

HOW WE THINK

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PREFACE

OUR schools are troubled with a multiplication of studies, each in turn having its own multiplication of materials and principles. Our teachers find their tasks made heavier in that they have come to deal with pupils individually and not merely in mass. Unless these steps in advance are to end in distraction, some clew of unity, some principle that makes for simplification, must be found. This book represents the conviction that the needed steadying and centralizing factor is found in adopting as the end of endeavor that attitude of mind, that habit of thought, which we call scientific. This scientific attitude of mind might, conceivably, be quite irrelevant to teaching children and youth. But this book also represents the conviction that such is not the case; that the native and unspoiled attitude of childhood, marked by ardent curiosity, fertile imagination, and love of experimental inquiry, is near, very near, to the attitude of the scientific mind. If these pages assist any to appreciate this kinship and to consider seriously how its recognition in educational practice would make for individual happiness and the reduction of social waste, the book will amply have served its purpose.

It is hardly necessary to enumerate the authors to whom I am indebted. My fundamental indebtedness is to my wife, by whom the ideas of this book were

inspired, and through whose work in connection with the Laboratory School, existing in Chicago between 1896 and 1903, the ideas attained such concreteness as comes from embodiment and testing in practice. It is a pleasure, also, to acknowledge indebtedness to the intelligence and sympathy of those who coöperated as teachers and supervisors in the conduct of that school, and especially to Mrs. Ella Flagg Young, then a colleague in the University, and now Superintendent of the Schools, of Chicago.

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HOW WE THINK

PART ONE: THE PROBLEM OF TRAINING THOUGHT

CHAPTER ONE

WHAT IS THOUGHT?

§ I. *Varied Senses of the Term*

No words are oftener on our lips than *thinking* and *thought*. So profuse and varied, indeed, is our use of these words that it is not easy to define just what we mean by them. The aim of this chapter is to find a single consistent meaning. Assistance may be had by considering some typical ways in which the terms are employed. In the first place *thought* is used broadly, not to say loosely. Everything that comes to mind, that "goes through our heads," is called a thought. To think of a thing is just to be conscious of it in any way whatsoever. Second, the term is restricted by excluding whatever is directly presented; we think (or think of) only such things as we do not directly see, hear, smell, or taste. Then, third, the meaning is further limited to beliefs that rest upon some kind of evidence or testimony. Of this third type, two kinds—or, rather, two degrees—must be discriminated. In some cases, a belief is accepted with slight or almost no attempt to state the grounds that support it. In other cases, the ground or basis for a belief is deliberately sought and its

Four senses
of thought,
from the
wider to the
limited

adequacy to support the belief examined. This process is called reflective thought; it alone is truly educative in value, and it forms, accordingly, the principal subject of this volume. We shall now briefly describe each of the four senses.

Chance and
idle thinking

I. In its loosest sense, thinking signifies everything that, as we say, is "in our heads" or that "goes through our minds." He who offers "a penny for your thoughts" does not expect to drive any great bargain. In calling the objects of his demand *thoughts*, he does not intend to ascribe to them dignity, consecutiveness, or truth. Any idle fancy, trivial recollection, or flitting impression will satisfy his demand. Daydreaming, building of castles in the air, that loose flux of casual and disconnected material that floats through our minds in relaxed moments are, in this random sense, *thinking*. More of our waking life than we should care to admit, even to ourselves, is likely to be whiled away in this inconsequential trifling with idle fancy and unsubstantial hope.

Reflective
thought is
consecutive,
not merely
a sequence

In this sense, silly folk and dullards *think*. The story is told of a man in slight repute for intelligence, who, desiring to be chosen selectman in his New England town, addressed a knot of neighbors in this wise: "I hear you don't believe I know enough to hold office. I wish you to understand that I am thinking about something or other most of the time." Now reflective thought is like this random coursing of things through the mind in that it consists of a succession of things thought of; but it is unlike, in that the mere chance occurrence of any chance "something or other" in an irregular sequence does not suffice. Reflection involves not simply a sequence of ideas, but a *consequence*—a consecutive ordering in such a way that

each determines the next as its proper outcome, while each in turn leans back on its predecessors. The successive portions of the reflective thought grow out of one another and support one another; they do not come and go in a medley. Each phase is a step from something to something — technically speaking, it is a term of thought. Each term leaves a deposit which is utilized in the next term. The stream or flow becomes a train, chain, or thread.

II. Even when thinking is used in a broad sense, it is usually restricted to matters not directly perceived: to what we do not see, smell, hear, or touch. We ask the man telling a story if he saw a certain incident happen, and his reply may be, "No, I only thought of it." A note of invention, as distinct from faithful record of observation, is present. Most important in this class are successions of imaginative incidents and episodes which, having a certain coherence, hanging together on a continuous thread, lie between kaleidoscopic flights of fancy and considerations deliberately employed to establish a conclusion. The imaginative stories poured forth by children possess all degrees of internal congruity; some are disjointed, some are articulated. When connected, they simulate reflective thought; indeed, they usually occur in minds of logical capacity. These imaginative enterprises often precede thinking of the close-knit type and prepare the way for it. But *they do not aim at knowledge, at belief about facts or in truths*; and thereby they are marked off from reflective thought even when they most resemble it. Those who express such thoughts do not expect credence, but rather credit for a well-constructed plot or a well-arranged climax. They produce good stories, not — unless by chance —

The restriction of *thinking* to what goes beyond direct observation

Reflective thought aims, however, at belief

knowledge. Such thoughts are an efflorescence of feeling; the enhancement of a mood or sentiment is their aim; congruity of emotion, their binding tie.

Thought
induces
belief in
two ways

III. In its next sense, thought denotes belief resting upon some basis, that is, real or supposed knowledge going beyond what is directly present. It is marked by *acceptance or rejection of something as reasonably probable or improbable*. This phase of thought, however, includes two such distinct types of belief that, even though their difference is strictly one of degree, not of kind, it becomes practically important to consider them separately. Some beliefs are accepted when their grounds have not themselves been considered, others are accepted because their grounds have been examined.

When we say, "Men used to think the world was flat," or, "I thought you went by the house," we express belief: something is accepted, held to, acquiesced in, or affirmed. But such thoughts may mean a supposition accepted without reference to its real grounds. These may be adequate, they may not; but their value with reference to the support they afford the belief has not been considered.

Such thoughts grow up unconsciously and without reference to the attainment of correct belief. They are picked up — we know not how. From obscure sources and by unnoticed channels they insinuate themselves into acceptance and become unconsciously a part of our mental furniture. Tradition, instruction, imitation — all of which depend upon authority in some form, or appeal to our own advantage, or fall in with a strong passion — are responsible for them. Such thoughts are prejudices, that is, prejudgments, not

judgments proper that rest upon a survey of evidence.¹

IV. Thoughts that result in belief have an importance attached to them which leads to reflective thought, to conscious inquiry into the nature, conditions, and bearings of the belief. To *think* of whales and camels in the clouds is to entertain ourselves with fancies, terminable at our pleasure, which do not lead to any belief in particular. But to think of the world as flat is to ascribe a quality to a real thing as its real property. This conclusion denotes a connection among things and hence is not, like imaginative thought, plastic to our mood. Belief in the world's flatness commits him who holds it to thinking in certain specific ways of other objects, such as the heavenly bodies, antipodes, the possibility of navigation. It prescribes to him actions in accordance with his conception of these objects.

Thinking in its best sense is that which considers the basis and consequences of beliefs

The consequences of a belief upon other beliefs and upon behavior may be so important, then, that men are forced to consider the grounds or reasons of their belief and its logical consequences. This means reflective thought — thought in its eulogistic and emphatic sense.

Men *thought* the world was flat until Columbus *thought* it to be round. The earlier thought was a belief held because men had not the energy or the courage to question what those about them accepted and taught, especially as it was suggested and seemingly confirmed by obvious sensible facts. The thought of Columbus was a *reasoned conclusion*. It marked the close of study into facts, of scrutiny and revision of evidence, of working out the implications of various hypotheses, and of

¹ This mode of thinking in its contrast with thoughtful inquiry receives special notice in the next chapter.

comparing these theoretical results with one another and with known facts. Because Columbus did not accept unhesitatingly the current traditional theory, because he doubted and inquired, he arrived at his thought. Skeptical of what, from long habit, seemed most certain, and credulous of what seemed impossible, he went on thinking until he could produce evidence for both his confidence and his disbelief. Even if his conclusion had finally turned out wrong, it would have been a different sort of belief from those it antagonized, because it was reached by a different method. *Active, persistent, and careful consideration of any belief or supposed form of knowledge in the light of the grounds that support it, and the further conclusions to which it tends, constitutes reflective thought.* Any one of the first three kinds of thought may elicit this type; but once begun, it is a conscious and voluntary effort to establish belief upon a firm basis of reasons.

Reflective
thought
defined

§ 2. *The Central Factor in Thinking*

There is a
common ele-
ment in all
types of
thought:

There are, however, no sharp lines of demarcation between the various operations just outlined. The problem of attaining correct habits of reflection would be much easier than it is, did not the different modes of thinking blend insensibly into one another. So far, we have considered rather extreme instances of each kind in order to get the field clearly before us. Let us now reverse this operation; let us consider a rudimentary case of thinking, lying between careful examination of evidence and a mere irresponsible stream of fancies. A man is walking on a warm day. The sky was clear the last time he observed it; but presently he notes, while occupied primarily with other things, that the air is cooler. It occurs to him that it is probably going to

rain ; looking up, he sees a dark cloud between him and the sun, and he then quickens his steps. What, if anything, in such a situation can be called thought? Neither the act of walking nor the noting of the cold is a thought. Walking is one direction of activity; looking and noting are other modes of activity. The likelihood that it will rain is, however, something *suggested*. The pedestrian *feels* the cold; he *thinks of* clouds and a coming shower.

So far there is the same sort of situation as when one looking at a cloud is reminded of a human figure and face. Thinking in both of these cases (the cases of belief and of fancy) involves a noted or perceived fact, followed by something else which is not observed but which is brought to mind, suggested by the thing seen. One reminds us, as we say, of the other. Side by side, however, with this factor of agreement in the two cases of suggestion is a factor of marked disagreement. We do not *believe* in the face suggested by the cloud; we do not consider at all the probability of its being a fact. There is no *reflective* thought. The danger of rain, on the contrary, presents itself to us as a genuine possibility — as a possible fact of the same nature as the observed coolness. Put differently, we do not regard the cloud as meaning or indicating a face, but merely as suggesting it, while we do consider that the coolness may mean rain. In the first case, seeing an object, we just happen, as we say, to think of something else; in the second, we consider the *possibility and nature of the connection between the object seen and the object suggested*. The seen thing is regarded as in some way *the ground or basis of belief* in the suggested thing; it possesses the quality of *evidence*.

*viz. sugges-
tion of some-
thing not
observed*

*But reflec-
tion involves
also the
relation of
signifying*

Various
synonymous
expressions
for the
function of
signifying

This function by which one thing signifies or indicates another, and thereby leads us to consider how far one may be regarded as warrant for belief in the other, is, then, the central factor in all reflective or distinctively intellectual thinking. By calling up various situations to which such terms as *signifies* and *indicates* apply, the student will best realize for himself the actual facts denoted by the words *reflective thought*. Synonyms for these terms are: points to, tells of, betokens, prognosticates, represents, stands for, implies.¹ We also say one thing portends another; is ominous of another, or a symptom of it, or a key to it, or (if the connection is quite obscure) that it gives a hint, clue, or intimation.

Reflection
and belief
on evidence

Reflection thus implies that something is believed in (or disbelieved in), not on its own direct account, but through something else which stands as witness, evidence, proof, voucher, warrant; that is, as *ground of belief*. At one time, rain is actually felt or directly experienced; at another time, we infer that it has rained from the looks of the grass and trees, or that it is going to rain because of the condition of the air or the state of the barometer. At one time, we see a man (or suppose we do) without any intermediary fact; at another time, we are not quite sure what we see, and hunt for accompanying facts that will serve as signs, indications, tokens of what is to be believed.

Thinking, for the purposes of this inquiry, is defined accordingly as *that operation in which present facts suggest other facts (or truths) in such a way as to induce be-*

¹ *Implies* is more often used when a principle or general truth brings about belief in some other truth; the other phrases are more frequently used to denote the cases in which one fact or event leads us to believe in something else.

lief in the latter upon the ground or warrant of the former. We do not put beliefs that rest simply on inference on the surest level of assurance. To say "I think so" implies that I do not as yet *know* so. The inferential belief may later be confirmed and come to stand as sure, but in itself it always has a certain element of supposition.

§ 3. *Elements in Reflective Thinking*

So much for the description of the more external and obvious aspects of the fact called *thinking*. Further consideration at once reveals certain subprocesses which are involved in every reflective operation. These are: (a) a state of perplexity, hesitation, doubt; and (b) an act of search or investigation directed toward bringing to light further facts which serve to corroborate or to nullify the suggested belief.

(a) In our illustration, the shock of coolness generated confusion and suspended belief, at least momentarily. Because it was unexpected, it was a shock or an interruption needing to be accounted for, identified, or placed. To say that the abrupt occurrence of the change of temperature constitutes a problem may sound forced and artificial; but if we are willing to extend the meaning of the word *problem* to whatever — no matter how slight and commonplace in character — perplexes and challenges the mind so that it makes belief at all uncertain, there is a genuine problem or question involved in this experience of sudden change.

The importance of uncertainty

(b) The turning of the head, the lifting of the eyes, the scanning of the heavens, are activities adapted to bring to recognition facts that will answer the question presented by the sudden coolness. The facts as they

and of inquiry in order to test

first presented themselves were perplexing; they suggested, however, clouds. The act of looking was an act to discover if this suggested explanation held good. It may again seem forced to speak of this looking, almost automatic, as an act of research or inquiry. But once more, if we are willing to generalize our conceptions of our mental operations to include the trivial and ordinary as well as the technical and recondite, there is no good reason for refusing to give such a title to the act of looking. The purport of this act of inquiry is to confirm or to refute the suggested belief. New facts are brought to perception, which either corroborate the idea that a change of weather is imminent, or negate it.

**Finding
one's way
an illustration
of
reflection**

Another instance, commonplace also, yet not quite so trivial, may enforce this lesson. A man traveling in an unfamiliar region comes to a branching of the roads. Having no sure knowledge to fall back upon, he is brought to a standstill of hesitation and suspense. Which road is right? And how shall perplexity be resolved? There are but two alternatives: he must either blindly and arbitrarily take his course, trusting to luck for the outcome, or he must discover grounds for the conclusion that a given road is right. Any attempt to decide the matter by thinking will involve inquiry into other facts, whether brought out by memory or by further observation, or by both. The perplexed wayfarer must carefully scrutinize what is before him and he must cudgel his memory. He looks for evidence that will support belief in favor of either of the roads — for evidence that will weight down one suggestion. He may climb a tree; he may go first in this direction, then in that, looking, in either case, for signs, clues,

indications. He wants something in the nature of a signboard or a map, and *his reflection is aimed at the discovery of facts that will serve this purpose.*

The above illustration may be generalized. Thinking begins in what may fairly enough be called a *forked-road* situation, a situation which is ambiguous, which presents a dilemma, which proposes alternatives. As long as our activity glides smoothly along from one thing to another, or as long as we permit our imagination to entertain fancies at pleasure, there is no call for reflection. Difficulty or obstruction in the way of reaching a belief brings us, however, to a pause. In the suspense of uncertainty, we metaphorically climb a tree; we try to find some standpoint from which we may survey additional facts and, getting a more commanding view of the situation, may decide how the facts stand related to one another.

Possible,
yet incom-
patible,
suggestions

Demand for the solution of a perplexity is the steadying and guiding factor in the entire process of reflection. Where there is no question of a problem to be solved or a difficulty to be surmounted, the course of suggestions flows on at random; we have the first type of thought described. If the stream of suggestions is controlled simply by their emotional congruity, their fitting agreeably into a single picture or story, we have the second type. But a question to be answered, an ambiguity to be resolved, sets up an end and holds the current of ideas to a definite channel. Every suggested conclusion is tested by its reference to this regulating end, by its pertinence to the problem in hand. This need of straightening out a perplexity also controls the kind of inquiry undertaken. A traveler whose end is the most beautiful path will look for other considerations and

Regulation
of thinking
by its
purpose