The University of Chicago
FOUNDED BY JOHN D. ROCKEFELLER

THE LOGICAL BASIS OF EDUCATIONAL THEORY FROM THE STANDPOINT OF "INSTRUMENTAL" LOGIC

A DISSERTATION

SUBMITTED TO THE FACULTY OF THE GRADUATE SCHOOL OF ARTS AND LITERATURE IN CANDIDACY FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

(DEPARTMENT OF EDUCATION)

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INTRODUCTION

It is the purpose of this paper to discuss the logical nature of the process of education. Education is taken to mean the way experience develops, or realizes itself. A theory of education is an interpretation of this process of self-realization. Logical theory is an account of "our thinking behavior;" "thinking" being the constructive movement in this process of development. The subject-matter of logic, then, is the operation of thought in the development of experience; and, if this development is education, the theory of logic one accepts must determine his theory of education.

This view looks upon education as a process continuing from birth to death. While education in its narrower sense, as synonymous with instruction, will receive attention, the primary purpose is to discuss education in its larger meaning.

The first part of this paper will be devoted to a brief outline of the historical development of "instrumental" logic, and to an exposition of that theory as worked out by recent writers on the subject, particularly by Dr. Dewey. No claim to originality is made in the general logical view presented. The purpose has been to present the theory as understood after a careful study of available material. It is probable that the interpretation has not been at all times true to the thought of the authors, particularly in some minor phases which have not been fully developed in the publications of the writers.

The second part of the paper will be devoted to a discussion of the educational theory which follows from this theory of logic. It is not the primary purpose to indicate a detailed method of instruction, though the mere statement of an educational theory must furnish the basis of, and indicate along broad lines, the general method which must be followed in all education.

Psychology is so intimately related to both logic and education that it seems necessary to discuss quite fully the psychological

nature of certain parts of the problem. In both the logical and educational discussions free use will be made of psychological material.

I

LOGICAL THEORY

In this brief statement of logical theory only those phases of the subject will be discussed that throw some light on educational procedure. Since the time of Aristotle, the operation of thought has received serious attention. Two general points of view have developed. One is known as formal logic, the other has been called instrumental logic. Formal logic treats of the operation of thought as carried on in reflective thinking. It takes thought as such and endeavors to discover and formulate the laws and principles of accurate thinking. The content of the concepts with which it operates is regarded as given independently of thought's operation. While formal logic may discuss the way bare sensations are molded into ideas and concepts so as to become fit objects for thought, its real concern is with how truth may be deduced from these concepts through judgment and inference.

On the other hand, the term "instrumental" is applied to that view of logic which holds that thought, human thought, has a part in the actual constituting of reality. It investigates not merely the concepts as given, but also their genesis and how thought determines the actual content of these concepts. Thought is not looked upon as engaged in reproducing an external world of reality, but as having a part in the actual constituting of reality. Whatever our thinking may assume to exist as exterior to and independent of thought, instrumental logic holds that such assumptions are mere postulates and that the content of thought, as we know it, bears the unmistakable character of thought's construction.

This conception of the creative character of thought is not new. Wundt points out that it preceded the development of formal logic. He says, "The Eleatic and Platonic dialectic are controlled by it [thought as instrument in creating reality], and a caricature of the same meets us in the fallacious conclusions and dilemmas of the Sophists." [1]

Aristotle is the father of formal logic. He took up the problem of discovering and formulating the laws of thought, and

[1] *Logik*, Band I, s. 3.

developed a complete system. The Aristotelian logic assumed that "objects" are given independently of thought, and the intellectual processes were regarded as entirely dependent upon these objects. This view of thought was generally accepted up to the time of Kant.

Kant marks an epoch in the evolution of thought. Not satisfied with the previous attempts of philosophy, which had failed to remove the opposition between thought and being but had made idealism or realism absolute, Kant subjected the entire theory of knowledge to a searching criticism. As a result of his investigations, Kant differentiates sharply the theoretical reason from the practical. On the theoretical side, in accepting phenomena revealed in sensation as real and absolute, and yet holding that they cannot become knowledge except in and through thought which determines the forms and conditions of their cognition, Kant exalts thought and makes it a real and necessary factor in the development of knowledge. While stoutly maintaining the existence of a world of reality independent of thought, he yet contends that phenomena are so modified and determined by thought that it is impossible to know the real character of the thing-in-itself; that the theoretical reason cannot go beyond phenomena and establish extra-experiential truth. It is limited to the sensuous given.

On the other hand, in Kant's critique of the practical reason, *pure reason* is made to determine a priori the will in respect of objects.[2] In the theoretical reason truth is derived from sense phenomena; in the practical reason there is recognized "a higher *source* of motives in which not sense but reason is the lawgiver."[2] Here the will is supreme and it follows "not incentives from without, but obeys, with absolute freedom, a higher practical principle of the reason."[2] From the possibility of a moral law is derived the idea of freedom; from that of perfect virtue is borrowed the idea of immortality; from the necessary demand for perfect happiness follows the idea of God.[3]

This recognition that phenomena in becoming knowledge must take on necessary forms of thought, that here reason is limited to sense, but that pure reason may determine the will with absolute freedom, was a revolution in epistemology. Yet Kant did not

[2] Schwegler, *History of Philosophy* (Seeley's transl.), pp. 290, 291.

[3] *Ibid.*, pp. 296, 297.

regard thought as really creative in the sense of actually constituting reality.

In the development of Kantian idealism by Fichte, Schelling, and Hegel, there is the attempt to present a world-view founded on the "system of reason." Thought as the world-activity was here supreme.

Among modern logicians Sigwart's view of the nature of thought as independent and self-supporting, and his idea of how the concept of reality is derived from thought, are particularly interesting and suggestive. He says, "If we consider the nature of thought, we find that an important part of it is engaged in the attempt to arrive at propositions which are *certain* and *universally valid.*" [4] Further, "From a psychological point of view, everything which the individual thinks may be looked upon as necessary," but besides this necessity "there is another which springs entirely from the contents and object of thought." [5] This "certainty" and "universal validity" which he makes the end of thought is to be found within thought itself, and is not grounded upon an external, independent reality. He makes this point explicit.

> We cannot refute the critical assertion that immediately, and in the first instance, all our knowledge is something for us, consisting in a system of ideas. That there is an Existent corresponding to this Thought of ours and in accordance with it, is either a blind belief, or the certainty must be grounded upon a refutation of the doubt it dispels—upon the proof that doubt is impossible.[6] . . . . The proof rests upon a necessity in Thought. It may be counted among the surest results of an analysis of our knowledge that every assumption of an external world is mediated by Thought. . . . . Thus except by Thought, we have no means of ascertaining whether we have really achieved our purpose of knowing the Existent; the possibility of comparing our knowledge with things as they exist apart from our knowledge is forever closed to us.[7] . . . . We may thus unhesitatingly say that if all we can attain to is necessary and universally valid Thought, then knowledge of the Existent is included therein.[8]

Here we find explicit recognition of the dependence of reality as known upon thought. Sigwart does not deny the existence of an external world. In fact, he assumes such existence, and much of his discussion of logic is based upon this assumption. But he

[4] *Logic* (Dendy's transl.), Vol. I, p. 1.

[5] *Ibid.*, p. 6.

[6] *Ibid.*, pp. 6, 7.

[7] *Ibid.*, p. 7.

[8] *Ibid.*, p. 8.

shows clearly that it is an assumption which depends wholly for its proof "upon the necessity in thought." For knowledge, all reality is the result of the operation of thought.

Both Bosanquet and Bradley attempt to give thought a genuine work to do in constituting the "real world," and yet they retain the concept of an independent reality.

Bosanquet makes thought a "living function" in the development of the world of reality as it exists for any individual. This world of the individual is actually constituted by thought. This character of thought and its relation to reality comes out in Bosanquet's discussion of Truth. He says,

> If the object-matter of reality lay genuinely outside the system of thought, not only our analysis, but thought itself would be unable to lay hold of reality. For logic at all events, it is a postulate that "the truth is the whole." The forms of thought have the relation which is their truth in their *power to constitute a totality*. . . . . The work of intellectually constituting that totality *which we call the real world*, is the work of knowledge.[9]

But Bosanquet does not minimize the idea of the existence of an independent reality. Indeed, he makes such reality, as that got through sense-perception, the starting-point and core of the individual's real world. The act in which thought constitutes for itself, or "affirms," this real world is the judgment.

> The truth, the fact, the reality, may be considered, in relation to human intelligence, as the content of a single persistent and all-embracing judgment, by which every individual intelligence affirms the ideas that form its knowledge to be true of the world which is brought home to it as real by sense-perception. . . . . [And] The real world for every individual is emphatically *his* world; an extension and determination of his present perception, which perception is to him not indeed reality as such, but his point of contact with reality as such.[10]

The question that concerns us here is: In what sense and to what extent does Bosanquet make thought really instrumental? The creative character of thought may be looked at from two points of view. First, To what extent is thought efficient and really creative in establishing and organizing this world of reality as it *actually exists for human intelligence?* Second, Does thought really have a part in constituting the real world as such; or, to put it otherwise,

[9] *Logic,* Vol. I, pp. 2, 3 (italics mine).

[10] *Ibid.,* p. 3.

is there a reality as such which is, in itself, in no way affected by thought, but which thought merely copies or reproduces?

The above quotations prove, unquestionably, that Bosanquet would answer the first question affirmatively. The world, *as we know it,* is constructed by thought. While he makes contact with reality through sense-perception the starting-point of thought, and the whole real world for the individual an extension, by means of judgment, of this immediate intuition, yet this reality got so at first hand is "indefinite," a "mere aspect," until determined and organized by thought.

As to the other question, Bosanquet ignores the point. Some expressions would indicate that thought merely discovers what is already there; but the whole attitude of his discussion leads to the conclusion that, for him, reality as such, apart from thought, is not the proper subject of logical discussion; that what logic is concerned with is *our* world, and that world is constituted by thought.

Bradley attacks directly the problem of the relation of thought to reality. He insists that thought is but an external tool, and yet he says that reality actually develops in our thinking. This contradiction comes out in his discussion of judgment. He defines the judgment proper as "the act which refers an ideal content (recognized as such) to a reality beyond the act."[11] This judgment always refers, directly or indirectly, to present reality. As to the effect of thought on our conclusions, and, hence, on the constitution of our real world, Bradley says,

> It is assumed that, whatever in our reason may be arbitrary, yet at least the conclusions must follow from the premises naturally and necessarily, without altering or straining or even addition. If we can be shown of our own free choice to have forged one link in the chain of inference, then the connection snaps and the ends fall apart. . . . . [And] An apparatus of proof has been compared to a scaffolding, which is removed when the edifice of reason has been built; yet, if *we* have but placed the parts in conjunction, there is nothing which will hold when the scaffolding is gone.[12]

This shows conclusively that here Bradley looks upon thought as wholly external.

But there is another side to Bradley's logic. He makes the statement that "reality develops," and this development appears to

[11] *Logic,* p. 10. [12] *Ibid.,* p. 454.

take place through thinking and because of thinking. In discussing the essence of reasoning, he says,

> . . . . at bottom, and in a struggling way, reasoning is really a self-development. Throughout the process our subject is developed, and again to some extent it develops itself.[13] [Again,] Reality appears, ... as possessing an attribute or group of attributes, which is given with two separate sets of qualities. And in the result this basis *through its own activity* becomes explicit. We may say here, as everywhere, that the real subject, implicit at the start, and *active* in the middle, shows itself at the end by a development of some latent relation or quality, which it claims as an attribute. . . . . And thus, in a certain sense, the movement of the subject has been a self-development; . . . . [and] if our process is not to end in ruin, the apparatus we have used (that is, scaffolding) must be simply a prop, supported on which the argument has grown up, till strong enough at last to *support its own fruit* and stand by itself.[14]

Here Bradley presents a wholly different view of thought. This idea of reasoning being a self-development, taken in connection with the "real subject" (that is the reality) as "active" and "developing," would seem unquestionably to make thought instrumental in character. But in the working out of this point of view, Bradley leaves much to be desired.

These idealistic logical theories of Sigwart, Bosanquet, and Bradley are in striking contrast to the theories of J. S. Mill and Wundt, each of whom develops a theory of logic based on the practical methods of scientific investigation.

J. S. Mill defines logic as "the science which treats of the operations of the human understanding in the pursuit of truth." [15] By "truth" Mill seems to mean actual determinable experiences. There is the assumption that facts of experience have systematic connection, and that this may become known. It is the business of logic to investigate the process by which the mind may come into possession of this knowledge.

Attention is called to two important characteristics of Mill's logic. First, it is a "logic of experience." He calls it the "logic of truth" as opposed to "formal logic" which he calls the "logic

[13] *Ibid.*, pp. 452, 453.

[14] *Ibid.*, p. 454 (italics mine).

[15] *System of Logic*, p. 3.

of consistency." Logic investigates "truth," and this truth, for Mill, is derived from experience. He says,

> Truths are known in two ways; some are known directly and of themselves; some through the medium of other truth (which can, of course, be reduced to direct intuition). The former are the subject of Intuition, or Consciousness; the latter, of Inference.[16] .... [Again,] .... truth can only be successfully pursued by drawing inferences from experience.[17]

Mill's whole elaborate discussion is an attempt to get away from the abstraction and idealism that characterize previous logic. He recognizes that thinking is practical, and so would develop a theory of logic derived from the actual operation of thought in the scientific investigation of truth.

The other characteristic is Mill's attitude toward the source of knowledge. The primary, irreducible data of experience are the states of consciousness—sensations, feelings, volitions.

> .... the best thinkers are now for the most part agreed that all we can know of matter is the sensations which it gives us, and the order of the occurrence of those sensations. .... [And,] All attributes, therefore, are to us nothing but either our sensations and other states of feeling, or something inextricably included therein. ....[18]

Mill assumes the existence of external objects and the powers or properties by which those objects excite mental activity, but says,

> These latter (at least) being included rather in compliance with common opinion and because their existence is taken for granted in the common language from which I cannot prudently deviate, than because the recognition of such powers or properties as real existences appears to be warranted by a sound philosophy.[19]

What Mill is sure of are the facts of experience. Thought, then, in its widest sense, as ideational activity, would seem to be responsible for the whole data of knowledge. This would seem to compel the conclusion that thought is "instrumental" in determining knowledge; not in an external way, as the means by which we arrive at truth that is true independent of thought, but by actually having a part in the development of reality itself. Mill, however, seems not to have drawn this conclusion, nor to have been conscious of the logical outcome of his position.

This general point of view is worked out more fully by Wundt.

[16] *System of Logic*, p. 3.
[17] *Ibid.*, p. 137.
[18] *Ibid.*, p. 48.
[19] *Ibid.*, p. 49.

He defines logic as the science which has to give an account of those laws of thought that are efficient in the investigation of truth.[20] It occupies a position between psychology and the other theoretical sciences. Logic "leads back" on the one hand to a psychological examination of the actual course of thought, and "looks forward" on the other to "universal knowledge and the way of procedure of scientific thought." Its particular problem is to investigate and establish the actually operative laws of thought as these laws reveal themselves in the whole range of scientific investigation.

This view of logic Wundt opposes, on the one hand, to formal logic, and, on the other, to what he calls metaphysical, or dialectic, logic. By the latter, he means that view of logic which makes thought an instrument (*Werkzeug*) "which gives to knowledge not merely its form but produces out of itself also the content of the same." [21]

Wundt objects to this "metaphysical logic," particularly because it sets up a system of thought that offers no aid to and has no connection with the scientific investigation of truth. Furthermore, he seems not to grant to thought any part in the creation of reality, when he says: "Never can it (thought) gain any other significance than that of *copying* the objects by which thought is conscious of having met all demands which reality imposes on its copying activity." [22] But a further examination of Wundt's philosophy leads to a different view of the function of thought. Wundt recognizes experience as the fundamental ground of all knowledge. Out of experience there develops both object and subject. Historically, this antithesis appears in the course of an individual's development; it is not there at the beginning.

. . . . the expressions outer and inner experience do not indicate different objects, but *different points of view* from which we take up the consideration and scientific treatment of a unitary experience. We are naturally led to these points of view, because every concrete experience immediately divides into *two factors;* into a *content* presented to us, and our *apprehension* of this content.[23] . . . . [And,] Even the use of the terms object and subject in this connection must be regarded as the application to the first stage

[20] *Logik,* Band I, s. 1.

[21] *Ibid.,* s. 3.

[22] *Ibid.,* s. 6.

[23] *Outlines of Psychology* (Judd's transl.), pp. 2, 3.

of experience, of distinctions which are reached only through developed logical reflection.[24]

If object and subject arise out of a "unitary experience" and "through developed logical reflection," thought must have an important and fundamental part in determining our conceptions of reality. Thought, from this point of view, is responsible for *my* reality; it comes to me through my thinking. To still contend that thought is a mere "copying activity" would seem to be a plain contradiction.

In the subjective field Wundt seems to regard thought as really instrumental when he says,

> None of the mental sciences [philology, history, political science, etc.] employ the abstractions and hypothetical supplementary concepts of natural science; quite otherwise, they all accept ideas and the accompanying subjective activities as *immediate reality*.[25]

In the domain of these mental activities Wundt recognizes, in the rise of "new attributes," the presence of a principle of "creative syntheses;" the actual evolving of "qualities" and "values" that cannot be derived from the analysis of the component elements. He says,

> Not only do the elements united by apperceptive synthesis gain, in the aggregate idea which results from their combination, a new significance which they did not have in their isolated state, but, what is of still greater importance, the aggregate idea itself is a new psychical content made possible, to be sure, by the elements but by no means contained in these elements.[26]

This definite recognition of the creative power of mental activity, when taken in connection with the activity of thought which is admitted to lie back of and condition the rise of the concepts object and subject, would seem to commit Wundt to the theory that thought is fundamentally and essentially instrumental in character.

The theories here briefly outlined show how these writers have attempted to explain the concepts of both matter and thought so as to satisfy actual experience. In the movement variously styled radical empiricism, pragmatism, or humanism (the fundamental thought is the same), we have the most recent contributions to this problem. From the standpoint of this "pragmatic" development

[24] *Outlines of Psychology* (Judd's transl.), p. 5.

[25] *Ibid.*, p. 3 (italics mine).

[26] *Ibid.*, p. 364.

the function of thought is essentially and immanently instrumental. As the theory of education outlined in Part II is based on this general point of view, a brief exposition of this type of instrumental logic follows. The purpose is, particularly, to set forth those characteristics that have a bearing on educational theory. A number of writers have contributed to the development of this logical theory, but it has been worked out most thoroughly by Dr. Dewey in his *Studies in Logical Theory*. To him more than any other writer is due the following interpretation.

From this point of view of instrumental logic there arise in ordinary everyday experience disturbed situations which do not readily adjust themselves. This disturbance is due to the failure of habitual ways of reacting. Conditions arise which the old habits, the old attitudes, the old ideas, are unable to assimilate and harmonize. There is a state of tension. But this obstruction of activity must be overcome; it is the essence of life to be active. There is an effort made to readjust the situation so that the broken co-ordinations may be brought into harmonious relation and normal activity resumed. The first effort usually fails. There may be a long period of wandering, of experimenting, of reflecting, before success is attained. During this period of tension, one is conscious, often intensely so, of the disturbed conditions. When a satisfactory readjustment is finally made, the whole affair tends to drop out of consciousness and attention is given to other problems. This whole situation—the break in habitual ways of reacting, the tentative movements toward readjustment, and the final successful co-ordination—is the thought-situation. Dr. Dewey says:

> It is the whole dynamic experience with its qualitative and pervasive identity of value, and its inner distraction, its elements at odds with each other, in tension against each other, contending each for its proper placing and relationship, that generates the thought-situation.[27]

This whole readjustive movement in which antagonistic and unrelated factors are brought into harmony is the thought process itself. Thinking is just such readjusting.

The field of thought is the field of human interests. Thought has to do with just these everyday experiences of life. We think about our physical needs, our social relations, our religious convictions. One would build a house, obtain political preferment,

[27] *Studies in Logical Theory*, p. 38.

or perform a religious duty. And each of these may mean strenuous effort, careful planning, periods of doubt and delay and opposition; final success may follow only after long and strenuous activity. Thought is the instrument or tool by means of which success comes. Such experiences of everyday life are antecedent to thought in the sense that, taken at any point, thought has grown out of such commonplace affairs. So long as everything goes on smoothly, there is no thinking. It is when there is conflict, when one does not know just what to do, when there is doubt, hesitancy, perplexity, that thought gets in its work. To overcome a disturbed situation within these life interests is the immediate motive to thought activity.

This thought activity involves consciousness. Habit, so far as it is automatic, takes care of itself, as it were. There is no need of consciously attending to its operations. But our entire conscious world, sensations, perceptions, conceptions, objects, images, ideas, that is, our entire physical world, in so far as that comes to consciousness, and our entire thought world—all have their existence in the thought-situation. All these things exist for me, if they exist for me at all, as *conscious existences*. When for any reason co-ordinations fail, the factors involved in the situation come to consciousness. It is difficult to see how there could be a sensation, a perception, or *any* object of thought, unless there were some need of attending to it. The presence of a sensation means the failure of given co-ordinations to meet conditions imposed upon them. The point of "fracture," the point needing attention, is the point that will come most clearly into consciousness; it will be in the focus of attention. The other data will come to consciousness in so far as they are related to this disturbance, and especially, in so far as they may become means for the solution of the problem generated.

It was stated above that the physical world and the thought world exist in the thought-situation. The truth is that our experience, as it comes to consciousness in the thought-situation, polarizes into an "external" physical world and a "subjective" thought world. Certain data are looked upon as peculiar to the thinker and as having no existence outside his thought. Other data are believed to exist independent of and apart from the thinker. Still other data are uncertain and doubtful. One has not yet determined whether to regard them as really true or as merely subjective. The possible

shifting of this third class of data gives the clue to the interpretation of all. A doubtful datum may come to be regarded, with further experience, as a positive fact and true for all thinkers. The law of gravitation and other physical laws are instances of such data that have come to be regarded as absolute fact. On the other hand, doubtful facts may move in the other direction and be looked upon finally as mere ideas. But this is not all. What has been regarded as absolute fact may become doubtful and finally relegated to the realm of ideas. Or, what was thought to be mere idea becomes doubtful fact and finally is accepted as absolute existence. The criterion for the acceptance or rejection of a given datum as law or fact is a practical one. A law is valid because it is found to be unfailing in its operation. A fact is true because we can always count upon it; we have learned how to react toward it. So long as it meets the practical demands made upon it, it is a fixture. In so far as it fails, we modify our conception of it and it ceases to be for us just what it was. The whole meaning of "object" and "subject," of "fact" and "idea," of "physical" and "mental," is determined by the character of our experience; and as this experience is being continually added to, as *new content* is being continually experienced, so the interpretation of any datum is liable to shift in the getting of a new point of view.

It is believed that the above exposition, so far as it goes, is true to the general thought of the logical theory from the standpoint of which this paper is written. There are certain characteristics that ought to be discussed. First is the category of activity.

Change, activity, development, are fundamental to this theory of logic. Activity appears as tendencies to action, a striving to pass beyond present conditions and limitations. The word "impulse" is sometimes used to express this fundamental tendency to movement. Everyone recognizes that the basic characteristic of reflex action, instinct, desires, motives, and the will is the impulse to act. But, because so often thought does not immediately terminate in overt activity, one tends to overlook the impulsive character of the idea. It is now commonly agreed among psychologists that the idea is in its very nature impulsive. It is a tool for the furtherance of conduct. Professor James says, in discussing voluntary action:

> The first point to start from, in understanding voluntary action, is the fact that consciousness is in its very nature impulsive. We do not first

have a sensation or thought, and then have to add something dynamic to it to get a movement. Every pulse of feeling which we have is the correlate of some neural activity that is already on its way to instigate a movement. Our sensations and thoughts are but cross-sections, as it were, of currents whose essential consequence is motion.[28]

It seems to be the very nature of the life process to pass beyond its present state and become something different. Stout says: "This tendency [to pass beyond] is not only a fact, but an experience; and the peculiar mode of being conscious, which constitutes the experience, is called conation." [29] This conative tendency, in its higher forms as realized in man, is the will. Indeed, the term "will" in its widest significance is sometimes used to cover this whole fundamental tendency to activity.

Activity looks forward. It is responsible for the tension, the problem, which arises in the failure of habits to function. It begets a tentative movement which, persisting, finally readjusts the situation. It is this tendency to movement that keeps life going; that prevents the organism from becoming fixed and static. Because of this activity there is growth.

Another fundamental category of experience is habit. By habit is meant the tendency of experience to repeat itself. The living organism tends to do the sort of thing it has done before. It is but a bundle of habits. It is what it is because of past experience. Reflexes, instincts, attitudes—all tendencies to activity in any specific way, whether well defined or not, are due to habit.

Habit thus constitutes the entire background of experience; the experience possible at any given time depends upon how far previous experience has become organized and preserved in some form of habit. Perceptions, conceptions, images, ideas, represent experience become habitual. Habit determines not only what we shall be cognizant of but it also determines how we shall deal with any given bit of experience. The only way we can deal with present experience is the way past experience has taught us; our habits are the tools, and the only tools, with which we have to work. Consequently, we always approach a problem predisposed toward certain ways of handling it. We would be absolutely fair and impartial, but the

[28] *Psychology,* Briefer Course, p. 426.

[29] *Manual of Psychology,* p. 63.

extent of our impartiality is limited by the narrowness of our experience.

The function of habit is to preserve the valuable experiences of the race and the individual. Those forms of activity which are repeated again and again tend to become fixed and correlated; the life process taken at any point exhibits a vast system of co-ordinations more or less stable in their reactions. These habits are the basis of activity. They are the material upon which and with which life builds. As a co-ordination becomes habitual it tends to drop out of consciousness, and permits attention to be directed to other problems. Habit relieves thought, economizes energy, reduces fatigue, and gives skill and rapidity to all forms of reaction.

The habits at any period will suffice for that period in so far as old conditions persist. But new situations arise; situations in which old habits and co-ordinations fail to meet the demand. There follows a more or less complete breakdown. This breakdown occurs in all forms of human activity, in the practical as well as in the theoretical. It exhibits the failure of present points of view, theories, associations, customs, or co-ordinations—that is, habits by whatever name they are called—to meet the needs of the moment.

The question naturally arises as to why it is that in time the organism does not become static through the complete accommodation of life to its conditions. On this point Professor Moore says:

> It would seem, then, that habit must be regarded as somehow developing its own interruptions. And, after all, this would not seem to be such a difficult conception. It is scarcely more than the commonplace notion, the philosophical significance of which Hegel perhaps first pointed out, that activity is conceived as constantly producing new conditions of its further on-going; that in activity there must be a constant reorganization of the results of the activity back into the process.[30]

Bearing on the same point Professor Baldwin says:

> An organism accommodates itself, or learns new adjustments, simply by exercising the movements which it already has, its habits, in a heightened or excessive way; the accommodation is in each case simply *the result and fruit of the habit itself* which is exercised. . . . . [Also,] Each such accommodation *is reached simply in the ordinary routine of habit, and is its outcome.*[31]

[30] *Existence, Meaning, and Reality,* "Decennial Publications," The University of Chicago, Vol. III, p. 42; p. 16 of reprint.

[31] *Mental Development: Methods and Processes,* pp. 217, 218 (italics mine).

From the point of view of both these writers, then, it is the very nature of the life process to beget its own interruptions. Experience, new experience, is the normal condition.

But as life does not become static, as habits continually suffer more or less extensive breakdowns, so it is the nature of life to readjust itself to meet new conditions. There is continual oscillation: a period of comparatively uninterrupted activity followed by a more or less serious disturbance; this is readjusted and a comparatively quiescent period follows. In the breakdown, there is a tendency for the old habits to assimilate the new conditions; that is, the old ways of acting would persist. If this is impossible, a reconstructive movement follows, the old habits being both the material readjusted and the tools of readjustment. The final successful co-ordination is sometimes spoken of as a compromise between these old habits. A better statement is that a new co-ordination is formed that includes within itself the conflicting factors. The old habits have not been eliminated but they have been "trimmed down" so as to fit into the larger co-ordinations. The statement is sometimes made, and truly, that life grows from the simple to the complex. There is just this sort of growing complexity going on continually.

Habit, then, has a twofold nature; habits are formed and habits are broken. And the breaking of habits would seem to be just as much a "habit" of life as the forming of habits. The formation of habits means preservation of that which is valuable; their breakdown and subsequent reorganization means growth, development, expansion.

This whole reconstructive movement which takes place on the breakdown of habit and which reorganizes the disconnected factors into a larger, more comprehensive co-ordination is the thinking activity. Habit and thought represent the two poles of the life process. Thought means growth; habit, preservation. Professor Moore says:

> . . . . activity in any final sense must include both a mechanical and a reconstructing function. As habit constitutes the mechanical, the conserving, materializing function, so the idea is the radical reconstructing function in activity. Habit and thought are thus constituent poles of experience. As such, neither can be defined apart from the other. Each limits the other in every particular case, but neither can be regarded as "the ultimate" out of which the other is absolutely evolved.[32]

[32] *Existence, Meaning, and Reality,* pp. 16, 17 (reprint).

Habit and thought, then, are absolutely correlative. There could be no thinking without habit; the formation of habit requires thought; it would seem that the two have evolved together.

In the discussion so far no distinction has been made between reflective and unreflective thought. In reflective thought the object of our thinking is our own past experience. It is when one consciously goes over his experience and readjusts, or attempts to readjust, a disturbed situation that thought is called reflective. Unreflective thought precedes and accompanies reflective thought; accompanies it, that is, in the sense that the thought of the adult is in part unreflective. Sigwart says:

> As soon as the individual begins to reflect upon his inner activity he finds that he is already engaged in various kinds of Thought; he can have no immediate knowledge of its beginning nor of its development out of simpler and more primitive activities. Only by means of a difficult psychological analysis of Thought, as we find it at work, can we discover its particular factors and the faculties which give rise to it, and thus form some idea of the laws of its unconscious growth.[33]

The child comes into the world endowed with certain well-developed modes of reaction; such are the reflexes and instincts. Some of these are so perfectly adjusted to his surroundings that there seems to be no need for thought. The activity is unconscious. But in his early years the child meets innumerable difficulties; there is abundant occasion for thought; there is thought. But the child is engaged in what he is doing. His experience has not yet polarized into "knower" and objects "known." It is only with years that he comes consciously to turn back and "reflect" upon his past experience. This "unreflective" thought is the thought of infancy and early childhood, but it is not confined to this. The thought of the savage, the half-civilized man, and the mass of civilized peoples is largely of the unreflective type. Indeed, much of the thought of every man cannot be called "reflective." He is intent on the end to be reached; so long as the activity absorbs him and, especially, so long as he meets no serious difficulty in adjusting means to ends, his thought does not come under the reflective type. While reflective thought is the great tool of growth, unreflective thought controls the minor readjustments. Here habit is powerful; but not all powerful, for there is some thought; there is more or less readjustment,

[33] *Logic*, Vol. I, p. 2.

but it does not rise to the level of reflective thinking. There are, then, three stages, or phases, into which activity might be divided: that of purely habitual action, that of unreflective thought, and that of reflective thought.

But the great instrument of human development is reflective thought. The particular form of thought's operation is called judgment. In reflective thought the judgment becomes explicit. In each judgment some discordant factor of our experience is taken up and readjusted by identifying it with, or relating it to, some other factor, or the whole, with the result that harmony is re-established. That to which readjustment is made is the subject of the judgment; that which is identified with, or related to, the subject and which serves to "explain" it is the predicate.

The predicate of the judgment, then, is the co-ordination which explains, or harmonizes, the situation. Many possible predicates may be suggested and tested before the right one appears. A proposed solution of a problem is called a hypothesis, and the characteristic tentative movement in reconstruction is just the testing of this hypothesis. This view of the thought process and the consequent importance given to hypotheses are at variance with the ordinary conception of reality, judgment, and hypothesis. The ordinary view regards reality as existing distinct and independent of the knowing individual; and a fundamental problem which traditional logic must solve is: How is reality known? This theory of logic takes no account of such an external, independent reality. Reality exists *within* experience, and this is the reality with which thought operates. Such categorical judgments, then, as "This is my home," given by Bosanquet, where "this" is held to indicate contact with an external reality, have no place in this theory. Indeed, fundamentally, every judgment is hypothetical. For, "The judgment is to be regarded as essentially a process of reconstruction which aims at the resumption of an interrupted experience." [34] The judgment is said to be finished, complete, when the "reconstruction" is satisfactory and the "interrupted experience" is resumed. The test is, "Does it work?" But there is always the possibility that further experience may necessitate the modification of any judgment. This process of reconstruction, of modifying former judgments, is essential to this theory. It recognizes the fact that

[34] Ashley, *Studies in Logical Theory*, p. 156.

all interpretations of experience are hypothetical; that nothing is eternally fixed and unalterable; that, however complete and satisfactory is found a given explanation, it may prove inadequate to explain future experience and a revision become necessary.

From the logical principles here presented it follows that thought is through and through hypothetical, and that the predicate of the judgment is explicitly hypothetical. The term hypothesis is, however, ordinarily applied to a predicate which has been formulated, tested, and tentatively accepted as an explanation of certain phenomena. A successful hypothesis comes to be regarded as a principle, law, or theory that is generally, or even universally, valid. Logicians have explained at length how these general hypotheses are formulated and how applied, in which discussions induction and deduction have received especial attention. It is believed that an exposition, from the standpoint of instrumental logic, of the formulation and testing of general hypotheses, and how induction and deduction are involved in this operation, will throw light on the whole situation.

Whenever a difficulty arises in experience, the situation will call up, naturally, a previous similar experience, if there has been such; and the predicate found successful in the previous situation will, unless there are obvious hindrances, be selected and tested to determine the possibility of its solving the present problem. If this predicate, either with or without much modification, proves successful, then, in a third similar situation, the mind will all the more readily turn to this predicate for a solution of the difficulty. A predicate successful in a certain class of phenomena comes to be regarded as a general law; if the class to which it is applied is regarded as complete, or if the relation between the individual of the class and the predicate be such that it (the predicate) is believed to hold good of each one of the class, we get the so-called "universal." In other words, a principle, a law, that is, a hypothesis by whatever name called, is a co-ordination, a habit, that has been found successful in dealing with certain phenomena. The development of a "law" is a process of evolution and, theoretically at least, the law is not fully determined until all the individuals to which it is applicable *are in and checked up*. The law taken at any point in the process is different from both the first and the last predicate; not wholly different but not identical throughout.

Looking at this process from the side of its evolution, the "interpreting" of successive data, we get *in*duction; the law is built up, established, by such interpretations. In the naïve mind, these laws "grow up" unconsciously. The reflective man may observe that the same predicate *has been used* in a number of judgments and thus come to recognize the operation of a law. The scientist sets out deliberately to observe phenomena, in order that, after observing a series of facts, he may "inductively" establish a "law."

Looking at the process from the side of the *use* of previous experience to interpret new data, we get *de*duction. Professor Angell says:

> These reactions (deductions) consist in applying to appropriate things the habitual accompaniments of specific objects, or events, in the form of general ideas, or principles, concerning similar objects and events.[35]

Thus induction and deduction are present *throughout*. In using the predicate of the first experience, A, to interpret the second experience, B, we *begin* a process of induction which may result in the establishment of a "law;" and this *use* of a previous predicate to interpret a new experience is the essence of deduction.

To summarize: The general point of view from which instrumental logic is developed has been termed "radical empiricism." It is based on experience as such. It takes the world of experience just as it stands as the world of reality, and would explain all categories of thought in terms of this experience. It is distinctly evolutionary. If there is one category more fundamental than another, it is that of activity. This activity is exhibited in the form of habit. But habit or activity or the union of the two somehow begets interruptions; the habit breaks down in the process of its own on-going. Habit, expressing as it does the experience of the race and the individual, furnishes the only tools available for the reconstruction of the interrupted activity. At this point consciousness appears and in some way is effective in controlling the situation. The process of reconstruction by which old co-ordinations are made over and organized into a harmonized, larger co-ordination is called thought. Thought is just this reconstruction. Within this disturbed situation and having its whole meaning there, is ever conceivable form of which thought can become cognizant. That is, one's field of knowledge, the whole range of his conscious

[35] *Psychology*, p. 240.

universe, arises within and gets its meaning from the thought-situation. Reality is not something thought would represent; there is reality in experience and it may be projected as an "external" physical world or conceived of as an "internal" thought world. It is real if it is experienced and one "world" is just as real as the other.

The criterion of truth is, "Does it work?" This means possibility of change in accepted "truths" as one gets more experience; consequently, the through-and-through hypothetical nature of all knowledge. This is the point of view of the scientist. He gets his data, his experience. He formulates hypotheses to interpret them; or, perhaps better said, he endeavors to state the mode or forms of their appearing and their operation. If his hypothesis works, and so long as it works, he accepts it. The whole scientific view of the universe is just such hypothetical construction. The "real world" of the naïve man, in so far as thought out at all and not simply accepted, is also just such hypothetical construction, the difference being that the scientist works consciously and the naïve man unconsciously. If the criterion of truth is, "Does it work?" we get the basis of all accepted truth in habit. So long as one can react to a situation in a certain way so long is one's interpretation of it true.

II

EDUCATIONAL THEORY

The preceding discussion of logical theory makes clear certain principles that, if accepted, must determine the theory of education. The educational theory outlined in the following pages is an attempt to apply these principles to education. The more important of these principles are:

1. All development of experience takes place in a disturbed situation brought about by the failure to function of habitual ways of reacting. Thought is the reconstructive movement through which this disturbed situation is readjusted.

2. Experience is essentially activity, or *will* in the widest sense of that term. All growth and development are through activity. The final end of all activity is practical conduct.

3. Habit as the form in which valuable experiences are retained constitutes the material with which thought operates. The disin-

tegration and redintegration of habit is the fundamental movement in development.

4. The failure of habits and the tension resulting therefrom give rise to the thought-situation. Within this thought-situation are realized all the manifold forms of intellectual life.

5. The reconstruction of the thought-situation is hypothetical. The test of its truth is practical: "Does it work?" Further experience may modify any conclusion. All development involves a continued reconstruction of experience.

These principles point out the way experience goes on. One's education is, at any given moment, the sum total of these accumulating experiences. The process of education is the process of experiencing. The results may be judged good or bad. The attainment of certain desirable ends is possible only by discovering the nature of this process of experience and by shaping its course of development. The particular problem of this paper is to point out this logical basis of all education. It was shown in Part I that the term "thought" is used to cover the whole reconstructive process. Thought is the instrument, or tool, through which experience reconstructs itself. But this process of reconstruction is just the process of education; the thought process is the educative process. Education might be defined as applied logic.

The remaining portion of this paper points out in some detail how these logical principles determine, fundamentally, the character of all education. How the fundamental forms of thought activity constitute education will be considered first; then certain generally recognized educative processes will be taken up and their place in the logical process indicated. The primary purpose of this paper is not to outline the method of education, except in so far as the establishment of the logical processes involved in all education must in a general way determine and point out such method. It seems advisable, however, to indicate briefly certain methods of procedure which are essential to education, but this is secondary to the main purpose.

Education is coexistent and coextensive with experience. It is going on throughout the entire lifetime of the individual. The term education is often limited, however, to childhood and youth, and particularly to the period of school age. The extremely plastic and comparatively unorganized condition of early life makes it the

great educative period. The child is making rapid strides in development; the school is the specific institution that society has set apart to aid the child in this development. For these reasons frequent reference will be made to the child and to the school.

Because of the immediate dependence of instrumental logic on psychology a portion of the discussion of educational theory is taken up with psychological analyses. This seems necessary to an adequate appreciation of the situation. In a general way, the principles will be discussed in the order given.

I. THE NATURE OF EDUCATION

In the discussion of logical theory, emphasis was laid upon the breakdown of habit which experience suffers. This gives rise to a disturbed situation, a state of tension, a problem. The very essence of experience being activity, there could be no rest here; so there follow tentative movements the end of which is to make some satisfactory readjustment. The problem is finally solved, the readjustment accomplished, and attention is turned to other problems.

This breakdown of habitual ways of reacting, the problem which it generates, and the final successful solution are essential to education. The old habits fail, and just at the point of failure is where education, which is just the process of readjusting, takes place. Attention was called to the fundamental nature of habit; how our ideas, points of view, facts, perceptions, concepts, in fact our whole intellectual content, are grounded in habit. They are forms of habitual reactions which come to consciousness as intellectual content in this breakdown of habit, and they constitute the intellectual capital that an individual has at any given time upon which he may draw in the solution of a problem. For education to take place, there must be this problem; there must be this intellectual content; and there must be at least a tentative solution. If success follows, the "point of view" is accepted; better, the acceptance of the point of view is the "success." This accepted solution is always tested; first, the fact that it solves the problem at hand is a test of its validity; second, its use as occasion may demand in subsequent experience furnishes additional testing. It is only the scientist who produces artificial conditions for testing his hypotheses. The child or the naïve man tests them as he needs them. This testing further readjusts and confirms tentative solutions. It gives validity

and solidarity to experience. This is an important part of education.

Education is "a reconstruction of experience," but it is not a mere working-over of past experiences. The very reconstruction of old experience constitutes a new experience. Further: in discussing the breakdown of habit, attention was called to the fact that experience begets interruptions; that change is involved in the very conception of life. These interruptions, these changes, are new experience. They constitute the new conditions which must be met and assimilated. Education is, then, an enlarging, an addition to, as well as a reconstruction of, old experience. It is development, growth, expansion. Logically, education might be defined as the process of growth and organization of experience through the reconstruction of old experience in order to harmonize it with, or "explain," the new.

This view of education is not the one generally accepted. The more common view looks upon education as a preparation for the future. The end lies outside the present moment. Various sorts of external results have been set up as the goal. It is the acquiring of learning, or information; the development of moral character; "a harmonious development of all the powers;" or simply a preparation for life. The theory of education derived from the principles of instrumental logic puts the goal within the educative process. Education is not something to be obtained through a long course of training or instruction; it is the process of growth which is now in progress. It is an internal evolution, not an external addition of information, knowledge, or mere accumulations of any sort. Education is the entire process of growth.

II. THE MOTOR ELEMENT IN EDUCATION

An appreciation of the logic of the educative process enables one to recognize the importance of the motor element in education. All growth and development are essentially activity. Activity manifests itself as tendencies to various kinds of movements, as a striving after objects, as definite forms of reaction. We have instincts, reflexes, desires, ideas, and will; these are some of the forms in which activity appears. The word "impulse" is here used to cover all these tendencies to activity, however vague and indefinite or clear and defined.

This growing activity is going on in this real world of physical and social and intellectual and moral interests. We are interested in our physical needs—food, clothing, shelter; in our world of loves, hopes, fears, and ambitions. It is because we are doing things and attempting to do things that intellectual growth, or growth of any kind, takes place. Because of conflicting impulses, problems arise in this activity. A man cannot build a beautiful home and at the same time use the money for travel. And so his desires come into conflict; both cannot be realized as they appear to him here and now. One must be abandoned if the other is to be secured, or some sort of a new arrangement must be devised if both are to be enjoyed.

These problems are not sentimental or fanciful or unessential. They must be solved if life is to be realized. They are just the things that are "worth while" and for which humanity strives. They make life real and vital. Furthermore, it is the solving of these practical, living problems that gives that satisfaction which experience demands as its adequate realization.

It is in solving just such real problems as these that education takes place. To speak particularly of early education: problems may be "set" for the child; his teacher may regard these set problems as essential to his right development; but only in so far as they are problems to the child himself does their solution give intellectual growth. The child is active. He does have problems, and the solution of these problems, his own, are the only ones on which his education depends. The question is not of "giving" the child problems, but of deciding which of his own problems shall receive attention. At any point in his experience the child has more problems, consciously or subconsciously present to him, than he can solve. The teacher ought to be familiar enough with child development to have some idea of the nature of these problems and of their meaning in terms of the social conditions which begot them, and of what value their solution would be to the child. It is the business of the teacher to emphasize and cause the child to react to those problems which have the greatest significance for him as a social being living in a given social environment.

The impulse to activity furnishes the starting-point for all education. Dr. Dewey says: "In man, there are few instincts pure and simple, but rather the loose beginnings and ends of very many

instincts. Hence, the range and variety of human, as compared with animal reactions." [36] These instincts are the "leavings" of our ancestry; that which was beneficial to them and which has been bequeathed to us. These inherited impulses and instincts are the only capital on which the child has to begin. He who would direct the child's development must place himself, as it were, within the range of these impulses and content himself with emphasizing the more important ones. Only in this way is it possible to direct the child into the more desirable forms of activity.

The impulses reveal fundamental forms of social activity, which are functioning in the civilization of today. The meaning of these impulses is to be found then in this civilization. Consequently, civilization must furnish the criterion for him who would direct the child's education. The language impulse shows itself in the babbling of the infant. To the child it means nothing. It is simply the outgoing of his activity along lines predetermined by inheritance. But to the adult it is the beginning of the chief means of communication with one's fellows. Out of this communicative impulse there develop talking, reading, writing, and the higher aesthetic appreciation of literature. It is the beginning of the child's intellectual social life. The mother and companions respond to the infant's babbling, and so it comes to have meaning for it. So it is with other impulses exhibited by the child. He who sees the end from the beginning has a criterion by which to judge the relative value and importance of these impulsive beginnings.

Activity involves change of some "physical" form. It is commonly held by psychologists that "thought" is accompanied by cerebral changes, if by no other. Conduct, for which thought exists, always involves some physical change. It is in, or by means of, some physical change that our ideals are realized. These ideals may be the attainment of personal pleasure, a business transaction with our fellow-men, or the performance of a religious duty. Our ideal may be expressed in language, by bodily activity, or by means of some "external" physical object. This fact has an important bearing on education. The child grows intellectually by working out his ideals in just such external ways. His thought should serve some end which may be externally realized. Here is the logical basis for handwork as a means of education. When the child can work out a problem in a given concrete form through the

[36] *The Study of Ethics*, p. 13.

medium of clay, wood, or graphically, it becomes "real" to him as mere thoughts do not. It is objective, it can be criticized, and, usually, it can be modified so as to approach more nearly the ideal embodied in it.

Much of the work of the schoolroom lacks this objective realization. The solutions of the problems, in so far as there are problems, are merely intellectual. As a rule, there is little opportunity to work out results in a concrete way. Thought fails to function and so we get sentimentalism and lack of interest. To make matters worse, the so-called problems are the problems of the teacher, not of the child. His intellectual activities are directed along lines which others have considered valuable and which have no vital interest for him. Take, for instance, the usual method of teaching arithmetic. The child is expected to learn the processes and principles in logical order, as systematically arranged by mature minds. But data are organized only *after* getting them. The human mind does not learn in the "logical" order naturally; the genetic order is not the logical order. Furthermore, the child sees no need of these data. They have not grown out of, and have no apparent connection with, his own interests. The problems, if problems are present at all, do not connect up with the real life of the child. There is a dualism; the child leads two lives, one a life outside the school, full of interest, with real problems; the other a life of the schoolroom dealing with material which, though it may have some interest, yet is not vitally related to the child's "real" life. So his knowledge is largely of the character of information. It is not usable and it is not "real," because it does not arise out of genuine problems. Furthermore, there is no opportunity to test and check up in a practical way the solution of the problems that may have some interest for him.

The fundamentally active character of all education seems now clear. Experience is a *process,* an activity. Thought is the *process* of reconstruction of experience, an activity. This *process of reconstruction* is education. Furthermore, education is not mere activity, but it is activity that would realize itself in some definite, concrete way. The end of education is practical conduct.

III. HABIT AND EDUCATION

The function of habit in the thought process has been discussed at length. It was shown that habit is the tendency of experience

to repeat itself; that the habits of any individual are the accumulated, valuable ways of reacting which the race has preserved and bequeathed to him, and those acquired during his own lifetime. These habits manifest themselves in impulses, instincts, reflexes, points of view, customs, and in every form of activity that tends in one direction rather than in another. It was shown that there exist not only these habits commonly recognized as such, but that *thought,* also, depends upon habitual co-ordinations. Our habits determine what we shall be cognizant of and also how we shall deal with our thought content. Habit is the great conserving principle. It is the working capital, the accumulated earnings, with which experience operates.

It was shown that habit breaks down; that in the very nature of the on-going activity which manifests itself in habit interruptions occur. There is a state of tension; a problem arises; the contents of our thought are in conflict, at war with each other, necessitating a readjustment which means the formation of a new habit that will harmonize the divergent factors and restore a unified activity. This breakdown and reconstruction of habit is the normal condition.

Habit is a primary factor in education. Reconstruction of experience *is the reconstruction of habit.* Experience is practical; it is "doing things." The way things are done, the way of acting, is determined by habit. In a sense, the goal of education is the formation of good habits. The great difference between the infant and the adult is that the adult has learned to react to the conditions of life in ways that give him power to control activity. By experience he has accumulated a vast number of habitual co-ordinations which do, in a measure, meet the demands. Thus he is free to take up new problems which, were it not for this past experience retained in the form of habit, he would not only be absolutely unable to control but would even be unconscious of their existence.

It was said that habits are the tools by which problems are solved. It follows that the more perfect the tool, the more completely a given form of reaction is under the control, the more efficient it will be. The value of so-called intellectual education has its value in the habits which it establishes. To illustrate: In nature-study, for example, the child gets certain facts of plant life which, if he is properly taught, enable him to understand certain phases of his experience that had been a problem to him.

The interpreting of these "facts" was in terms of previous experience. That was the only thing he had to interpret them with. Now that the facts are interpreted, they are a part of his organized experience, his habits; they not only control his actions at the time of such interpretation but they determine future conduct. It may be possible, but not probable, that a fact which the individual needs at one time will be so out of relation to all future experience that the particular form of reaction to that fact will never be repeated. If education were a preparation for the future, and if the problems had no vital relation to present living, it is conceivable that, under such conditions, the solution of a merely intellectual problem might have little relation, if any, to the experiences of real life. There is an intellectual field of thought which does not have immediate relation to practical life; a field of thought which is pursued because of the intellectual appreciation and satisfaction which it gives. But it is not admitted that such thought is free from the law of habit or unrelated to practical conduct. In the first place, it has been shown that our entire intellectual content may be expressed in terms of habit; that it is grounded in habit. In the second place, it is questioned whether anyone is really interested in so-called abstract truth *per se*. It is because the scientist or philosopher is able widely to separate the means from the end and yet see the relation of each part to the whole that he becomes interested in abstract fields of thought. It is because of his faith that his "truth" is true and hence does have some bearing upon life at large that he is interested in it. And if "at large," i. e., if at all, it must be in the conduct of some individual, or individuals, and hence is practical.

There is, in the process of education, a continual passing over of broken co-ordinations into more comprehensive readjustments. But the "passing over" is not made at one jump. It can reasonably be questioned whether any co-ordination ever becomes perfectly adjusted to the conditions of experiencing. Not only does it do its first work imperfectly but a practically perfect adjustment is attained only after many repetitions. There is a gradual approach to efficiency. On the other hand, an absolutely unchanging habit implies unchanging conditions in experience; but this is impossible. No experience is ever absolutely duplicated. This necessitates continual change in habit.

Under logical theory were discussed the conditions that lead to the interruption of habit. It was shown that the occasion of the failure of habit is the arising of a situation in which the habitual modes of reaction are in conflict; they fail to function. The presence of sensation indicates the point of break; perceptions, conceptions, images, ideas, appear because they are related to the disturbance. Often, it is a percept which refuses to be accounted for satisfactorily. To the botanist, it is a new and strange plant which he cannot classify. Each such difficulty arises either within the circle of our ordinary reactions which these reactions cannot assimilate and which necessitate a going outside or beyond them to get its "explanation;" or it arises outside of and gets its explanation within, or through, these ordinary reactions. One enlarges experience by taking it beyond the accustomed circle; the other enriches experience by being brought into the usual modes of reaction; both enrich life by the added experience got through the reconstruction of old experience.

Here we get a clue to the demand of life for ever-widening experience. It is necessary in order that the present life be understood and controlled. We get increased power by getting outside of and beyond the present. The richness and fulness of intellectual life is in exact ratio to the actual readjustments effected. An ever-widening experience is absolutely essential to the interpretation of the life process. But this demand for the "new" must grow out of problems arising in the old. New experience merely *as new* is worthless; only as the new is reached out for and appropriated because it enables one to solve problems, accomplish purposes, has it any educational value. The value of new experience will depend upon this relation to the old. A historical fact as a mere datum of information has no educative value. Unless the fact comes in response to a real demand on the part of the experiencing individual and contributes to a fuller interpretation of the conditions which begot that demand; or, at least, unless when the attention is directed to the fact it enlarges one's point of view, gives one a better understanding of life, it is, and remains, a mere bit of isolated experience; it does not enter into one's organized life, the real self, and, consequently, has no part in determining future experience.

This interpretation of new experience, which is so essential,

gives the ground for repetition. Reference was made to the fact that no habit is perfect in its inception, necessitating a continual perfecting of the co-ordination. This perfecting is largely a process of elimination. The child in learning to walk makes a great many movements that are unnecessary. The growth in his habit is largely the eliminating of these unnecessary movements. Only gradually does a habit become adapted to the demands made upon it. It was also stated that no experience ever repeats itself, and that this necessitates a continual modification of habit. The repetition of habit, then, narrows the co-ordination by this elimination and at the same time widens it, making it serviceable to a continually enlarging range of experience. The real demand for repetition is in this demand for previous experience to interpret new experience. It is questioned whether repetition that has no vital relation to the reconstruction of genuine experience and for the interpretation of that experience, but is repeated on request for the sake of its supposed value, has any place in education at all. The opportunity for a rich and wide experience gives a genuine demand for the repetition of previous experience in the normal, natural way. True, a child learning to talk will get a new word and repeat it over and over again and delight in the repetition. But the demand for the word in the first place lay outside the mere act itself; the use of the word, beyond mere babbling, was for some purpose. The repetition gives the child better control over the new co-ordination; as soon as the word is really learned, for the child, the apparent mere repetition ceases. The practice of so much bare repetition in our schools has come about through a misconception of the purpose of education. The teacher desires to impart certain "knowledge" which she considers valuable because it will be needed at some future time. This knowledge is not the result of the living experience of the child and there is no demand for its continued use, and hence its repetition, in the child's normal experience; so educators have considered it necessary to devise certain artificial means for securing its repetition. The positively illogical ground for the practice is evident. The logical demand for repetition is in the use of co-ordinations formed in previous experience for the purpose of readjusting a new, and hence problematic, situation.

If a process is so taught, when it is needed, that the child really becomes master of the new co-ordination, the teacher may

safely allow the matter to rest there until the process is again demanded. What the child needs is not rare and unusual items of information but a knowledge of how successfully to meet the ordinary and constant demands upon him. The co-ordinations formed for this purpose will be required again and again and so be continually repeated.

To insure a full and rich development, there must be opportunity for free activity in which the child will get new experience. Power comes with the use of past experience in interpreting these new conditions. This application of previous experience means a continual reorganization of habits that increases their efficiency. The notion that a mass of habits may, or should be, acquired which, when once attained, are adequate for all time, is a common error and very largely responsible for the lack of growth and spontaneity so essential to all development. The belief that truth is absolute and unchangeable, regardless of what future experience may bring, is the greatest bar to progress. It is the very nature of one's experience to undergo more or less disintegration. But in the redintegration which the disintegration begets, experience more than repays itself for the apparent loss. It is because new experience proves the old inadequate that reorganization comes. This view of continual change does not mean skepticism. It is a growth, a development. The old is not cast aside, but is reorganized, readjusted, and taken up into larger co-ordinations. The future is built up out of the past. This whole process—the formation and reorganization of habits in order to readjust a disturbed situation in which situation new experience appears—is education.

IV. THE WORK OF THOUGHT IN EDUCATION

This reconstructing of experience, of habit, is thinking. Activity might be termed the matrix out of which habit and thought evolve. Habit conserves valuable experiences. Thought reconstructs disorganized habits, and it is in this process that the various forms of intellectual life appear.

A consideration of a few of the fundamental characteristics of thought's operation will make clear the conditions under which education takes place. There will be considered: (1) Consciousness, including the subconscious and the unconscious; (2) Suggestion and Imitation; (3) Attention and Interest; and (4) Judgment.

1. *Consciousness.*—Thought takes cognizance of its own contents and operations. It becomes "aware" of itself. This "awareness" is what is meant by the word "consciousness." Consciousness operates in the control of experience, in the readjusting of a disturbed situation. Mr. Irving King says: "The degree of organization present in consciousness bears a direct ratio to the degree in which new and complex adjustments have been formed in the lifetime of an individual."[37] Consciousness is concerned in the creating of one's entire universe, both the "internal" and the "external" world. It is said to have its origin in the disturbed situation, but as there seems to have been "disturbance" from the beginning of life it would appear that thought has always been conscious of its operations.

Consciousness is used as a general term to cover all "awareness," but all degrees of consciousness are not the same. In any given state of consciousness, there is a certain object, or objects, that commands attention. This point stands out more clearly in consciousness than the others. It has been called the "focal point." In addition to this focal point many other objects or ideas are in consciousness. Every object which becomes a focal point seems to come to that point by gradually crowding out the objects which precede it. In turn this object gradually disappears, giving way to others. (The term "object" is here used to indicate anything toward which attention may be directed.) It is undoubtedly true that many objects are in consciousness and influence the direction of the "stream of thought," that never reach the focal point. They never get inside the "fringe." The term consciousness in its narrower signification is applied to the focal point, while those objects which are in the fringe are said to be in subconsciousness. There is yet another sphere of activity, the "unconscious." Here activity is so habitual that there seems to be no need for thought. The question might legitimately be raised whether there is any action without some readjustment, though it be slight; and if readjustment, then thought. Practically, however, habits do become so thoroughly automatic that thought, and so the conscious element, may be ignored. This would give then, with reference to consciousness, three divisions of activity; the conscious (in the narrower sense), the subconscious, and the unconscious.

[37] *Psychology of Child Development*, p. 31.

The process of education, the reconstructive movement, is a conscious process. There is a break in old co-ordinations. The disjointed, warring factors come to consciousness and the situation is controlled through the conscious reorganization of this content. The break generates the problem; consciousness makes control possible. Let the disturbed situation be brought under control and the co-ordination that adjusts the situation remains and is a means for solving other problems. It is not enough that the problem be consciously present. There must be a solution if the experience is to have value. The more sharply the whole situation comes to consciousness, the more likely there will be formed an adequate solution and the greater the value of that bit of experience in future adjustments. There is little or no growth in unconscious activity. The subconscious is more fruitful; in fact, it plays a large and important part in development. The fact yet remains that the *extent* to which a disturbed situation comes into consciousness, and a readjustment to the whole situation is "consciously" made, determines the degree of efficiency of the resulting co-ordination and its value in future experience. It is only because so much more of our experience is in subconsciousness than in the center of attention, that the subconscious plays so large a part in development. Consciousness present *in some degree* seems to be essential to growth.

It follows, then, that in education there must be no minimizing of problems. Continually to smooth over the child's difficulties is to rob him of conditions essential to his growth. If the child is to think clearly and judge accurately, he must become keenly conscious of his difficulties and realize fully the ground of their solution. To permit him to leave a problem half solved or vaguely understood is but to leave a barrier to future progress. Only in full conscious activity is the nature of the whole problem and the full meaning of its solution to be realized. Clear, keen intellectual activity is an essential condition of a thoroughly adequate development.

It is important to understand clearly the place of the unconscious and the subconscious in intellectual development. These two terms cover instincts, reflexes, and fixed habits. The instinctive and reflexive activities are fundamental to life. The instincts lead to the securing of food, to self-protection, and to race-preservation.

The reflexes keep the organism going. These reflexes and instincts are due to inheritance. They are valuable assets handed down to us by our ancestry; acquisitions which have been retained because of their value. One's subconscious world is made up of these half-conscious reflexes, instincts, and habits acquired during lifetime, which do not come to full consciousness because of their automatic nature or because other factors are in consciousness that need attention. A large part of one's subconscious world would come to full consciousness if permitted to do so. Attention is always directed to the point of greatest stress; it operates where there is greatest need.

This vague "subconscious" content exerts tremendous influence in directing the stream of thought. It envelops the object of attention and clothes it with meaning. It would seem that an object is "familiar," not so much because of that which is consciously recognized, as for those things which are "felt" to be around and about it. It is because of the feeling that we could if we wished explain this and that feature of the object, that we could react to it in such and such ways, that make it a "known" object. This whole "felt" world belongs to the subconscious. We feel the direction from which the object has come and toward which it is moving. We feel that it is accompanied by an innumerable company of related ideas. These things are what give it meaning. The educator must recognize these influences. A difficulty experienced often lies in this fringe. By directing the individual's attention to these subconscious factors, and bringing them to the focus, often he will see the difficulty and readily solve the problem.

On the other hand, it is of the utmost importance that by far the greater number of co-ordinations can, and do, remain in subconsciousness. It would be impossible for the mind "consciously" to attend to all the factors in even the simplest activities. Only because the mass of co-ordinations are fairly well "set" is it possible to direct attention to new difficulties. Further, these established co-ordinations are the tools for the solution of problems. The thoroughly organized and stable co-ordinations of the eye, the hand, the common percepts and concepts, the norms of judgment—these are what enable one to cope with new situations. If in writing attention must be "consciously" given to holding the pen, to spelling words, to securing correct grammatical forms, it would be

impossible to give thought to the composition. The successful, valuable co-ordinations that stay with us are just what give power and make advance possible. The passing over of co-ordinations from the conscious to the subconscious, and to the unconscious, is absolutely essential to education.

2. *Suggestion and imitation.*—Suggestion and imitation are closely related forms of activity. Because of their importance in education they will be taken up in some detail.

a) Suggestion. Professor Baldwin defines suggestion as:

> from the side of consciousness . . . . the tendency of a sensory or an ideal state to be followed by a motor state, and it is typified by the abrupt entrance from without into consciousness of an idea or image, or a vaguely conscious stimulation, which tends to bring about the muscular or volitional effects which ordinarily follow upon its presence.[38]

The only criticism the writer would offer here is on that part implied in the words, "entrance from without into consciousness." If the author means that thought is affected by an absolutely external and independent world, in so far, from the standpoint of instrumental logic, the definition cannot be allowed. It is true that the "sensory" or "ideal state" does appear in consciousness, but not " from without." It is due to the failure of habitual reactions to function, and the "sensory or ideal state" is the coming to consciousness of factors of this disturbed situation.

Professor Baldwin further says: "The fundamental fact about all suggestion . . . . is, in my view, the removal of inhibitions to movements brought about by certain conditions of consciousness, which may be called 'suggestibility.'" [39] This statement brings out clearly the logical point to be emphasized. A suggestion is just that which offers a possible solution to a problem.

In discussing "what makes consciousness suggestible," Baldwin says:

> We may say, first, that a suggestible consciousness is one in which the ordinary criteria of belief are in abeyance; the coefficients of reality are no longer apprehended. Consciousness finds all presentations of equal value, in terms of uncritical reality-feeling. It accordingly responds to them all, each in turn, readily and equally. Second, this state of things is due primarily to

[38] *Mental Development: Methods and Processes,* pp. 105, 106.

[39] *Ibid.,* p. 107.

a violent reaction or fixation of attention, resulting in its usual monoideism, or "narrowing of consciousness." For belief is a motor attitude resting upon complexity of presentation and representation. Just as soon as this mature complexity is destroyed, belief disappears, and all ideas become free and equal in doing their executive work.[40]

From the point of view of instrumental logic, the "criteria of belief" referred to here are the organized ways of reacting. We "believe" either, first, that which has proven successful in the solving of problems, especially if it has been thoroughly tested; or, second, that which we "think" would harmonize conflicting factors though we may not yet have had, or possibly in the nature of the case cannot have, the opportunity to test and verify. The word "belief" is often limited in its use to the second. In either case, it is the co-ordination that harmonizes our experience that is "believed." The statement that when "the ordinary criteria of belief are in abeyance" "consciousness finds all presentations of equal value" is objected to. Logically, what takes place is this: The organized reactions fail to function and beget a tension; before a readjustment can be made, old co-ordinations, i. e., "criteria of belief," are broken up and the factors involved in the situation come to consciousness. "Consciousness" does not "respond to them all, each in turn readily and equally;" the factors are not "free and equal." At the outset certain factors appear to be more closely related to the difficulty and more likely to be efficient in the solution of the problem than others. It is only after these fail that other alternatives are tried. It would be an exceedingly abnormal condition in which the breakdown was so complete that all factors stood out on anything like equal terms. The only sense in which all ideas are of "equal value" is that all of them are possibly available factors in the solution of the difficulty.

The essential point in suggestion is that in a disturbed situation a certain predicate arises which gives promise of effecting the desired result. The "promise" is the suggestion; that is what makes it a suggestion. Now, in so far as in some particular feature of that predicate more than others lies its hopefulness, that particular feature might with reason be termed the suggestion. It is probable that a number of suggestions will be presented before the final, successful one is secured.

[40] *Mental Development: Methods and Processes,* p. 107.

This "suggestion" operates in the unconscious field as well as in the subconscious and conscious; but in the unconscious field it is reduced simply to a stimulus which gives the cue to the accustomed response. It is hardly necessary to add that such a cue exists only objectively. The "onlooker" observes certain states follow in serial order, each one being the cue to the succeeding one. It is in this sense only that the term suggestion can be applied to unconscious activity. In the subconscious state vague ideas are continually effecting reactions. These operate where the habits, not yet automatic, are so well formed that the disturbance does not come into the focus of attention. The disturbance is too slight as compared with other difficulties that demand attention. A difficulty that might ordinarily require close attention would, in the presence of more serious difficulties, be left to take care of itself, as it were, while the attention is directed to the more serious problems. It is within the field where consciousness is most active that "suggestion," as well as all other factors, comes to its full intellectual value.

It is clear that suggestion is an essential element in all development. Using the term in its broadest sense, in which it stands for every factor that appears in consciousness as a possible solution of a difficulty, it is present in all intellectual growth. If it be held that there are in experience certain readjustments made which are purely accidental, in these, so far as accidental, suggestion does not operate. Suggestion gives the leverage for the solution of problems. If all factors of a disturbed situation were on a dead level, if no one gave more promise of a solution than another, progress would be tedious and fortuitous.

An educational theory must take into account this suggestibility in experience and recognize its universal operation. In working out an original demonstration in geometry experience has shown that the first thing is clearly to get before one the whole situation, to take account of stock, to find just what the problem is and what is on hand to work from. Sometimes the solution is then seen at once, but often it comes only after long and careful thinking. At first, there may appear no clue at all; usually, however, there soon is discovered a starting-point that appears to lead in the right direction. Following up this, other points may be suggested and finally the whole demonstration may be revealed. Often, however,

a line of reasoning is found to be fallacious, compelling one to go back to the beginning and start again. The whole movement is experimental, tentative. Suggestion after suggestion is tested until a valid proof is established.

This description of actual experience is taken to be a fairly accurate statement of the logical movement in solving any intellectual problem. The difficulties encountered in geography, history, or literature are removed in much the same way. In teaching, it is of the first importance that the child come really to see the situation, to see what he needs and what he has to work from. Then, if he is to get the full benefit of a solution, the child must be allowed to discover points that suggest a way out and to follow up these until he must abandon them, and sees why, or reaches a satisfactory solution. The temptation is strong for the teacher herself to suggest the way out. In her eagerness to get the final result, she forgets that it is only as the child actually works out his own problems that they are, for him, really worked out, that only in this way is it possible for him fully to appreciate the final outcome.

In the education of the child the conditions that surround him should provide suggestions for the solution of his problems. As a matter of fact they do provide suggestions. It is too often that he is not allowed to use the suggestions which are at his disposal; or, which is perhaps more common, he is given no assistance in the use of these suggestions. Indeed, the belief is all too common that the child has no means within his own experience for solving his problems, but that the task of supplying this material devolves upon the teacher. Even where there is a recognition of the presence of problems in the child's own experience, developed in the on-going of that experience, there is yet a lack of appreciation of the fact that the *means* of solution must be the child's own as well as the problem. Really to be a suggestion to the child, it must have a vital relation to his experience; it must be part and parcel of that experience. It must really suggest.

All experience is not of equal educational value. Some fields are richer in suggestion than others. The degree of suggestibility offered by any possible experience depends upon the relation of that experience to the previous life of the individual. Its value, educationally, is in just this degree of suggestibility which it offers. The teacher may, and should, direct the child's activities so that he

will come into a richer life. She ought to lead him to experience in a vital way not only that which will bring to consciousness latent problems but also that which will give him suggestions for the solving of his problems. It is her privilege to exercise a large degree of influence as to what, among many possibilities, the child may actually experience. This is an important part of the teacher's work.

b) Imitation. This is one form of suggestion. Professor Baldwin defines imitation as follows:

> There is in all the instances [examples of imitation referred to] some kind of constructive idea, a "copy," in more or less conscious clearness, which calls the action out, and which it is the business of the imitator to reinstate or bring about somehow for himself.[41] . . . . Wherever there is life there is means of continuing advantageous stimulations drawing up to them by active movement, or by other actions whose evident purpose is the same.[42] . . . . [And,] The adaptation of all organisms is secured by their tendency to act so as to reproduce or maintain stimulations which are beneficial. In this way only can new reactions be made available for repetition, and so secured to habit. But this reaction, which tends to secure a continuation of its own stimulation, is exactly the nervous process of conscious imitation.[43]

Mr. King criticizes Professor Baldwin's view of imitation.[44] He maintains that Professor Baldwin has described a certain form of individual reaction from the social side; that the child himself does not imitate; that the activities which others call imitation are performed by the child not in order to imitate but in order to get new experience. Mr. King says:

> With the child the emphasis is not on the copying of a certain act, but on the attainment of a certain experience that comes through the copying or imitating. From the first beginnings of control, the child is seeking to define his experience, or render it more definite. He is on the alert for stimuli that will enrich and enlarge his experience.[45]

From the standpoint of instrumental logic, Mr. King's point of view would seem to be more nearly the truth. The statement of Professor Baldwin that, "Wherever there is life there is means of continuing advantageous stimulations by drawing up to them by active movement, or by other actions whose evident purpose is the same," is, logically, but the means by which, in a disturbed situa-

[41] *Mental Development: Methods and Processes*, p. 267.
[42] *Ibid.*, pp. 277, 278.
[43] *Ibid.*, p. 278.
[44] *Psychology of Child Development*, chap. x.
[45] *Ibid.*, p. 119.

tion, experience tends to readjust itself for its further on-going. Mr. King says truly that imitation is but suggestion looked at from the social side. From the standpoint of the onlooker, the experience of others is more or less adequately reproduced in the individual. The reason the child imitates is that the social environment offers certain experiences which help him "find" himself. Just why the individual finds it desirable to respond in an "imitative" way can be accounted for, in part, by like inherited tendencies; we have inherited from a common ancestry. Also, being an individual in relation with other individuals, a part of a social whole, the good of each individual is attained in co-operation with other individuals. It would seem to follow naturally that acts which one individual performs would be practically the same that others in the same social group would perform. The value of imitation, as in all forms of suggestion, is that it enables one to solve problems. Because the problems of the child are largely the problems of the race and because he has inherited tendencies to act as the race has acted, naturally he will tend to solve his problems as the race has solved them. Further, the social group in which the child now lives has largely the same problems and the same inherited tendencies that he has, and, hence, their activities will in a measure be such as he wishes to perform; consequently, to "imitate" his fellows will be the most natural, as well as a most helpful, thing to do. Over and above this there is the conscious recognition, which the individual comes to have, that he can learn from others and thus come to realize himself more economically and more satisfactorily. The "unconscious" tendency to imitate, if there be such, seems to be due to inheritance.

As stated above, imitation aids in the solution of problems. There is always a larger whole, a thought-situation, in conflict, which the imitation is somehow to help in readjusting. The real nature of imitation is brought out by reference to the fact that no one imitates everything. There is vastly more that one does not imitate than that he does. One imitates an act because the imitation of that particular act will help solve a problem; the others will not.

On the educational side what was said of suggestion applies to imitation. In organized society, to realize hopes and ambitions it is necessary to conform to social usage, and to *conform* is to *imi-*

tate. The child finds a wealth of material—beliefs, customs, institutions—which he may seize upon and utilize. Through imitation the entire social life becomes available for the solution of his problems. The whole range of human activities, present and past, are put under tribute to the individual. The imitating of primitive racial activities is a common "method" in the schools. The growing complexity of social and industrial life makes the task of interpreting his conditions increasingly difficult to the child. By going back to those primitive methods by which his ancestors solved their problems in a simple way, the child can appreciate more easily the factors involved in these same problems and the principles according to which they are solved. Imitating these simpler forms of activity, the child comes better to appreciate the meaning of his complex environment. The method is logical provided the difficulty which the child is to solve is one that has grown up out of his own experience, a real difficulty for him; and if his experience has been sufficient to enable him to appreciate the historical material used. The danger here of making unwarranted abstractions is evident.

The psychological basis of imitation is in preformed co-ordinations. In all "forms of thought" old modes of reaction persist and tend to reappear when occasion offers. This tendency of previous experience to persist in the form of definite co-ordinations is of utmost importance in education. The whole theory of apperception, so strongly emphasized by the Herbartians, is just this tendency of previously formed co-ordinations to "assimilate" new experience, and is, as Baldwin has pointed out, a form of imitation. Old habits *tend* to persist without modification or, to state it on the intellectual side, we would explain all new experience by means of old ideas. In any case, after a readjustment has been made, after the new experience has been interpreted, related, and has taken its place as a part of our "universe," it will be found that, after all, our experience has not undergone any very great change. While it is undoubtedly true that every new experience begets some modification, yet in those situations which necessitate a very profound modification of established principles the change is slight as compared with the vast field of practically unmodified experience. It is just because there is so much that, at any given time, does not undergo serious change that one is able to "understand" his experience.

The child whom the teacher would conduct into entirely new fields of thought, into experiences that have no close relation to his past life, is placed in a situation where growth is impossible. He is deprived of the tools necessary for the accomplishment of a task set for him. Imitation and suggestion function adequately only within a thought-situation that has developed in the midst of real life problems; which problems have their whole meaning in the failure to function of certain previously formed co-ordinations. In so far as these co-ordinations do persist, in so far is there imitation.

3. *Attention and interest.*—Education consists in the reconstruction of past experience and the consequent building up of a larger and better organized world of present experience. This reconstruction, on the logical side, is the thought process which takes place within a disturbed situation. It is in this disturbed situation that attention is active. Wherever there is thought there is attention. Any object of thought is an object of attention. To be attentive means that thought is active. The term is applied, particularly, to a continuous application of thought to some specific purpose. The actual work of accommodation, of readjustment, is going on at a point that is called the point of attention.[46] Attention has been likened to vision where some one object, or objects, occupies the center of vision surrounded by other objects that become less distinct the farther they are from the center. Royce says:

> Present at any one time to one's mind is a small portion of the flowing stream of mental contents, in which one can in general distinguish at least two, and sometimes more, elements of content (perceptions, feelings, images, ideas, words, impulses, motives, hopes, intentions, or the like), while beside and beneath what one can distinguish there is the body of the stream or (to change the metaphor) the background of consciousness, where one can no longer distinguish anything in detail, although in some other moment one may easily note how the whole background has changed.[47]

This "small portion of the flowing stream" is the center of attention, the "focal point." This focal point is just where, in the disturbed situation, the breakdown is most serious. In any such situation, the portion to be reconstructed is usually a very small part of the whole. To repeat: it is just because the great mass of habits persist and are available as means, that any solution is

[46] Angell, *Psychology*, p. 64.

[47] *Outlines of Psychology*, p. 85.

possible. Any very serious derangement would mean a collapse. In this disturbed situation the whole force of thought, the whole attention, centers in the point of difficulty, while the great bulk of organized life becomes the means for solving the problem. When the given point is adjusted, the stress, and so attention, is transformed to some other point.

Attention is bound up with interest. One attends to the things in which one is interested. Dr. Dewey defines interest as "impulse functioning with reference to an idea of self-expression." [48] There is always the outgoing activity directed toward some object for the purpose of realizing certain value.

The point to be emphasized in this connection is that this effort for self-expression, this interest, is due to a disturbed situation. So long as all goes smoothly there is no interest. There is no differentiation of experience into an *object* of *value* set over against the subject. But when the impulse is active, when the end is perceived, when the value involved is recognized, and yet some difficulty is in the way of its realization, then we have interest; and, like attention, the interest centers in the point of difficulty; further, one is interested in anything and everything that promises to master the difficulty, to solve the problem. An individual becomes intensely interested in the thing he needs in order to accomplish his purpose. When the object is secured, the end realized, that particular object disappears from thought and new objects of interest arise.

The connection between interest and attention is now clear. Both refer to one and the same psychological process, the reconstruction of experience in a disturbed situation. There is always present a problem more or less definitely defined. To that problem one attends and in that problem is one interested. The two terms refer not to different facts, but to different attitudes that may be taken with reference to the same facts. When one is thinking of the activity of the thought process *as directed* toward some object of interest, it is "attention;" when thinking of the activity *as actually functioning,* as in process of realizing the desired end, it is "interest."

There is a disposition among psychologists to make emotion, or feeling, a characteristic element of interest. Unquestionably the "feeling tone" is present throughout the entire disturbed situation.

[48] *Interest as Related to Will,* p. 230.

When habits fail to function there is a tension. This tension is the basis of emotion. Both interest and emotion are due directly to this obstructing of activity. To make one a characteristic of the other is to misinterpret the whole psychological process. The fact is, a highly emotional state indicates a minimum of functioning. As the process of reconstruction begins actually to make progress, the *emotion diminishes* while the *interest* is just coming to its maximum.

Attention and interest are necessarily implied in the educative process. If education is the reconstruction of experience, if this reconstruction takes place because of the vital interest in realizing the purposes of the self, if thought is consciously to attend to that reconstruction, and if control is to be secured only through such attention directed toward interesting objects, the absolute necessity of securing attention and interest is evident. But the problem for the teacher is not so much how to get the child to attend, as how to get him to attend to certain things that she considers valuable. The difficulty here lies in the fact that the teacher's interests are not the same as the child's. The solution lies in their unification. So long as the activities proposed by the teacher do not appeal to the child, so long will he continually revert to those that do interest him. As a rule the child will readily respond to a demand on his attention. If the "work" proposed appeals to the child as of value, if he believes the doing of it will give certain desirable results, there is no lack of interest. The child is eager to do things that are, to him, worth while. If the "work" does not interest him, often there will be divided attention; apparent outward attention may be accompanied with continual mind-wandering. Really to direct the child's thought the teacher must seize upon points that are of vital interest to him, real problems in his experience. The available points may have but remote connection with the end which the teacher has in view; but by getting hold of these real interests, there is a chance to direct the child's activities into the more fruitful fields of activity. When the problem proposed by the teacher really becomes the child's problem, there is no question of attention and interest; nor will there be any question of genuine intellectual advancement.

The practical application of this theory is not so impossible as it may seem at first glance. The teacher sees the child laboring under certain difficulties that would be removed if he understood a

certain principle. For instance, in beginning the study of geography the child has difficulty in getting relative distances and locations that might be cleared up if he understood the use and meaning of a map. He has but a vague notion of the problem and is entirely ignorant of how to solve it. To refer to the ordinary political map would only add to his perplexity. There could be no possible intrinsic interest in studying it. The problem now for the teacher is to seize upon a real but simple difficulty of the child's of which he is, or may easily become, conscious and which the child may clear up in his own mind by a crude drawing. From this starting-point more complex situations may be worked out and the notion of expressing relative distance and location graphically thus be enlarged and systematized so that the ordinary map is intelligible, and becomes the efficient instrument for interpreting the previously vague geographical notions. The fundamental point is that genuine interest in a crude drawing, or in a more elaborate map, lies in the fact that it is an instrument, a tool, by which the child is able to solve a real difficulty. So long as the child is engaged in the solution of a, to him, real difficulty there will be no lack of attention or interest.

4. *The judgment.*—Under logical theory the nature of reflective thought was discussed. It was shown that not all experience comes to consciousness as reflective thought, that in early childhood, among savages, uncivilized people, and more or less in the life of every man readjustments are made which are not "consciously" attended to. These readjustments cannot be said to be "out of consciousness," but they are not in the focus of attention. The term subconscious is used to indicate this field of experience.

Reflective thought is the field of conscious readjustment. Here the individual is fully aware of the need of readjustment and "consciously" casts about to overcome the difficulty. The act of readjusting a disturbed situation is called the judgment. The term is applied particularly to reflective readjustment. In the judgment the point of difficulty, the subject, is singled out, and co-ordinations that still persist are selected as possible predicates to explain the subject. It might happen that many possible predicates would be "tried on" before success is attained. Attention was called to the fact that the final outcome of the judgment is a larger co-ordination which includes within itself the contending factors.

The essential characteristic of the process of education is this act of judging, this reconstructive movement which is the exact point of growth. Just here, and only here, is there progress. The general outline of a co-ordination, or point of view, may be formulated under some particular stress and the details worked out gradually. Or one may be hardly conscious of the first beginning; the entire process from inception to final form may have come about gradually and with no serious break at any point. In any case the changed attitude is due to a reconstruction of previous co-ordinations or points of view. To be development, there must be continued readjustment, continued acts of judgment. These acts occur in response to specific demands. To be of value these demands must be genuine; they must appeal to the child himself as actually worth while. They must have arisen out of the child's own activity and present an actual bar to his progress; difficulties that he must overcome if he is to accomplish his purposes. He will then be eager to solve these problems just because they are his problems, and his life.

To judge from common practice, education, as to content, is the acquisition of certain organized material that is considered necessary for the individual's future welfare. When this body of "truth" is comprehended, when the facts and principles in themselves and in their relation to each other are understood, there is power, ability to appreciate life and accomplish purposes. Truth is objective. It is something external to and independent of the human mind and must be taken over into the understanding. The problem of the teacher is how to bring about this transfer effectively and economically. This seems to be the common view of education. There is an almost universal lack of appreciation of the fact that the subject-matter of education, the material upon which or with which thought operates, is material of thought's own construction. It is built up out of the individual's own experience through successive acts of judgment. Truth that someone else developed has absolutely no educational value to the child except as it becomes part and parcel of his own experience. Accredited truth, facts, and principles that have become established, are invaluable. The heritage of the race cannot be ignored. But only as the experience of the race suggests to the individual the solution of his *own* problems, the interpretation of his *own* experience, can it have

any real educational value. Without an act of judgment, without an actual reconstruction of one's belief, there can be no education.

History, arithmetic, geography, grammar, are taught as a coherent body of valuable truth. The emphasis is upon the content, the body of truth; as though the possession in memory of this truth is the thing of prime importance. The child is to be got ready for living. He is to be equipped for future trials. There is almost a total lack of appreciation of the fact that the really important thing is for the child to interpret and organize his *present* vague and disconnected experiences. The only genuine excuse for studying the facts of history *now* is that just now the child needs these facts. The time to study the facts of history systematically and logically arranged is when the child has come to *feel* that he is a part of a larger social whole; that the experiences of this larger whole both present and past are a part of his life, or at least are vitally connected with his life; and that a knowledge of this racial development, particularly the trials and vicissitudes of his own nation, does give his own experience added value and meaning. Only gradually does the child become distinctly conscious of the full value of this historical material. That he does feel its worth and does by its help actually reconstruct and better organize his experiences is the genuine test of its value to him.

There must be a large degree of freedom in education. The child must be free to formulate problems and free to exercise his judgment in solving them. As it is impossible to know all the child's past experience; as it is impossible, therefore, to know all his problems and his consequent interests; so it is impossible to provide in detail in advance for his course of development. The "in detail" is the point of emphasis here. The educator ought to understand the laws of mental growth and acquaint himself with the conditions under which the child has been and is developing; he should know something of society, the direction of its movements and the probable demands, in a general way, that society will make on the child when mature. With this information it is possible to lay out along broad lines a curriculum into which the average child will "fit," and greatly to facilitate his growth. But just what this particular child at this particular time will be interested in, what will be *his* problem, no one can foretell. It is the duty of the teacher who has the child in charge to study his

immediate needs, to supply in detail the conditions essential for his growth; but the child must be free to react upon these conditions. The teacher may be of assistance in helping the child "find" his problems and, especially, may the teacher put him into the way of solving them, but the real work must be done by the child himself; he must actually solve his problem, *actually reconstruct his point of view,* if there is to be any real growth. Above all the child needs a rich environment, intelligent direction, and opportunity to initiate and solve his own problems. These are the conditions that make for sound judgment and intelligent development; these the school should provide for the child.

V. THE HYPOTHETICAL CHARACTER OF EDUCATION

Under logical theory there were discussed the formation and testing of hypotheses, the question of the thoroughly hypothetical nature of the judgment, and the processes of induction and deduction in the formation of general principles. The purpose was to show that knowledge is essentially hypothetical. By "knowledge" is here meant those co-ordinations that are constructed in order to interpret, or harmonize, a problematic situation; and they are accepted as knowledge, or "truth," so long as they satisfy the demand.

Knowledge, at any point in experience, gets its validity in its success in accomplishing what thought sets out to do. With further experience there is always the possibility that a particular truth, apparently fixed and sure and certain, may undergo revision. But the belief is next to universal that education consists largely in acquiring certain information—laws, principles, facts—that is fixed, unchangeable, and true, independent of thought. Knowledge is stamped with *authority*. It is accepted as final. The only question, if a question is raised here at all, is in getting real knowledge. If "real" it is absolute.

If the instrumental type of logic is a true interpretation of the function of thought this whole attitude so characteristic of current education is absolutely and fundamentally wrong. Education is a process of evolution; each individual builds up his own world of reality, of knowledge, of truth, out of the products of his own activity. That only is *my* truth which enables me to "understand" my experience. Truth comes in the interpreting of given facts of experience. This interpretation consists, logically, as has been

pointed out, in forming a new co-ordination, being the readjustment of a disturbed situation in which the "facts of experience" have been at odds with each other. Further experience may compel a radical modification of the first point of view. Real growth, genuine education, is just this continual reinterpretation of experience.

A geographical fact, for instance, does not really become knowledge to the child until it, for him, has assumed vital connection with the world of reality as he sees it. There must have been such a readjustment of his habits, his way of looking at things, as will include and account for this bit of experience. Furthermore, and the point so often overlooked, this readjustment will not be made until there appears some demand for it; there must be a problem, a difficulty, however slight, which *calls for* this readjustment. So long as a fact remains disconnected, exists as mere information, it has not become genuine knowledge at all. When the fact is interpreted, it not only now takes on a modified meaning, but there is more or less modification of other truth. Future experience is likely still further to alter its meaning. It is this continued modification of experience present in all development that makes education essentially hypothetical.

The truth of this theory is demonstrated in actual, practical experience. The "objective" physical world and the "subjective" thought world arise out of a unitary experience. The same fact is now regarded as external truth, and again as merely subjective. The accepted explanations of the movements of the earth and other physical laws are instances of such data which were once regarded as mere ideas, possible explanations of certain phenomena, but which have come to be regarded as absolute fact. It has already been pointed out that the criterion for the acceptance or rejection of a given datum as fact or idea is a thoroughly practical one; that so long as laws and facts meet the practical demands upon them, they are fixtures; in so far as they fail we modify our conception of them and they cease to be to us just what they were.

This hypothetical character pervades the entire world of physical objects—ground, trees, animals, our bodies—though most men would abhor the suggestion that their interpretation of such reality is a construction of thought. But is the conception of a material substance anything more or less than a postulate which thought has

set up in order to account for certain experiences? There are color, form, touch, smell, taste. Thought is not satisfied to look upon these as distinct, separate experiences that are merely subjective. The notion of a material substance which somehow bears these qualities does, at least in a measure, satisfy the human mind, though it must be recognized that "substance" is a purely hypothetical creation. All one can really "know" are these qualities; the explanation is hypothetical.

The conception of law is built up from experience. Take the law of gravitation. One is sure of certain experiences. To account for and harmonize these experiences, there has been formulated the law of gravitation. No one doubts but that the falling of bodies has been *experienced* by the human mind ever since the earliest stages of evolution. But there came a time when thought could no longer accept this as a brute fact. It must be *explained* in some way. The first conception of the law was undoubtedly regarded as a mere hypothesis, a possible solution of the problem. In its first form it was, no doubt, exceedingly crude and incomplete. Further observation, testing, and revision brought it to a point where it did satisfy thought; though additional experience may have demanded, and may yet demand, further revision. If the law of gravitation is now regarded as fixed and absolute, it is only because, just now, it is accepted; there is no question up; it is meeting the demands upon it. Generally speaking, all law, however absolute it may now be regarded, has had just such a history.

The whole vast field of scientific investigation presents indisputable proof of this hypothetical nature of "truth." All scientists recognize the use of the hypothesis in arriving at their conclusions. The more profound thinkers recognize the hypothetical character of these conclusions. The history of any science presents a succession of hypotheses put forth with the hope, or belief, that they would satisfy the demands of experience. A given hypothesis is accepted for a time, only later to be discarded for a more hopeful one. The present status of each science represents its present stage of advancement; the future will bring new experiences and new revisions.

The introduction of the laboratory method in the schools is an attempt to approach certain study-subjects from the standpoint of scientific inquiry. In so far as this method encourages a spirit of

investigation and the formulation of hypotheses to "explain" discoveries, it has the sanction of sound logical theory. That method which uses laboratory experiments merely to "prove" laws that are regarded as final statements of truth is wholly devoid of the true scientific spirit. The laboratory method has been confined almost wholly to the teaching of the sciences in secondary schools and higher institutions. The spirit of investigation should be extended to other subjects of study and down into the elementary school. There is no reason why geography and history, for example, should not be taught from this standpoint.

Let instruction be given from the standpoint of the child's need, and the study of particular subjects be developed from this point of view. The average child is eager to get information. Questions arise on almost every conceivable subject. Attention needs only to be given to some particular phase of his experience and the questions are multiplied. The child has the spirit of inquiry. The teacher has only to utilize and direct this tendency. The objection may be raised that with such a method it would be impossible to develop a subject logically. Such objection would naturally come from one who exalts the subject-matter. But if knowledge for the child has value only in reference to his need, the objection is groundless. The child must learn to arrange his own subject-matter and, hence, it must be *after* he gets it. The skilful teacher will so direct the child's activities in securing this subject-matter that the problem of logical arrangement will be very greatly simplified.

Recognition of the fundamentally hypothetical character of knowledge and of the process by which it is continuously developing is essential to a full appreciation of the nature of education. The static view of truth tends to stagnation; the dynamic view inspires continuous growth and development.

CONCLUSION

The problem which confronts the practical teacher is this: "How can the child's activities be so directed that while he is doing things that are interesting, in the normal, natural way, he will at the same time be getting that experience, that knowledge, and that training which will best fit him for life?" The chief difficulty, as pointed out above, lies in seizing upon those interests of the child which may be so directed as to get the sort of experience needed.

The tendency has been to go to one of two extremes; either to emphasize the individuality of the child to the exclusion of social demands, or, as is more usual, to make the social demands paramount and ignore the individual. Too many teachers see only one or the other of these courses open to them. They fail to see that each is an abstraction. When it is remembered that the child is what he is because of the whole past experience and development of the human race, that he is a product of all the past; and when it is remembered that every other individual, and all those tendencies and characteristics and institutions which go to make up the sum total of present social life, are also products of that same past; it is not so strange a thought that the child in his inherited characteristics, impulses, and interests would be fitted exactly to the society in which he lives. Indeed, it would be a strange thing if the fundamental impulses and interests of the child did not come to their realization just in this social life about him. Further, the whole environment of the child from birth has been just this same social life. Both the inherited tendencies and social environment go to make the individual, in his inmost tendencies and interests, fitted for the social life that he is to live.

The practical problem is how to discover these fundamental tendencies and give them proper direction. The following suggestions are offered as an aid to the solution of this problem. To be brief, the discussion will be limited to the work of the lower grades of the elementary school. It is in these lower grades that we find the material offered to the child most at variance with his interests. In the upper grades, in the high school, and in college, the student usually becomes vitally interested in the subjects of study. Gradually, the child comes to appreciate the value to him of history, geography, literature, and other subjects. The extent of this appreciation measures the value of any subject of study. It is just because the child on entering school has not come to have this appreciation, and in most cases is not expected to have, that the work is dead and formal. Most courses of study are based upon the assumption that the chief business of the first few years of the elementary school is to teach the child reading, writing, and the elementary number operations; that is, the child is to be taught the tools of learning, so that he may be prepared in the following years really to get knowledge. On the contrary, the child of six ought

to be doing things in which he is as vitally interested as is the adult in his work. The knowledge acquired ought to come as the interpretation, or understanding, of his experience. It follows that the child ought to be taught the tools of learning in order to get a vitally interesting content, and he *ought not to be taught them until he needs them.* How to do this is a problem.

When a child enters school the first duty of the teacher is to acquaint herself with his natural disposition and primary interests. Emphasis should be put upon the motor side; allow the child to do interesting things—play games, dramatize stories, and engage in various sorts of handwork. The first consideration is that the child be really interested in these activities; the second is that these activities be so directed that he will be getting really valuable experiences.

In an attempt to work out the problem of elementary education from this standpoint, it was found that children are vitally interested in the activities of their immediate environment—domestic, social, industrial, and civic. For instance, the children made a study of foods and especially of bread. They became interested in the source from which bread comes. They learned that bread is made of flour, that flour comes from wheat, that wheat is grown in the field. They studied the nature of soils, the need of sunshine and rain for the growing grain, sowed the grain in boxes, ground wheat between stones and in a coffee mill, bolted the flour through genuine bolting cloth, and baked their flour into bread. It was found that the children were intensely interested in all these forms of activity. It did give them the answers to questions that are coming up in the life of every child, and, at the same time, it gave them a knowledge of industrial conditions that are an essential part of education. This is but one of many topics studied. Others, among food-stuffs, were meats, rice, and fruits. Under clothing, they studied wool, cotton, and silk. Under shelter, they took up house-building, and actually constructed and furnished a house. The same general plan was followed in the first three grades. In the second and third grades not so many topics were taken up, but those selected were studied more thoroughly. The results were very satisfactory.

Along with this study of an interesting content were taught the formal subjects of reading, writing, arithmetic, and language.

These were taught in immediate relation to their use, and *not until needed.* In the teaching of reading, the purpose was to get the content. The emphasis was always on *what* the child reads rather than *how.* The child learned to read in order to get the story told. In number work, during the first two years, he was expected to perform only those number operations called for in his ordinary school activities. It was found that by taking note of these demands for number operations, the child learned to count, to read and write numbers, to perform simple fundamental operations, and this in a most naïve concrete way. This gave him an excellent foundation for the abstract number work of the higher grades. Language work was treated in a similar way. Everything was taught with a view to the purpose it was to fulfil, and when the demand for it arose. The teaching of this formal side of education was made incidental to the child's development, but it was in no sense *accidental.*

As the child advances through the grades, gradually his intellectual life becomes more complex and there is possible a wider and wider separation of means and ends, and yet the child see the vital relation of means to end. For instance, the child will come to feel the need of learning abstract number operations and become interested in them, just because he does realize the value of them in his life. There comes a time, then, for the study of these "detached" spheres of knowledge. But the point is they must never become really detached. This is of vital importance.

This attempt is only a beginning, but it is believed that it is in the right direction. There is a strong tendency in modern education, especially in America, toward a saner method in education. The tendency toward the laboratory method is one indication of this movement. The child must have the means for the solution of his problems. These problems grow out of the child's contact with nature and the industrial processes by which man controls nature, and out of his relation to social institutions. As the child's real problems grow out of his practical experience, so must he find their answer in practical experience. On the industrial side he must have opportunity to study the products themselves and actually to perform processes of manufacture. In seeing, handling, doing, the child gets control of, and so understands, his environment. The laboratory method gives this opportunity.

Serious difficulties hinder the carrying out of this method of education. There must be a change in textbooks. Most books in use have been written from the social point of view; they lay stress upon information and upon authority. There must be books to which the child may go for information as he needs it, but not textbooks that profess to exhaust a subject, and that are put into the hands of the child for him to "learn." The child must study his problems first-hand. The textbook should be an aid to this study. Further, our school buildings must be planned differently. The memoritor-information idea seems to dominate school architects. The laboratory method, the study of material at first-hand, the working out of industrial processes, the possession of a "working" library to which the child may go as he needs information, all necessitate a radical change in school architecture. Above all, the school building must be a workshop provided with the necessary books, tools, and material.

The best methods of today point in the direction here suggested. The organization of the schools on a sound logical basis is the paramount problem that confronts education.

It is not forgotten that moral development is a fundamental consideration in education. Thought normally issues in practical conduct. But the purpose of this paper has been to point out the logical basis of education, not the ethical. That task is left to other hands.