CHAPTER ONE

An Account of General Inquiry

Dewey's last and most famous statement on inquiry, which, for the purposes of this book, is synonymous with method comes in his late tour de force, *Logic: the Theory of Inquiry*.[2] There, he claims:

> Inquiry is the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent distinctions and relations as to convert the elements of the original situation into a unified whole. (LW 12 1938, p. 108)

Prior to this highly generalized conception of inquiry (which I shall discuss more fully momentarily) is the claim that,

> inquiry, in spite of the diverse subjects to which it applies, and the consequent diversity of its special techniques, has a common structure or pattern: that this common structure is applied both in common sense and science, although because of the nature of the problems with which they are concerned, the emphasis upon the factors involved varies widely in the two modes. (LW 12 1938, p. 105)

Further, Dewey tells us that,

> The search for the pattern of inquiry is, accordingly, not one instituted in the dark or at large. It is checked and controlled by the knowledge of the kinds of inquiry that have and that have not worked; methods which . . . can be so compared as to yield reasoned or rational conclusions. (LW 12 1938, p. 108)

Elsewhere and in a different context, Dewey writes:

> When it is understood that philosophic thinking is caught up in the actual course of events, having the office of guiding them towards a prosperous issue, problems will abundantly present themselves. Philosophy will not solve these problems; philosophy is vision, imagination, reflection—and these functions, apart from action, modify nothing and hence resolve nothing . . . Philosophy recovers itself when it ceases to be a device for dealing with the problems of philosophers and becomes a *method*, cultivated by philosophers, for dealing with the *problems of men*. (MW 10 1916–1917, p. 46. Italics mine)

What I urge is that we take these four statements of Dewey's, run them together, and take the final product to be inquiry. When we do this; when we run these four statements together, we get something like this:

1. Inquiry transforms problematic situations into understandable and manageable ones. When we inquire, we develop distinctions and relations out of the situation that allow us to see through problems.
2. Inquiry is inclusive of common sense and science, and has varying techniques, though there is a common structure (or pattern) to inquiry.
3. Past inquiries are (in part) the context for further inquiries. We use what we have already learned in present and future problem solving.
4. Inquiry helps to solve "the problems of men": inquiry helps solve social problems.

As I discuss inquiry, these are the senses I shall rely on. All inquiry is transformative; inquiry involves discriminating, analyzing, relating; inquiry takes place (in part) in the context of past inquiries, and inquiry is guided by the problems it aims to solve. We can take these broad points as what is common to inquiry regardless of the contexts in which it is used and developed. So for example, whether inquiry is used in a laboratory experiment undertaken in a grade 10 science classroom, or helping children to grasp a reading lesson in grade 3, these features or characteristics of inquiry will be present.

What I want to show in the rest of this chapter is how general method or inquiry, works. I will do this by examining three angles to inquiry: what inquiry consists in, or has as its features; where inquiry operates, or its

contexts; and the mechanics of inquiry; what makes it tick. Discussing the first of these angles involves noting which techniques, practices, attitudes, and tempers are required for inquiry; discussing the second of these involves noting the sorts of problems inquiry is called on to help solve; and discussing the third of these involves examining the logic of inquiry proper; how we form and handle conceptions, abstractions, propositions, and inferences.

OF WHAT DOES INQUIRY CONSIST

Perhaps the best statement on general inquiry in the context of education comes from Dewey's most famous work, *Democracy and Education*. Here, Dewey says,

> Such matters as knowledge of the past, of current technique, of materials, of the ways in which one's own best results are assured, supply the material for what may be called *general* method. There exists a cumulative body of fairly stable methods for reaching results, a body authorized by past experience and by intellectual analysis, which an individual ignores at his peril. (MW 9 1916, p. 177)

I want to discuss just what each of these matters amounts to. I begin with knowledge of the past. We can take this in several senses. The first sense might be knowledge of our individual immediate past. How have we handled problems in our own situations and circumstances? We often have a clue to our future problem-solving performances in our past attempts. The habits, if you will, of problem-solving tend to set in early and become reinforced, and as every educator knows, can be terribly difficult to break. One of the ways education can help head off the development of bad problem-solving habits is (characteristically enough) to help children develop good ones to begin with. Developed early on, these good problem-solving habits can then be used to develop further good habits.

The second sense of knowledge of the past is that knowledge is accumulated: that is to say, it is the combined knowledge of the group, classroom, school, community, nation, and culture. Accumulated knowledge is so not only by virtue of repositories of information but also so by virtue of oral customs and traditions, passed down from generation to generation in one's social group(s). Often, as the teachers of children, we are the ones that present this accumulated knowledge of the past. What we have learned is passed along to the next generation. This is not to say that education has its functions and purposes exhausted in transmitting traditions or knowledge; rather, one of the functions of education is to provide this.

The third sense of knowledge of the past is experimental and reconstructive. We chide those that teach by rote, and emphasize drills, memorization, and recitation over and against group work. We applaud discovery learning, and learning by doing. Why? One reason is that we believe that rote does not accomplish what it sets out to do: fashion students into critical thinkers. The question is of course, how do we fashion students to be critical and reflective thinkers? An often-heard answer is that we do so by having children actively engage in the subject matter at hand. A ready-to-hand example is the calculation of force in a physics experiment: the student actually works with materials, observes changes in distance, et cetera, and calculates the force involved. In other words, she experiments. Nevertheless, not only does she experiment, she reproduces and reconstructs. We can reproduce experiments that led to significant gains in scientific understanding. We can drop balls with Galileo, or learn how to use a manometer with Torricelli; we can see how difficult it would be for the early Americans to survive in the winter with little food and shelter by role-playing aspects of this. Reconstructive knowledge of the past involves investigating the problem-solving strategies of past peoples, to see where they went wrong, where they got it right, and how we can improve on their strategies. Reconstructive knowledge of the past takes the past and uses it in the context of the present.

Current technique is the next feature of general inquiry. When we think of techniques, we are to think of the ways and means we problem-solve. These ways, of course, differ depending upon the problem. One would not think of trying to solve a problem involving the angle of incidence of light hitting water by reading Shakespeare for insight; for the same reason, understanding the grammar of sentences is probably of little help to a student attempting to learn trigonometry. Mathematical methods are often called for in experimental science; seldom are they called for in literature classes. Likewise, techniques of character and plot analysis would be of little benefit in the physics classroom. The point is that there is an assemblage of built-up techniques, common to the various contexts that are used to problem solve in those contexts. What is general about inquiry across these contexts is that there are techniques that we draw on when we problem-solve and, for the most part, these are successful in aiding us in our goal. I discuss the situation in which they prove unacceptable further on in this chapter.

Some of the more common techniques are theories (how and why does the world operate the way it does?; how and why do we humans operate the way we do?; how can we categorize our findings about a subject-matter?). Others include mathematical methods designed to handle large amounts of data, or develop sophisticated means of relating disparate data. Still others involve observational and interpretative strategies (often of

use in the social sciences) such as empathy or 'putting oneself in another's shoes.' There is also textual analysis and interpretation (often of use in the humanities); logic; communication patterns and strategies, including the dissemination of scholarly literature; guidance and facilitation; and the list goes on. It is important to see these techniques as tools, as means to further the problem-solving process. They are not ends in themselves. Mathematics for example, developed out of and is used for problem-solving existential and social crises, and continues to be used this way, notwithstanding those scholar-mathematicians that delight in abstraction. The question of the role of abstraction in general inquiry is an important one, and I consider this further on in the chapter.

What counts as materials? The subject matter that inquiry has as its focus comes to mind first. We may say for example, that motion or Hamlet's indecision is the subject matter at hand. We can be more general or more specific, as the problem we are trying to solve, and the context calls for. Obviously, the materials involved in constructing a light experiment (track, ball, ruler, watch, etc.), and understanding Shakespeare (the play *Hamlet*, secondary sources, a performance, etc.), are different. But note that in both cases, materials are needed at various stages. Of course, we need to be able to experiment with motion, and this requires certain implements, but we also need to be able to measure the results, and these require other implements. Likewise, we need to be able to read *Hamlet*, and this requires access to the play. But we also need to be able to discuss *Hamlet*, and this requires a classroom, a teacher, other students, and perhaps secondary sources. In both cases, implements or as I shall call them, *tools*, are involved. These tools stretch from the material to the immaterial. If we consider our observations, measurements, and analyses, indeed, our thoughts, concepts, and behaviors as tools, we begin to see the manifold nature of materials.

Our own best results are assured by the successes of our inquiries: this seems circular. Is it not the case that best results are the successes of our inquiries? This is correct, until we qualify this through a definition of success. What counts as a successful solution to problems is the satisfaction (Dewey calls it a unified whole) that results. This is not to be taken as merely an emotional response, though it is inclusive of emotion. It is cognitive, behavioural, and affective. Further, it leads to future successes: we now have a method we can apply in different contexts to see if it solves these problems. If our method is sound, and we are able to adjust it accordingly, we may just develop from this a habit of inquiring that is made a routine feature of our general dispositions. This is what Dewey hopes formal education will do for children: provide them with opportunities such that they can develop the habits of inquiry so that they might then have strong and robust problem-solving dispositions.

There are two more characteristics of inquiry that are important to mention, though not dealt with in the above quotation of Dewey's. The first of these is the attitude or temper of inquiry; the second is self-correction. Dewey talks about attitudes in another famous work, *How We Think*. Here, Dewey says:

> Because of the importance of attitudes, ability to train thought is not achieved merely by knowledge of the best forms of thought. Possession of this information is no guarantee for ability to think well. Moreover, there are no set exercises in correct thinking whose repeated performance will cause one to be a good thinker. The information and the exercises are both of value. But no individual realizes their value except as he is personally animated by certain dominant attitudes in his own character . . . It is a matter of common notice that men who are expert thinkers in their own special fields adopt views on other matters without doing the inquiring that they know to be necessary for substantiating simpler facts that fall within their own specialties. (LW 8 1933, p. 135)

We may think of the high school physics teacher who has an (uninformed) opinion of immigration matters, let us say. She believes that immigration ought to be curtailed and certain people kept out of the country, a position based, not on her expertise but on personal opinion or on the opinion of others. The problem occurs when a noted authority takes a public position on an issue, without the requisite background in, and attitudes necessary for, fair and impartial inquiry. Likewise, a teacher who does not have the attitudes necessary for textual interpretation may use his or her authority to pronounce on some matter in literature. For example, let us say: "I don't see what good Shakespeare does anybody; why can't we just have children learn science?" Common to both of these scenarios is a lack of the proper attitude for inquiry in and for that context. As inquiry takes place in different contexts and calls upon differing techniques, materials, and tools (including thinking tools), it equally calls on attitudes congenial to different contexts. Some of these attitudes, as with techniques, are difficult to transpose from one context to another and recognizing this can forestall premature judgments of value.

The other notable conclusion Dewey draws in the above passage regards the role of character. Character is a necessary ingredient in inquiry. There is no guarantee that an English teacher will, because she possesses the skills, attitudes, and techniques for interpreting twentieth-century American literature, have the attitude for conducting chemistry experiments. There is certainly valuable information and techniques to be gained through practice,

as Dewey says. Moreover, some of these may even be transposable to other contexts. This transposition, however, is limited; but there is no substitute for information and exercise internal to one's context of inquiry.

The other important characteristic is self-correction. This means that inquiry has the capacity to adjust itself when its findings are not in accord with its hoped for or anticipated results, and a capacity to adjust itself to the contexts in which it is in and is used. As problems are the proper matter of inquiry, and these problems are very often social problems, it is the consequences of enacting the results of the inquiry that determine what way to go. Dewey provides support for this. For example, Dewey claims:

> Just as the validity of a proposition in discourse, or of conceptual material generally, cannot be determined short of the consequences to which its functional use gives rise, so the sufficient warrant of a judgment as a claimant to knowledge . . . cannot be determined apart from connection with a widening circle of consequences . . . Until agreement upon consequences is reached by those who reinstate the conditions set forth, the conclusions that are announced by an individual inquirer have the status of hypothesis, especially if the findings fail to agree with the general trend of already accepted results. (LW 13 1938, p. 484)

We cannot foreswear the consequences of the conclusions of judgments we make. If I conclude a student is malingering because she shows up to class fifteen minutes late, then I am setting in motion consequences for her, myself, and the class. Some of these consequences will prove to be relatively benign. It probably will not cause a great disruption if I recommence my lesson after a moment. However, the judgment I make may lead me to make other judgments, or commit to other actions that are not so benign. For example, I may alter my impression of the student and carry this alternation with me in subsequent evaluations. In a laboratory context, my conclusions may not be in accord with the conclusions of others, and as a result they may be invalid. Note that the justifiers for consequences anticipated are not the individual experimenters: it is the community of experimenters. The justification for what counts as consequences (as well as when the consequences are broached) is social. I shall discuss this in detail shortly.

THE CONTEXTS OF INQUIRY

Thus far, we have discussed that inquiry must be sensitive to the contexts in which it is found and used. We have maintained that inquiry must self-correct: Inquiry must consider what the consequences of a settled result will

be, and adjust itself accordingly. This means that, with the exception of some general features, inquiry will look quite different in different contexts. Indeed, though contexts are many, they are all contexts in which a potential problem arises. The seemingly limitless expanse of contexts makes inquiry across these a difficult undertaking, as inquiry is required to be sensitive to consequences in the particular context in which it is found and used, and to self-adjust accordingly. Many of the tools used in one context will not work in another, and to avoid difficulties requires deliberate and careful selection of techniques.

Fortunately, we are not frequently called upon to inquire deliberately and deeply into a manifold of contexts. There are several contexts, though, that Dewey thinks are important to inquire into, and that all citizens should have facility in. For the purposes of educating children, these are:

1. experimentation under and in laboratory conditions and contexts (science)
2. aesthetic contexts (art, music, and literature—making and doing)
3. interpersonal contexts (classmates, authority figures, friends, and relatives)
4. Public contexts (other citizens in a community, the larger community, and beyond).
5. Bodily-kinesthetic contexts involving awareness and psychomotor control

Schools have the responsibility and opportunity to facilitate the development of inquiry in each and all of these contexts. This is so because each and all of these contexts are necessary for the physical, emotional, intellectual, and social growth of the child. Sadly, administrative needs and misguided legislation often demand that the first context take precedent over the others; when this is done, it is at the cost of others. What often results is a narrow and truncated view of what counts as a legitimate problem, legitimate context, and legitimate tools and attitudes. One cannot simply transpose the techniques and methods of laboratory science onto, for example, problems of a public nature, and expect the appropriate consequences to ensue. While experimenting on the capacity of acids to damage foliage in a classroom yields potentially valuable information, it does not produce valid consequences for nonlaboratory settings. One must develop new problem-finding and solving techniques and methods, and continue to work in the context of problems of a public nature for this to occur.

I discuss each of these contexts briefly, and spend much more time with all of these in subsequent chapters. Here, I provide a rough summary of what the tools and techniques in each of these might look like, and what sorts of consequences inquiry aims for in using these. To begin with, laboratory science of the sort practiced in physics, chemistry, and biology classes, aims at precision and the accuracy of measured findings. Often these findings are data—measurable changes in phenomena studied. The tools for being able to measure changes in phenomena are varied, but at some level, mathematics is necessary to gather and organize the data into a quantified statement, easily reproducible and understood by others. As well, tools to manipulate the environment to effect desired changes in phenomena are required. These can be anything from balls and inclines to a supercollider. Most importantly, but often neglected, are the frameworks, theories, and conceptions generated in and through laboratory science. Helping a biology student to understand homeostais is not to help a student to an easily identifiable or measurable bit of data; it is to teach a student to understand the functions of a living organism in such a way that she can make sense of disparate phenomena and changes in physiology. Homeostasis functions as a model of disparate events.

Aesthetic concerns are another neglected context of inquiry. This is sad, particularly because helping a child to reach aesthetic fulfillment and satisfaction is a sure way to encourage further inquiry and the development of good dispositions. What we mean by aesthetic is, for my purposes, construed as experiential. To say aesthetic, then, is to say that one has a certain sort or quality of experience, a highly satisfactory experience. The sort of aha moment, when a student gets it, would qualify as aesthetic. Teachers also have these moments: A particularly successful class is one wherein the students grasp a difficult lesson or concept. Moments such as these are often what carry us forward in our teaching practices. Dewey often connects aesthetic inquiry to making and doing: art, music, building, designing, and developing. But it need not be confined to these alone. Reflection can be equally aesthetic. What makes something aesthetic as opposed to humdrum is the quality of the experience had.

Interpersonal concerns are also neglected, though much educational literature has seen the need for attention to these.[3] It does no good to promote experimental inquiry and at the same time neglect to help students develop the interpersonal skills needed to solve complex problems—problems that simply cannot be solved by isolated individuals. The skills needed to solve complex problems in interpersonal settings cannot be transposed with facility. The image of a solitary scientist alone, working furiously through the night in his laboratory is quaint, but misleading. Scientists test their work not only in the laboratory, but in trade journals, and this requires a

community of scholars. Furthermore, laboratory science cannot take place without a cadre of administrators, students, assistants, and apprentices. More generally, it stands to reason that, if we want to solve social problems, then we cannot do so in isolation from one another. Social problems demand social solutions, and these solutions are premised on the capacity for groups that have the problem to come together to solve the problem. Inquiry in these contexts must focus on the skills of communication, dialogue, and the development of a shared and sympathetic set of sentiments toward others. Large projects, exacting laboratory experiments, and sport strategies are often done in groups, not simply for the sake of efficiency, but for the creative, imaginative, and critical resources others provide.

Issues of public concern ought to be at the forefront of inquiry. I say this because we often claim that we want the public to be informed and educated about problems (for this is a large part of what democracy consists in), but equally because inquiry has more success if it is done in a public, open, manner, rather than in isolation or behind the scenes. I also add that what goes for interpersonal problems goes for public ones as well: Public problems demand public solutions. When we teach students about citizenship, human rights, civics, law and government, and the historical treatment of immigrants and the poor, for example, we do so because we want students to see that the problems generated in each of these areas are problems common to us all. If we want citizens who inquire publicly (and Dewey does), then we must help them develop the attitudes and techniques of public inquiry. Some of these are coeval with inquiry in interpersonal contexts—communication, dialogue, and a shared and sympathetic set of attitudes toward those who cannot effectively solve their problems. But an understanding of the procedural and administrative facets of democracies (in the context of Europe, North America, and other Western, liberal nations), their histories and past problems, and the means of alleviating these problems, will also be required.

One of the great tragedies of public education (at least in North America) is the ongoing relegation of physical education to the periphery. This is tragic, particularly considering the health issues we currently face. Developing bodily-kinesthetic habits is a task every bit as demanding and time-consuming as developing the habits of aesthetic or scientific inquiry, and every bit as important. Inquiry is as pervasive in the former context as it is in the latter two. If anything, inquiry is more difficult, because there is seldom time to linger over possible consequences. Movement demands immediate attention and action, and the wrong movement portends injury. The benefits of bodily-kinesthetic inquiry are manifold: healthy bodies; satisfying experiences; collegial relations (team sports, clubs, outings); and increased alertness for more traditionally intellectual modes of life.

HOW THE LOGIC OF INQUIRY OPERATES

Thus far, we have discussed the nature of inquiry, the techniques and tools of inquiry, and the contexts of inquiry. Here, I want to focus on the guts of inquiry—the logic that inquiry uses from the beginning to the end of problem-solving. This logic will differ depending upon the contexts, but what I present here can generally be found in inquiry operating in any context. By logic, I do not mean the formal logic often taught in college courses for math credit. Dewey's understanding of logic is not solely mathematical. In fact, Dewey thinks that the mathematicization of logic has prevented otherwise intelligent practitioners from seeing the contexts in which logic takes place, and even more importantly, the point of logic. Logic is a means to solve problems; not an intellectual end in itself. Dewey thinks that logicians often forget that logic's primary function is to settle situations. I draw from Dewey's, *Logic: the Theory of Inquiry*.

We begin the path of inquiry when we are confronted with an indeterminate situation (LW 13 1938, p. 109). We do not grasp a particular bit of a situation and label that indeterminate—Dewey is quite clear about this. Rather, the situation in its entirety is what is indeterminate: Indeterminacy is a synonym for doubt; the sort of doubt that philosopher Charles S. Peirce once called an irritation. An irritation prompts us to scratch. Likewise, indeterminacy compels us to look for a settlement. An indeterminate situation is not yet inquiry though, only when

> existential consequences are anticipated; when environing conditions are examined with reference to their potentialities; and when responsive activities are selected and ordered with reference to actualization of some of the potentialities, rather than others, in a "final existential situation," is inquiry properly speaking, begun. (LW 13 1938, p. 111)

When we anticipate consequences, we try to think ahead to what they will accomplish. We think of manipulating our environments to effect a potential improvement. We contemplate what the actualization of this manipulation will accomplish. When we have a deliberate focus, we are in a position to say that there is a problem. Another way to put this is to say that problem finding is prior to problem solving. The indeterminate situation is just that; a situation. It is not yet a problem until a judgment that a situation is problematic, occurs (LW 13 1938, p. 111–12). The task now is to judge the right problem—that is to say, to determine that the problem is, in fact, in concert with the indeterminate situation. Much of our time and energy is wasted in labelling an existential situation improperly: we

judge the wrong problem to be the case. The classic educational example concerns a child's performance on a test: did the child do poorly because she is unprepared, or because she did not sleep sufficiently well last night? Only investigation will result in a determination. We would be judging the wrong problem if we did not collect enough information to label the existential situation properly. Because the conception of the problem determines what consequences we will entertain, we have the potential to do damage and waste time and resources if the initial judgment is faulty. Likewise, to set up a problem where no problem exists is an exercise in futility.

The important concern here is that the problem is to be a genuine one—that it reflects the indeterminate situation out of which it develops. Genuine problems tie directly to the indeterminate situation and have consequences that follow (though not always directly) from the judgment. My favourite educational example of the development of a nongenuine problem is the recent return of the high-stakes testing movement in the United States. In this case, it developed in response to perceived differences in academic performance across the globe. Rather than questioning whether there was a problem with differences in test scores that made a difference to students or teachers, legislators and government officials presented the public with both a problem and its solution—curiously enough, more testing of children, the very practice that had sparked the problem in the first place! Instead of a genuine problem, the public of the United States was provided with an illusory one. Sadly, Canada (at least Ontario) seems to be marching headlong into the same battlefield.

Once a problem has been identified, a solution or set of solutions is anticipated. This requires finding what Dewey calls definite constituents, constituents of a situation that are settled (LW 13 1938, p. 112). Another way to put this is that we must find settled, existential (real) traits. We generally do this through observation and/or measurement. What counts as a solution to the problem, then, will be some improvement in the situation, notable through observed changes in traits. In other words (and this is the important conclusion to draw), solutions to problems are existential. In the context of education, that usually means an improvement in behaviour, or performance on evaluations, or a change in the self-report of a student (for the better). Along the way, more subtle improvements may occur, and it is important that these be picked up on.

There is of course, a role for ideas: ideas are the anticipated consequences that will then be carried out in practice (LW 13 1938, p. 113). An idea is a possibility. As we move further along the path of inquiry, some ideas are jettisoned, others are kept and strengthened. Ideas differ according to their consequences. What counts as a good idea is the instrumental force of the consequences it bears out. At the level of ideas, however, what counts

as consequences is not existential: it is anticipated to have the preferred existential import, but this evaluative undertaking has not yet happened. What counts as a consequence for ideas is how well they hook onto each other, how well they relate to each other such that a coherent model or framework is constructed (LW 13 1938, p. 115). Depending on the context in which the ideas are formed and tested, these may be of a more or less abstract nature. Consider the abstraction of Einstein's theory of general relativity versus Newton's: we can see Newton's theory of motion at work in a way we cannot with Einstein. The subject matter at hand plays a large role in determining this: sometimes high degrees of abstraction are required to solve the problem at hand.

Ideas that pan out are those that (circularly) are meaningfully related to one another. The next step is to see whether or not these ideas can be operationalized. To operationalize an idea is to test it out in an existential situation—the situation that we determine is a problem. This is what we commonly refer to as experimentation.

> Ideas are operational in that they instigate and direct further operations of observation; they are proposals and plans for acting upon existing conditions to bring new facts to light and to organize all the selected facts into a coherent whole. (LW 13 1938, p. 116)

Some ideas are operationalized when they lead to other, further operations that terminate in an existential change. A student confronting a difficult passage in Shakespeare's *Julius Caesar* may require additional ideas beyond those already developed in the context of the classroom if he is to write a successful paper. He may wish to investigate, for example, the history of the Roman Republic to get some indication of what was at stake in Caesar declaring himself, emperor. He will formulate an idea of Roman government that leads him to another idea—perhaps a set of purported reasons for Caesar's murder. He can develop these in the context of his paper.

Some ideas lead directly to an existential change. Consider the following examples. In a grade 5 classroom, a teacher wishes to have students understand homonyms. An explanation is given: homonyms are words that sound the same, but are spelled differently. The child takes this rule and works through existential situations, actually identifying homonyms correctly. This is a fairly simple and direct example. Consider a more complicated one. A grade 12-advanced chemistry teacher attempts to explain the concept of angular momentum. Because this deals with wave mechanics—a postulated, indirectly measurable, but nevertheless nonobservational attempt at understanding how smaller particles move in orbit around larger ones—the idea of

angular momentum can only be connected to the idea of wave mechanics, which in turn is connected to the idea of quantum mechanics, which is in turn connected to the idea of subatomic particles; atomic particles and so on. Note that measurement here is at best indirect: there is no directly observable particle for the student to note. She must see that the idea makes sense in the context of other, meaningful ideas, and that this idea has its consequence in capturing a better sense of what is going on than another idea (say, the movement of subparticulate matter as God's plan) might.

Let's spend a bit of time looking closely at what counts as an idea. Dewey tells us that ideas are meaningful relations. These are thought-relations, relations that are born out of the circumstances of reflecting on anticipated consequences and the means to obtain them. Dewey distinguishes between two relations: conceptions and propositions. I discuss propositions first. When we make a statement or a sentence, we are making a proposition. It is raining, or the snow is white, or Johnny cannot read, are all propositions. What makes these propositions is that they are statements of what we believe to be the case. These are statements to be tested existentially; that is, concretely. We can ask: Is it the case that Johnny cannot read? How would we know? We must test this proposition. When we make propositions in inquiry, we make claims about what is in fact the case. We can call these existential propositions or, as Dewey sometimes does, generic propositions.

Existential or generic propositions are often propositions of classes or kinds. We use these to sort, order, and classify existential traits, data, phenomena et cetera. Take the example of a high school biology class in which students learn to classify various members of the animal kingdom under a rule. What constitutes a human being? What distinguishes a human being from some other animal? What, in short, is a defining characteristic of a human being? Propositions of these sorts are often of the all-some variety. For example: All human beings have opposable thumbs. John has opposable thumbs. John is a human being.

We can construct this logical statement precisely because we can classify those having opposable thumbs as human beings. The inability to do this would jeopardize the conclusion that John is, indeed, a member of this class.

Let's consider an example from English literature: Hamlet is an adult male. Hamlet loves and wants to marry his mother. Adult males want to marry their mothers. This second proposition is demonstrably false. It hinges on the conclusion that, because Hamlet wants to marry his mother and Hamlet is an adult male, all adult males wish to marry their mothers. As an existential proposition (and contra Ernest Jones), this generic proposition fails.

Existential propositions do not occur in a vacuum. Where does the license to form a generic proposition come from in the first place? The

answer is a conception. Think of a conception as a rule that states, if such and such occurs, then this and that will follow, or whenever Johnny does behaviour X, he gets in trouble. When we make a conception, we are making what Dewey calls a universal—a rule that claims that something just *is* the case, given certain specifying conditions. It is under these rules that generic propositions operate. We can say, for example, that Johnny cannot read, because we have the prior conception that, if Johnny hasn't eaten his breakfast, he will not concentrate on his reading. Given that Johnny has not had breakfast this morning, the existential proposition, Johnny cannot read, follows. The question that remains is, can Johnny read otherwise than this?

Of course, conceptions are often much more complex than this. Philosophical conceptions, in particular, are notorious for being abstract and difficult to operationalize. Consider the concepts of humanity or dignity; these are frequently mentioned ideas in social science classes on civics or law and government. What gives these concepts the authority to operate? The reason they function is that many different generic or existential propositions can comfortably fit under them, or work with them. The conception, humanity, has done a lot for concrete changes in peoples' lives. This is the cash value, so to speak, of this conception. It has led to existential propositions that provide us with ways to develop better living conditions for human beings. What gives abstract conceptions their operational strength is their ability to generate workable existential propositions that have a tangible effect on human conduct.

Consider the following: Natural Selection better helps us account for the variety of species than does the notion of fixed kinds.

Current, yet misleading controversies regarding science and religion to the contrary, Natural Selection is a working solution precisely because it has allowed us to develop generic propositions that really do help us understand better, why and how a species might come into being. We not only have the capacity to theorize about our primate heritage, we can usefully locate and organize our ancestors. The conception of fixed kinds from the beginning of time cannot help at all, because it denies that coming to be is possible. Here is another example: The understanding of the social context of Elizabethan life better helps us to understand Shakespeare's writing of *Hamlet* than Freud's *Oedipal Complex*.

This former conception does more for us, allowing us to generate more and better generic propositions, than the latter. From a study of the social context, we can determine what education Shakespeare might have had, what influences were prominent, and what the general intellectual milieu was. The latter conception gives us very little leeway in the manner of anticipated consequences, because it restricts our investigation to a

predetermined understanding of the play. Such a conception can only arise after a thorough examination of the context has taken place.

Once inquiry has established a set of anticipated consequences and successfully shown that these are the fact of the matter for an inquirer or inquirers, it is tested by others. Until this testing occurs, the anticipated consequences are merely hypotheses. Frequent testing of inquiry over lengthy spans of time tends to generate common sense facts of the matter. The existential import of inquiry is played up, and the manner in which inquiry arrived at the conclusions it did, are played down. Often, common sense is habituated: we develop a stock of habits that we use in solving day-to-day problems and in our interactions with others. We have and use the dispositions to treat certain situations in a certain way, and, for the most part, we are successful. What distinguishes scientific inquiry from common sense is the role of ideas. Scientific inquiry operates largely at the level of abstract reasoning and ideas: common sense operates at the level of the concrete (LW 13 1938, p. 119).

What of the self-corrective aspect? How does inquiry adjust in situations wherein anticipated consequences don't pan out? It is helpful to see inquiry as loosely circular, or spiral, here. Inquiry begins and ends in situations. Indeterminate and (later) problematic situations are the beginnings of an inquiry: A satisfactory situation is the end of an inquiry. An inquiry then, is a whole with its beginnings and endings in a situation. What occurs between the beginning and the end is adjustment. We make adjustments to our judgment of what constitutes the problem; we make adjustments to our conceptions and generic propositions; we make adjustments in the way we modify the environment and the tools we use to do so. What counts as a successful inquiry is a satisfactory or settled situation, and until this is accomplished, inquiry self-corrects. If I am having difficulty understanding a passage in a text, I need to identify the specific problem, develop anticipated routes to successful understanding, and evaluate these. I also need to evaluate the methods I am using to help me understanding the text. If, for example, I am using a set of techniques that are unhelpful (I am reading the passage over and over again, with no better understanding taking place), then I need to change or develop new methods. My generic proposition; I will read and read again until understanding take place, is faulty. Perhaps I need to consult a dictionary of Elizabethan terms.

Universal conceptions and general propositions self-correct. A conception is only as good as the meaningful relations it generates. If it doesn't hook together well with other meanings and other ideas, then it probably isn't very helpful. Beyond this, conceptions have their operational nature bound up in the generic propositions that evolve from them. If the generic propositions don't pan out; if the proposition, that I should do this to obtain this or that effect, does not succeed, either the generic proposition itself

is faulty, or the conception that instantiates the proposition is. Repeated failures of a generic proposition should alert the inquirer to the strong possibility that the original conception is faulty. This necessitates returning to the problem in question, reframing it, and developing new conceptions and anticipated consequences.

CONFLICTS AND DOUBTS REGARDING INQUIRY

Despite the self-correcting nature of inquiry, many who have read Dewey have and continue to have doubts regarding the overall plausibility of the theory. The first concern is that Dewey leaves little room for emotion and imagination in his theory of inquiry.[4] The criticism boils down to the fact that experimentation, rather than the affective traits of humans, dictates what will count as a successful inquiry. A related concern is that inquiry denigrates or downplays, abstract thinking.[5] Many critics of progressive education latch onto this as the central reason for the demise of American education. Finally, there is the concern that the self-correcting nature of inquiry is too lenient on what counts as hard facts and truths: that facts of the matter have more force and depth than Dewey's theory of inquiry gives credit for.[6] I discuss each of these in turn.

The first concern that Dewey leaves little room for emotion and imagination in his theory of inquiry has generated a number of sophisticated responses. One has been to play up the aesthetic and qualitative nature of inquiry, particular in contexts of art. Here what is important is the satisfaction of the experience rather than the particular techniques and methods. What inquiry aims for; the unified whole, is what is given priority. Another has been to stress Dewey's notion of deliberative rehearsal—a notion he develops in *How We Think* (LW 8 1933, p. 187–88). Here, one of the central features of inquiry is to imagine anticipated consequences to the tentative solutions to the problem at hand. Yet another has been to suggest that inquiry does not separate emotion and imagination from the contexts in which they occur: rather, it orders and controls responses so that richer and more deeply felt emotions could surface. Only on a dichotomous approach to inquiry, where hard facts are stressed to the detriment of other traits, is the denigration of imagination and emotion a problem. All of these solutions are correct.

The second concern, that Dewey downplays abstract thinking, is easily dealt with once we realize that conceptions are required for the various existential propositions to function. What authors are usually getting at when they criticize Dewey for denigrating abstract thought, though, is the tentative nature that Dewey assigns conceptions and propositions; the abstract thoughts that Dewey supposedly endorses are tentative because they are dependent on their operational status. The abstract thoughts that

these critics have in mind are often timeless truths or metaphysical states of affairs. They endorse just what Dewey does not: a realm of fixed ideas or notions. Rather than begging the question of who is right, those who are metaphysically inclined towards fixed truths, absolute principles or laws, and certainty regarding the findings of science and knowledge, will not be satisfied by any response Dewey's theory of inquiry might provide. Likewise, proponents of Dewey's theory of inquiry will always be suspicious of attempts to fix, once and for all, ideas, notions, and concepts.

The third concern is Dewey's supposed lack of ability to pronounce on hard facts or truths of the matter. This is correct. What counts as truth for Dewey is very different from a correspondence theory of truth common to early Enlightenment thinkers and early twentieth-century empiricists. Dewey prefers the term "warranted assertibility" over truth, because truth contains too much baggage for us to be able to work with it satisfactorily (LW 13 1938, pp. 15, 17). The settled results of inquiry (and this includes conceptions and propositions) are always potentially subject to modification or even outright dismissal. When we point to the world and say that does not change or that is the fact of the matter, Dewey would agree with us. But this does not change the point Dewey is making, that facts of the matter are potentially subject to change under varied conditions, and these conditions are occasioned by the problems we face. Nevertheless, this does not change the fact that to hold something as tentative, rather than for all time, is not, despite some critics' concerns, to put the world in peril, at least, not all at once, as William James famously opined.

CONCLUSION

Let us put it all together. Inquiry begins with an indeterminate situation. An indeterminate situation is unsettling, as Dewey maintains. Active investigation into an indeterminate situation begins and a judgment that this constitutes a genuine problem follows. The development of anticipatory consequences, that portend a satisfying solution, is undertaken. This involves two sorts of ideas. The first is conceptions. These are often abstract, and only indirectly relate to the existential traits that fulfill the requirements of a satisfactory solution. They have their worth in how well they relate to other ideas, and how well they produce newer and better meanings and general propositions. The other sort of idea is a generic or existential proposition. These tell us what will happen when we act. If our conceptions are correct, these propositions will often bear fruit. If not, we may need to devise new generic propositions, or revise our conceptions. The aim in all of this is to reach a settled, determinate situation—a satisfying solution to the problem at hand.