qualitative and non-teleological relations. But they occur and operate within the described community of pattern. They are explicable, and explicable only, on the ground of the distinctive problems gen-

erated by scientific subject-matter. The independence of scientific objects from limited and fairly direct reference to the environment as a factor in activities of use and enjoyment, is equivalent, as has already been intimated, to their *abstract* character. It is also equivalent to their *general* character in the sense in which the generalizations of science are different from the generalizations with which common sense is familiar. The generality of *all* scientific subject-matter as such means that it is freed from restriction to conditions which present themselves at particular times and places. Their reference is to *any* set of time and place conditions—a statement which is not to be confused with the doctrine that they have no reference to actual existential occasions. Reference to time-place of existence is necessarily involved, but it is reference to whatever set of existences fulfils the general relations laid down in and by the constitution of the scientific object.⁸

Summary. Since a number of points have been discussed, it will be well to round up conclusions reached about them in a summary statement of the structure of the common pattern of inquiry. Inquiry is the directed or controlled transformation of an indeterminate situation into a determinately unified one. The transition is achieved by means of operations of two kinds which are in functional correspondence with each other. One kind of operations deals with ideational or conceptual subject-matter. This subject-matter stands for possible ways and ends of resolution. It anticipates a solution, and is marked off from fancy because, or, in so far as, it becomes operative in instigation and direction of new observations yielding new factual material. The other kind of operations is made up of activities involving the techniques and organs of observation. Since these operations are existential they modify the prior existential situation, bring into high relief conditions previously obscure, and relegate to the background other aspects that were at the outset conspicuous.

⁸ The consequences that follow are directly related to the statement in Ch. IV that the elimination of qualities and ends is intermediate; that, in fact, the construction of purely relational objects has enormously liberated and expanded common sense uses and enjoyments by conferring control over production of qualities, by enabling new ends to be realistically instituted, and by providing competent means for achieving them.

The ground and criterion of the execution of this work of emphasis, selection and arrangement is to delimit the problem in such a way that existential material may be provided with which to test the ideas that represent possible modes of solution. Symbols, defining terms and propositions, are necessarily required in order to retain and carry forward both ideational and existential subject-matters in order that they may serve their proper functions in the control of inquiry. Otherwise the problem is taken to be closed and inquiry ceases.

One fundamentally important phase of the transformation of the situation which constitutes inquiry is central in the treatment of judgment and its functions. The transformation is existential and hence temporal. The pre-cognitive unsettled situation can be settled only by modification of its constituents. Experimental operations change existing conditions. Reasoning, as such, can provide means for effecting the change of conditions but by itself cannot effect it. Only execution of existential operations directed by an idea in which ratiocination terminates can bring about the re-ordering of environing conditions required to produce a settled and unified situation. Since this principle also applies to the meanings that are elaborated in science, the experimental production and re-arrangement of physical conditions involved in natural science is further evidence of the unity of the pattern of inquiry. The temporal quality of inquiry means, then, something quite other than that the process of inquiry takes time. It means that the objective subject-matter of inquiry undergoes temporal modification.

Terminological. Were it not that knowledge is related to inquiry as a product to the operations by which it is produced, no distinctions requiring special differentiating designations would exist. Material would merely be a matter of knowledge or of ignorance and error; that would be all that could be said. The content of any given proposition would have the values "true" and "false" as final and exclusive attributes. But if knowledge is related to inquiry as its warrantably assertible product, and if inquiry is progressive and temporal, then the material inquired into reveals distinctive properties which need to be designated by distinctive names. As *undergoing* inquiry, the material has a different logical

import from that which it has as the *outcome* of inquiry. In its first capacity and status, it will be called by the general name *subject-matter*. When it is necessary to refer to subject-matter in the context of either observation or ideation, the name *content* will be used, and, particularly on account of its *representative* character, content of propositions.

The name *objects* will be reserved for subject-matter so far as it has been produced and ordered in settled form by means of inquiry; proleptically, objects are the *objectives* of inquiry. The apparent ambiguity of using "objects" for this purpose (since the word is regularly applied to things that are observed or thought of) is only apparent. For things exist *as* objects for us only as they have been previously determined as outcomes of inquiries. When used in carrying on new inquiries in new problematic situations, they are known as objects in virtue of prior inquiries which warrant their assertibility. In the new situation, they are *means* of attaining knowledge of something else. In the strict sense, they are part of the *contents* of inquiry as the word content was defined above. But retrospectively (that is, as products of prior determination in inquiry) they are objects.