

TOWARDS INQUIRY BASED EDUCATION

by

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THESIS ABSTRACT

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While John Dewey's work on the philosophy of education provides a robust descriptive account of educational experience, it does not provide anything like a critical system for the analysis of particular educational curricula. This lack has led to a common confusion with regard to the nature of an inquiry based education: inquiry too often becomes the content, rather than the method, of education. In this thesis, I will show how Dewey's analysis of educational experience can provide grounds for a critical apparatus that might be applied to any curriculum, though especially those founded upon the process of inquiry. This critical approach will be applied to an example case, the "ice hands" activity from Douglass Llewellyn's *Inquire Within*, demonstrating the gap that often exists between the process of inquiry as a description of the process of learning and the process of inquiry as the content of a lesson plan.

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for my mother, who was my first school
for my father, who taught me I was free
and for Maggie, who shares the world with me

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CHAPTER I

INTRODUCTION

Contemporary calls for educational reform have good reason to draw on the resources of John Dewey's philosophy of education as one part of a comprehensive re-evaluation of pedagogical practice. However, while Dewey provides a robust descriptive account of educational experience, he does not provide anything like a critical system for the analysis of particular educational organizations. This lack has led to a common confusion with regard to the nature of an inquiry-based education: inquiry too often becomes the content, rather than the method, of the education. In this thesis, I will show how Dewey's analysis of educational experience can provide the ground for a critical apparatus that might be applied to any curriculum, though especially those that aim to found themselves on the process of inquiry. This critical approach will be applied to an example case, the ice hands activity from Douglass Llewlynn's *Inquire Within*, demonstrating the gap that often exists between the process of inquiry as a description of the process of learning and the process of inquiry as the content of a lesson plan..

The first chapter consists mainly of an analysis of the key concepts that make up Dewey's notion of educational experience as an experience that produces *growth*. Dewey tells a robust story of just how learning takes place, but that story is spread through a number of Dewey's works, including *Human Nature and Conduct*, *Experience and Nature*, *Democracy and Education*, *Experience and Education*, *How We Think*, *Art as Experience*, *et al.* The first chapter brings together pieces of this puzzle to provide a

coherent picture of just what a Deweyan picture of educational experience amounts to through an analysis of the necessary components of growth. While continuity and interaction make up Dewey's sparse explanation of experience in *Education and Experience*, the full picture of educational experience, as *an experience*, must include an account of the organism/environment system, the relationship between impulse and habit, ends-in-view, the occurrence of problematic situations, the pattern of inquiry in response to problems, and finally growth as the outcome of a problem resolved. The tight connections between these notions makes a simple explication of any one of them alone impossible, though the ongoing debates surrounding Dewey's notion of *growth* suggest that an analysis that centers on that concept would be of great value.

With this picture sketched out, the second chapter consists of the construction of the critical apparatus itself, in this case a set of concepts used to look for the interruptive moments that take place within educational practice, thereby initiating the inquiry that leads towards growth. Dewey's theory of education is purposefully open ended: there is much that cannot be specified in advance as a result of the concern for the particular environmental and personal circumstances that make up the educational experience. However, it is possible to use Dewey's concepts as a lens to help us make judgments of a given approach to education based on whether that approach will produce beneficial growth. The work here will be to turn Dewey's descriptive analysis of educational experience into a tool for analyzing particular educational practices. This will necessarily make heavy use of the concepts outlined in the first part, particularly with regard to the intimate connections between ends-in-view and problematic situations.

In the third chapter, the critical apparatus will be applied to the example case: the ice hands activity from Douglass Llewellyn's *Inquire Within*. Llewellyn's work has been chosen for its innocuousness before anything else. The ice hands activity that he uses as a paradigm example in his book intended to introduce teachers to the inquiry-based method of education is not in any obvious way unusual for the field. This chapter consists first of an account of that activity broken down into the steps that Llewellyn sets up as the schema for any inquiry based activity, and then secondly the application of the critical apparatus built in chapter two. With the completion of this chapter, the demonstration of the thesis is itself complete: the apparatus built from the foundation of Dewey's account of educational experience uncovers a gap separating the intended consequences of the ice hands activity from potential unintended consequences, and suggests ways in which that activity could be improved to further avoid such consequences.

The final chapter then aims to examine to what extent the work accomplished in the previous chapters is applicable to other cases, to what degree the results obtained might be generalized, as it were. This requires a probing into the level of abstraction made use of to accomplish that work, as well as a brief look at a secondary example that is shown to parallel Llewellyn's ice hands in key ways. It is only there then that we might examine the gravity of the current indeterminate situations facing educators today and the relation our work here might bear to those problems.

As a final note, it must be said that this work in its current form would not have been possible without the use of the Intalex Past Masters digital edition of the 2nd release of

Dewey's collected works. While many other resources, be they pulp, silicone or flesh and blood, made vital contributions, the impact of the technological intervention that is the Past Masters series has left a visible mark on the style of the first and final chapters, and has transformed the entire process of the work into a cybernetic affair. What follows is not the result of human effort, neither singular nor plural, nor the automated result of pure machinery, but a cyborg product that announces itself as such. The tools that were utilized in the creation of the piece are of such a kind as to have made something that could not have been made without them.

Within the body of the text, the numerous references to *The Collected Works of John Dewey* make use of a simple three part system: ([M for Middle or L for Later]W, Vol. [x], pp.[y]).

Whatever the cyborg process has produced though, it remains to be seen in just what way the world is shaking, and in what way the seismic waves will reshape the educational institutions that now stand, how they will bend or wrinkle, whether they will hold firm or collapse and be swept away. One cannot know in advance, and one can only prepare so much. Earth shakes, we must respond.

CHAPTER II

GROWTH AS THE KEY CRITERION OF EDUCATIONAL EXPERIENCE

Educative Experience Produces Growth

A philosophy of education, like any theory, has to be stated in words, in symbols. But so far as it is more than verbal it is a plan for conducting education. Like any plan, it must be framed with reference to what is to be done and how it is to be done. The more definitely and sincerely it is held that education is a development within, by, and for experience, the more important it is that there shall be clear conceptions of what experience is. (LW Vol.13 pp.13)

John Dewey's call to bring the philosophy of education into harmony with the clearest conceptions of experience brings along with it a demand for a clear conception of just what makes a given experience educational. What is it that makes any given experience, in the first place, an experience where learning takes place, and then, in addition, an experience that makes future experiences more likely to be educational?

While there are, and will remain, difficulties inherent in constructing anything like a complete theory of experience, there is at least some degree of consensus among those who follow Dewey about the criteria that will class some experiences as educational and mark others as being distinctively outside of that category: educational experiences result in growth, particularly growth that encourages future growth. Dewey himself was clear enough about this in *Democracy and Education*: "It is a commonplace to say that education should not cease when one leaves school. The point of this commonplace is

that the purpose of school education is to insure the continuance of education by organizing the powers that insure growth.” (MW Vol.9 pp.56) So far as growth is insured, it will continue its process; the school education should promote growth in such a way as to allow that growth to continue outside of the school.

If educational experiences are merely those that result in some degree of growth, without Dewey’s further caveat that such growth should make possible further growth, there is some worry that growth will lead down the wrong sorts of paths, that education and mis-education will be impossible to disentangle. “Any experience is mis-educative that has the effect of arresting or distorting the growth of further experience.” (LW Vol.13 pp.11) This is the importance of the repetition of growth: educational experience results in growth that results in growth, mis-educational experience results in growth that block off further growth. Dewey elaborates, in an oft-cited passage:

That a man may grow in efficiency as a burglar, as a gangster, or as a corrupt politician, cannot be doubted. But from the standpoint of growth as education and education as growth the question is whether growth in this direction promotes or retards growth in general. Does this form of growth create conditions for further growth, or does it set up conditions that shut off the person who has grown in this particular direction from the occasions, stimuli, and opportunities for continuing growth in new directions? What is the effect of growth in a special direction upon the attitudes and habits which alone open up avenues for development in other lines? (LW Vol.13 pp.19)

This notion of recursive, self-sustaining growth that is the mark of educational experience has survived Dewey well. While it may not always retain its complete structure, we find the concept of growth near the center of thought on education throughout the discourse. The general sentiment seems to be that, “We know, fundamentally, that education is about change and growth” (Allsup 2007). It is used, for example, to argue for the inclusion of art in the curriculum, “The individual's growth results in the assimilation of new meanings; this factor enriches the individual personality. Aesthetics is one aspect of this growth” (Spitzer 1965). The notion of growth as an intrinsic good, something akin to (but not to be identified with) an end-in-itself is intuitively agreeable; it is difficult to imagine an argument against the proposition, “that which promotes growth is good.”

Often it seems that Dewey’s notion of growth is so self-sufficient that one need only repeat Dewey in order to make use of it,

Democracy and education, more over, serve to reinforce the same self-renewing ethos: “The object and reward of learning is the continued capacity for growth.”

The object and reward of freedom and self-governance is also the continued capacity for growth. This “continued capacity for growth” underlies and sustains the relationship between education and experience and democracy. (Garrison 2003)

Growth serves here as a kind of foundational concept, one that remains largely analyzed. The almost tautological relationship between growth and goodness means that once a connection can be made to growth, we can rest assured that we are on the right trail. So long, of course, as the growth we are headed towards will also lead us to more growth.

Breault writes “Dewey warned that it is not sufficient to talk simply of growth as the result of activity. We must, instead, ‘specify the direction in which growth takes place’” (Breault 2005) Perhaps the recursive structure of growth is enough of a guarantee of its goodness, though some authors have worried otherwise. Naoto Saito, for example, maintains “Growth for more growth is the end of education.” (Saito 2000), but points out that growth towards growth may not yet be enough to make sense of the concept of growth: the common form of critique seems to be, “growth towards what?” Saito observes that Dewey’s contemporaries Ivan Kandel and Boyd Bode challenged the idea of growth. Kandel would argue that Dewey’s child-centered model of education promoted, “the development of individualistic children without any sense of direction, responsibility, or ideals, and in the end its fostering of nihilism and anti-intellectualism in America” (Saito 2000). In a similar vein, Boyd would argue that there was an internal tension in Dewey’s thought between, “as the social and external direction given by the adult, and the Rousseauian concept of ‘self-directing from within’ the child” (Saito 2000).

This vagueness about the directionality of growth means that while many have been quick to appropriate Dewey’s growth and put it to use thanks to its intuitive value, there have at the same time been many calls reconsider growth as a problematic concept in Dewey’s work that lacks a coherent interpretation. The consensus that growth is the prime criterion of educational experience is of little use if the concept of growth itself is so open as to make it undecidable whether we have, in any particular instance, a case of growth or not.

Those who are committed to the notion of growth as the primary criterion of educational experience may nod along when Saito says, “In face of this deep-rooted skepticism related to the question, ‘growth towards what?’ a persuasive defense of Dewey’s alternative idea of growth is urgently needed.” (Saito 2000), but they will likely still agree with Pekarsky’s contention that “although there are many references in the literature to the vagueness and untenability of Dewey's views on growth, there have been few attempts to examine these views systematically; and those attempts that have been made are inadequate" (Pekarsky 1990)

There have, of course, been many attempts to give a more robust account of growth, though the range of results is almost astounding: somewhere between Dorothy Newbury’s “Search for the meaning of discipline in Dewey’s theory of growth” (Newbury 1956), which equates discipline with inquiry, to David Cavallo’s examination of a plurality of models of growth (Cavallo 2004) we find Saito’s account of growth as reconstruction of habits, Jerome Popp’s Darwinian reading of Dewey’s growth (Popp 2007), Hickman’s Hegelian account (Hickman 2009), and more. James Campbell’s argument that, “continuity of growth is the 'end' or purpose of life. Life itself is the process." (Campbell 1995) which, if read as in agreement with Sydney Hook’s earlier contention that “human growth cannot be understood without going beyond biology and psychology whose terms are abstracted from the inclusive social and cultural matrix. The organism grows not only in and with its natural environment; it grows with other

organisms in society" (Hook 1959) creates problems for anything along the lines of Popp's more biological reading of growth.

With such a plurality of perspectives, filled as it is with conflicts not easily resolved, we can only return to Dewey's demand that "so far as [a theory of educational experience] is more than verbal it is a plan for conducting education. Like any plan, it must be framed with reference to what is to be done and how it is to be done." Unless our account of growth is such that it might generate a plan for conducting education, it is only so much clamor and noise. Our concept must be formed such that it is a tool that might direct our future actions; as the case stands, we find ourselves in an indeterminate situation, unable to proceed without clarification of meaning.

What follows then is a kind of schematic of the concept of growth in relation to a network of other concepts in Dewey's work. It is the case that using Dewey's notion of growth, and growth of growth, to delineate educational experience is only worthwhile so long as Dewey's account of experience holds water: if our understanding of experience is radically different from Dewey's, say if we accept Cartesian dualism, there will be no sense in pursuing growth as the aim of education. This is important to note because a complete account of Dewey's concept of experience is beyond the scope of this work. It is inevitable that there will remain threads that cannot be pursued down to their ultimately grounding premises because, Dewey maintains, no such ultimate grounds exist at all.. We can take solace then in the work of those who continue to draw parallels between Dewey's 'experience' and more contemporary developments in neuroscience,

cybernetics, art and so on. (c.f. Johnson 2007, Godfry-Smith 1994, Higgens 2002, Fairfield 2010)

Here then growth will be situated within Dewey's analysis of experience, but in such a way as to make it possible to generate a plan for conducting education. The difficulty of this task is something Dewey himself noted:

I admit gladly that the new education is *simpler* in principle than the old. It is in harmony with principles of growth, while there is very much which is artificial in the old selection and arrangement of subjects and methods, and artificiality always leads to unnecessary complexity. But the easy and the simple are not identical. To discover what is really simple and to act upon the discovery is an exceedingly difficult task (LW Vol.13 pp.14)

Growth Is the Outcome of Inquiry

The view to be developed here and in the following section might be summarized as follows: growth is the inevitable result of successful inquiry. Having met some difficulty pursuing an end-in-view, an organism must adapt to, or with, its environment by way of new habits to overcome the difficulty in question. As we will see in the following, such growth is not necessarily good in and of itself: growth is merely the acquiring of new habits that overcome some particular problem, and is not yet guaranteed to be growth that makes further growth possible, it might even close off such possibilities. For human beings, the acquisition of new habits takes the form of enriched meaning of our ongoing experience. We will begin then by examining ends-in-view, for it is only as a result of

their pursuit that there is ever any need for growth at all, and because it is growth itself that is to become the end-in-view of education.

In *Democracy and Education*, Dewey introduces the notion of end with an example of bees,

Consider for example the activities of bees in contrast with the changes in the sands when the wind blows them about. The results of the bees' actions may be called ends not because they are designed or consciously intended, but because they are true terminations or completions of what has preceded. When the bees gather pollen and make wax and build cells, each step prepares the way for the next. When cells are built, the queen lays eggs in them; when eggs are laid, they are sealed and bees brood them and keep them at a temperature required to hatch them. When they are hatched, bees feed the young till they can take care of themselves. (MW Vol.9 pp.109)

It is the temporal sequence, the meaningful order of events, that transforms what would otherwise be no different from sands blowing in the wind into action directed towards ends. Life then pursues meaningful ends in so far as there are sequences of action that regularly occur in a given situation; the 'end' is that which marks the transition from one type of action to another. The completion of a cell means that the queen can lay eggs. When a bee's legs are thoroughly coated in pollen, it can return to the hive, and so on. The end then is both an end in the sense of the ending of a certain kind of action, as well as the aim of the action that leads to that end; the action will continue until it reaches its end.

To say that people pursue ends then is just to say that human beings engage in meaningful action, action that has patterns that suggest what will be done in a given situation. But human beings are aware of their ends. This awareness gives us several more important features of ends-in-view:

[T]he aim as a foreseen end gives direction to the activity; it is not an idle view of a mere spectator, but influences the steps taken to reach the end. The foresight functions in three ways. In the first place, it involves careful observation of the given conditions to see what are the means available for reaching the end, and to discover the hindrances in the way. In the second place, it suggests the proper order or sequence in the use of means. It facilitates an economical selection and arrangement. In the third place, it makes choice of alternatives possible. (MW Vol.9 pp.109)

Ends-in-view then organize human experience by orienting us towards objects in our environment as potential means for accomplishing our ends or obstacles against it, setting up in advance sequences of action that will bring us closer to our goal, and alerting us to the various possible sequences that might lead to the same end. This makes it possible for people to engage in what Dewey will call a 'wide' use of reason, where bees might only be capable of a much more narrow sort. Narrow reason, "holds a fixed end in view and deliberates only upon means of reaching it. [Wide reason] regards the end-in-view in deliberation as tentative and permits, nay encourages the coming into view of consequences which will transform it and create a new purpose and plan." (MW Vol.14 pp.149)

Dewey will further maintain that whether wide or narrow, it is not the action that serves to accomplish the end-in-view, but instead the end itself that directs the impulse at the heart of action:

Having an end or aim is thus a characteristic of *present* activity. It is the means by which an activity becomes adapted when otherwise it would be blind and disorderly, or by which it gets meaning when otherwise it would be mechanical.

In a strict sense an end-in-view is a *means* in present action; present action is not a means to a remote end. (MW Vol.14 pp.156)

An end is not then something that we lack and pursue in order to finally possess it, but something we have that drives us onward. An end-in-view is thus productive; it is the source of meaning that organizes activity into meaningful sequence. Dewey insists that ends-in-view, unlike the classical ends-in-themselves, the Good, the Beautiful and the True, are not objects of pure contemplation, but instead,

are intellectual and regulative means, degenerating into reminiscences or dreams unless they are employed as plans within the state of affairs. And when they are attained, the objects which they inform are conclusions and fulfillments; *only* as these objects are the consequence of prior reflection, deliberate choice and directed effort are they fulfillments, conclusions, completions, perfections. (LW Vol.1 pp. 85)

Ends are tools we use to direct our action in the world. So far so good, but we are still a few steps from growth. In mundane circumstances, our pursuit of ends-in-view will not entail any kind of growth: so long as we do not encounter any unfamiliar obstacle along our way, we need not grow to accomplish our tasks. When things run smoothly, we are

not altogether different from the bees who collect their pollen and produce their honey without anything that could be called “education” going on.

It is then, when we encounter problematic situations, that an opportunity for growth arises. When we cannot readily accomplish our ends-in-view, when we are unprepared to handle the situation at hand, our only choices may be growth or death. Inquiry then is the process by which we negotiate a problematic situation in order to grow in such a way as to continue our action in the world. This is necessary consequence of the organization of life:

The structure and course of life-behavior has a definite pattern, spatial and temporal. This pattern definitely foreshadows the general pattern of inquiry. For inquiry grows out of an earlier state of settled adjustment, which, because of disturbance, is indeterminate or problematic (corresponding to the first phase of tensional activity), and then passes into inquiry proper, (corresponding to the searching and exploring activities of an organism); when the search is successful, belief or assertion is the counterpart, upon this level, of reintegration upon the organic level. (LW Vol.12 pp. 40)

Because ends-in-view are pursued by organic life, and because those ends are sometimes frustrated, life that does not have the capability to adjust, through inquiry that results in growth, to new circumstances will pass out of being. Non-human life obviously *does* adjust to new circumstances, though at the far end of the spectrum, say for single celled bacteria, it can only do so over the course of generations by way of evolution.

Somewhere between evolutionary problem solving and full-blown culturally established

and institutionalized inquiry, we find animals that can by trial and error overcome obstacles that stand in the way of ends-in-view. The payoff here is that the most general pattern of inquiry is a result of the organization of life generally: where there is life, there are problems that must be solved, or life would cease to be.

The general pattern is that an organism, pursuing an end, encounters a problem, engages in inquiry, adjusts to the previously indeterminate situation, and resumes pursuit of the original end-in-view. Growth is that adjustment that makes it possible to resume pursuit of the end-in-view, and it will be in the form of a new habit. The following section will consider in some detail the mechanics of habit and their relation to growth.

Inquiry Is a Result of the Nature of Experience

If growth then is the necessary outcome of successful inquiry, then we must understand inquiry as a process of change and look within it for the sort of change that will constitute growth. What is it that changes, and how does it change?

As we have shown that inquiry is a pattern that we will find wherever we find life pursuing ends and encountering problems. Inquiry, which has a well-marked beginning in the encounter with a problem, and a well-marked end in the solution that allows for continued action, is then *an* experience.

[W]e have *an* experience when the material experienced runs its course to fulfillment. Then and then only is it integrated within and demarcated in the general stream of experience from other experiences. A piece of work is finished

in a way that is satisfactory; a problem receives its solution; a game is played through; a situation, whether that of eating a meal, playing a game of chess, carrying on a conversation, writing a book, or taking part in a political campaign, is so rounded out that its close is a consummation and not a cessation. Such an experience is a whole and carries with it its own individualizing quality and self-sufficiency. It is *an* experience. (LW Vol.14 pp.42)

Pursuit and accomplishment of an end constitutes *an* experience. When a problematic situation occurs, when our pursuit is arrested, a new end comes into being: overcome the difficulty. The pursuit of this new end-in-view is then what will be called inquiry. As *an* experience, it will be governed by the properties of experience as such. So far as educational experience is possible, so long as inquiry that results in growth occurs, experience must at least be characterized by continuity and interaction. It is here perhaps that our picture of growth will begin to come into focus.

So I come back to the principle of continuity. At bottom, this principle rests upon the fact of habit, when *habit* is interpreted biologically. The basic characteristic of habit is that every experience enacted and undergone modifies the one who acts and undergoes, while this modification affects, whether we wish it or not, the quality of subsequent experiences. For it is a somewhat different person who enters into them...From this point of view, the principle of continuity that every experience both takes up something from those which have gone before and modifies in some way the quality of those which come after. (LW Vol.13 pp.18)

The principle of continuity then must be explained in terms of habit. The grounding fact of habit is just that organisms are capable of adapting their behavior, whether consciously

or not. Insofar as organisms are capable of adapting, it must be the case that what they do and what they experience must change them. What is important here then is that there is no way of differentiating what will create some change from what will not. Dewey then makes of the fact of habit that *every* experience must involve some change in the organism so experiencing. The changes and modifications though, if they occur in relation to ends pursued, result in changes in the patterns of action that a particular end inspires. The temporal sequence of actions that a given end-in-view demands may be rearranged or otherwise altered. A habit then is then just that sequence of actions called forth by a given end. It is, Dewey will say, a kind of function,

Habits may be profitably compared to physiological functions, like breathing, digesting. The latter are, to be sure, involuntary, while habits are acquired. But important as is this difference for many purposes it should not conceal the fact that habits are like functions in many respects, and especially in requiring the cooperation of organism and environment. (MW Vol.14 pp.15)

Much like a mathematical function, a habit takes as an input a given situation that inspires some particular end-in-view, and by way of a given sequence results in that end. Of course the end is not always reached. We must be careful, Dewey cautions, not to conflate habit with simple repetition,

Tendency to repeat acts is an incident of many habits but not of all. A man with the habit of giving way to anger may show his habit by a murderous attack upon someone who has offended. His act is nonetheless due to habit because it occurs only once in his life. The essence of habit is an acquired predisposition to *ways* or

modes of response, not to particular acts except as, under special conditions, these express a way of behaving. (MW Vol.14 pp.32)

Pure repetition is not possible because the same situation will never repeat itself exactly, though there is much that is repetitive about habits. In the normal course of things, our habits allow us to accomplish those ends that regularly occur. The world though is a complex place and the typical sequence of actions that would normally result in some particular end-in-view will not always and in every case run so smoothly. We encounter problems just when the usual sequence of actions is interrupted. It is the case then that many of our ends, again like the bees, will be pursued without any need for thought, without the ends *coming into view*, as it were. It is in the breakdown of a habit that an end of ours becomes apparent,

The habit denied overt expression asserts itself in idea. It sets up the thought, the ideal, of food. This thought is not what is sometimes called thought, a pale bloodless abstraction, but is charged with the motor urgent force of habit. Food as a good is now subjective, personal. But it has its source in objective conditions and it moves forward to new objective conditions. For it works to secure a change of environment so that food will again be present in fact. Food is a "subjective" good during a temporary transitional stage from one object to another. (MW Vol.14 pp.39)

Inquiry begins when the interruption of a habit comes into view. Inquiry itself is an organization of a set of interpenetrating habits that set about dealing with the problematic situation in question, and the change that an inquirer undergoes due to the process of inquiry, in so far as the end of inquiry is reached, is growth. If we ask then what this

process changes, the answer must be that it is the habits themselves. And it is by way of habits that the habits are changed: habits interpenetrate and communicate. Habits are systems of habits, systems of sequences of action, never found in isolation from a whole set of other habits,

Apart from communication, habit-forming wears grooves; behavior is confined to channels established by prior behavior. In so far the tendency is toward monotonous regularity. The very operation of learning sets a limit to itself, and makes subsequent learning more difficult. But this holds only of *a* habit, a habit in isolation, a non-communicating habit. Communication not only increases the number and variety of habits, but tends to link them subtly together, and eventually to subject habit-forming in a particular case to the habit of recognizing that new modes of association will exact a new use of it. (LW Vol.1 pp.214)

Habits, as sequences of actions that bring us towards some end-in-view, proliferate, generate new habits, by way of the breakdown of problems and the reconstructive process of inquiry. We are in most cases engaged in many active processes at any given time, and the various habits that direct our behavior may come into conflict or reinforce one another. The living organism, following Dewey, might be conceived as a system of interacting habits, each habit working its way towards some end, some product to be produced. Growth is the acquisition of new habits as a result of old habits encountering blockage. Educative growth, growth that promotes growth, is the growth of habits that increase the ability to produce new habits, new meaningful sequences of action. This then is what is given by the principle of continuity.

It is just as important to consider the second principle that makes an educational experience possible: interaction.

The word "interaction," which has just been used, expresses the second chief principle for interpreting an experience in its educational function and force. It assigns equal rights to both factors in experience—objective and internal conditions. Any normal experience is an interplay of these two sets of conditions. Taken together, or in their interaction, they form what we call a *situation*. (LW Vol.13 pp.24)

We must then be careful not to locate habit or growth *in* the organism alone, in its internal conditions. The situation is always an organism situated in an environment, and the principle of continuity operates smoothly across both domains. A new habit is the result of a change in the environment just as much as a change in the acting organism, and a change of habit in the organism is bound to induce changes in the environment.

This relation between the acting organism and its surrounding environment produces new habits by ways of modification of the organism and its environment respectively and becomes an intricately modulated system once it is recognized that the environment is, for human beings, a cultural one

Experience is a matter of the interaction of organism with its environment, an environment that is human as well as physical, that includes the materials of tradition and institutions as well as local surroundings. The organism brings with it through its own structure, native and acquired, forces that play a part in the interaction. (LW Vol.14 pp.251)

This means that we must take into account the myriad of tools available and the ends to which they are put. Tools, as means to ends, are already the stuff out of which habits are made. A given habit is a complex of the motivations that drive an individual and the means by which they might realize their ends. Growth then need not be located solely in the learning student, but is also just as much a change in the surrounding world. Growth is the opening up of new possible ends, as a necessary result of old ends becoming blocked. It grants new meaning to old things, as they become means to new ends.

This is the origin and nature of "goals" of action. They are ways of defining and deepening the meaning of activity. Having an end or aim is thus a characteristic of *present* activity. It is the means by which an activity becomes adapted when otherwise it would be blind and disorderly, or by which it gets meaning when otherwise it would be mechanical. In a strict sense an end-in-view is a *means* in present action; present action is not a means to a remote end. (MW Vol.14 pp.156)

This change of meaning is a change in the environment. It is the addition of new tools, new machines, new patterns of organized sequential activity. What is new does not issue forth from nothing, does not enter into being from nothingness fully formed, but must be a recombination and rearrangement of what is already there. The growth of a new habit is the establishment of a new sequence of actions, a new pattern. This change necessarily involves the organism and its environment in so far as the organism acts upon and is acted upon by and in the environment. Habits make use of the environment, they rearrange and recombine the materials of the world, and they leave behind products that then constitute a part of the environment moving forward.

The end is then an end-in-view and is in constant and cumulative reenactment at each stage of forward movement. It is no longer a terminal point, external to the conditions that have led up to it; it is the continually developing meaning of present tendencies—the very things which as directed we call "means." The process is art and its product, no matter at what stage it be taken, is a work of art.

(LW Vol.1 pp. 280)

The products produced by habits, as their ends, are then the stuff of future habits. A whole complex of habits must already be in place to make possible the habit of hammering nails: that habit comes into being only in the context of the end-in-view of the nail-to-be-hammered, which is itself a small step in a larger project of the-thing-to-be-constructed, and such projects are supported by the processes of making plans, selecting materials, manufacturing hammers and nails, organizing workers and so on, each of which is itself a complex set of patterns of activity. As habit involves, or makes use of, the environment, it cannot be thought of as a pure 'idea' locked away in a hypothetical mind. The habit just is the organization of activity in the world, and so involves organism and environment to equal degree.

The world seems mad in preoccupation with what is specific, particular, disconnected in medicine, politics, science, industry, education. In terms of a conscious control of inclusive wholes, search for those links which occupy key positions and which effect critical connections is indispensable. But recovery of sanity depends upon seeing and using these specifiable things *as* links functionally significant in a process. To see the organism *in* nature, the nervous

system in the organism, the brain in the nervous system, the cortex in the brain is the answer to the problems which haunt philosophy. (LW Vol.1 pp. 224)

This then is the principle of interaction. Combined with the principle of continuity and an understanding of ends as ends in view, we have a network of interrelated concepts that form the skeleton of the narrative whose end is growth. An organism moves through its environment towards its ends by way of habits. These habits are the organized sequences of action that make use of the environment to produce ends. Under mundane circumstances, the ends are pursued and produced without interruption. When this is the case, the principle of continuity implies that the habits so made use of become more deeply ingrained, just as a trail is carved through a field by the repetition of footsteps over the same path, or the way that the proliferation of a manufactured tool makes every more likely the use of that tool as the means to its own end. Habits do not always run so smoothly though, and they are not always in harmony with one another. When some conflict arises, when some habit cannot reach its end, the process of inquiry begins. The breakdown of some habit or sets of habits either results in growth, in the form of changes in the environment and the organism that make possible a new sequence of actions, or in the destruction of the organism and death. Growth is the production of new habits, the opening up of new possibilities of action. The aim of an educational experience then is to produce that sort of growth that is conducive to future growth.

Growth of Growth Is the Aim of Education

In a complex and continuously changing world, it is not possible that all problems will be solved once and for all. Whatever set of habits make up the whole of human civilization

— if such a category is sensible at all — it is inevitable that some of those habits will come into conflict, either with the world or with each other. The life of an individual human being would have to be restricted to a point of near torture for it to be imaginable that no habit would ever encounter some breakdown, that every end would be reached without need for thought. Not even purely mechanical things can boast of such an existence: entropy theoretically guarantees the eventual breakdown of any mechanical process, but in most cases the examples of breakdown will be easy enough to find.

It is for this reason that it is not some particular growth that is called for in education, but a growth of the very possibility of future growth. There is no full and final set of habits that will carry a person through life without the need for any further learning. Instead, it is habits that operate in and through breakdowns that are of utmost importance: inquiry is the set of those habits that are brought to bear on the breakdowns of other habits, and so it is towards inquiry that an education that seeks to insure continued growth must turn.

Without a theory of experience to generate its structure, a theory of education can only be of the conservative sort: repeating what has been done in the past because it is what has worked in the past. In so far as the concept of growth remains without a coherent interpretation, any theory of education that aims to create growth will be operating in the dark, without any way to decide whether this growth or that is to be desired.

It is of course not yet the case that this account of growth is enough. If it is to be useful with regard to its intended purpose, creating a central pillar for a philosophy of education,

it must generate some plan, and, “Like any plan, it must be framed with reference to what is to be done and how it is to be done.” (LW Vol.13 pp.13) In the following chapter then we will turn to this project: if this is the meaning of growth, how can we construct educational experiences from it? How will we generate a plan? If there are any truths in this work, they will only be truth of the pragmatic kind, to be measured by the, “degree to which the consequences they produce coincide with what they promise or predict. When they work well and produce useful consequences, they are true; otherwise they are false.” (MW Vol.12 pp.219)

CHAPTER III
HABIT ANALYSIS

The Environment and the Organism

Education may be conceived either retrospectively or prospectively. That is to say, it may be treated as process of accommodating the future to the past, or as an utilization of the past for a resource in a developing future...The idea of education advanced in these chapters is formally summed up in the idea of continuous reconstruction of experience, an idea which is marked off from education as preparation for a remote future, as unfolding, as external formation, and as recapitulation of the past. (MW Vol.9 pp.85)

From the very start, if we are to go about making some use of the model of educational experience that Dewey has crafted for us, we must be aware that it will not be possible to construct anything like a global system. No single curriculum running from enrollment to graduation will be adequate to the particularities and variations of every place and time. While this might seem a commonplace, it is in stark contrast with contemporary efforts to standardize education, whether by creating a common 'core' that will unite students across state boundaries, or merely by subjecting all students to an identical final exam. This is the difference between what Dewey will call a conservative, or traditional, education and a progressive one.

Within the confines of a traditional education, one is free to create a program with a design based entirely on idealistic principles. This is because

The subject-matter of education consists of bodies of information and of skills that have been worked out in the past; therefore, the chief business of the school is to transmit them to the new generation. In the past, there have also been developed standards and rules of conduct; moral training consists in forming habits of action in conformity with these rules and standards. Finally, the general pattern of school organization (by which I mean the relations of pupils to one another and to the teachers) constitutes the school a kind of institution sharply marked off from other social institutions. (LW Vol.13 pp.5)

A new school then might be planned out entirely in advance with little regard to anything apart from the structures of previously successful institutions of learning. Following what Paulo Freire criticized as the ‘banking theory’ of education (Freire 1970), the traditional school aims to create in each student a copy of a kind of encyclopedia of facts and skills. The central problematic of such a design is the method of transmission: how is it that skills, values and knowledge mastered by a teacher might become in turn mastered by a student?

One should note that if Dewey’s model of educational experience holds water, it should be useful in an attempt to solve just that problem, and given the complex politics of educational policy, it is likely that this has been the primary use to which Dewey’s thought has been put.

A program, however, that only makes that limited use of Dewey's analysis of experience will fall far short of a truly progressive education: having decided in advance what is to be learned leaves only the techniques of teaching to be decided. The end goal, or reproducing a new copy of the past mastery in the new generation, remains. The traditional educator has no particular *need* for a model of experience, and will only turn to it insofar as the traditional techniques of transmission begin to break down.

In contrast, a progressive education must begin with a model of experience, in order to confront a local situation in which education is already going on. The fundamental unity of progressive education is "found in the idea that there is an intimate and necessary relation between the processes of actual experience and education. If this be true, then a positive and constructive development of its own basic idea depends upon having a correct idea of experience." (LW Vol.13 pp.7) The 'correct idea of experience' here must take into account a particular organism in a particular environment, located in a unique place in space and time. Whereas in the traditional education the idea of experience might remain implicit, buried deep within the content that makes up the bulk of the transmission, a progressive education has need for an explicit understanding of human experience, and educational experience in particular, to guide its decision process as it makes its way from the present given to the future built.

The necessary relation between actual experience and education first necessitates that an educational program be intimately related to the unique place and time in which it occurs. The problems faced and habits acquired to overcome them in medieval Europe bear little

relation to the problems and habits one might discover in 21st Century New York, and in turn, though the jump is smaller, those habits and problems will differ from those found in 21st Century Alaska. The profound differences in the patterns of human life that are successful in particular locations create opportunities for great differences in experience, and thus differences in education.

Without a universal ideal of a complete education then, a progressive education can only make its progress by way of experiment and the use it makes of the model of experience is in its decision of what experiments to engage in. Instead of a complete plan for a curriculum then, the progressive educator has need of a critical apparatus that can be used to generate new experiments from the educational paradigm currently employed.

Such an apparatus would be a tool for taking what is currently going on as education and improving it. While Dewey has laid the groundwork for such a tool, his failure to provide one might be another symptom of what Colin Koopman has recently pointed out as Dewey's avoidance of problematization (Koopman 2009). Without a critical apparatus to problematize a standing educational system, it is all the more likely that Dewey's work on educational experience will be put to work only in the area that is inherently problematic for the traditional educator: the method of transmission.

Here we are contending that from Dewey's *How We Think* to his *Logic*, what we find is a descriptive account of the processes that make learning possible, something like the necessary conditions for the possibility of human education. What we do not find is

anything like a general method for analyzing a particular, situated pedagogical practice, though we may find, as in *Experience and Education*, critical accounts of some practices or, as in *How We Think*, general prescriptions such as “Work should not be drudgery”, “Recitation should stimulate intellectual eagerness” and “Play should not be fooling”. While such critiques and prescriptions are useful in their own right, they still fall short of anything like a method for examining any given particular pedagogical practice in detail. We are however convinced that the descriptive account is robust enough to give us the ground upon which we may construct such a tool.

We will here suggest then a method of problematization based on Dewey’s analysis of experience that can then make use of inquiry to suggest new experiments that might move education forward.

The production of new experiments may be broken into two phases. In the first, a current educational paradigm or method is brought under critical scrutiny in the light of our model of educational experience. A system of education is then made the subject of an assessment with regard to its fit with our theory. A whole range of factors with regard to the specifics of the concrete situation in which the educational paradigm is employed must be taken into consideration in order to assess the kind of growth produced by the educational method in practice. That growth itself must be considered in light of the recursive nature of beneficial growth: how will the new habits play out in their environment? Will they promote further growth or discourage it? What obstacles will the newly acquired patterns of activity encounter going forward?

In the second phase, after the descriptive model of educational experience has brought to light potentially problematic outcomes of current practice, or once the gaps between theory and practice have been made clear, the current paradigm can be altered in such a way as to avoid problems created by habitual conflicts set up by the current paradigm.

The following three sections then build out the critical apparatus itself. Section II prepares an analytic field as the ground or site where in the educational practice to be put into question might come into view. Section III provides concepts that can be then used for the actual analysis thereof, and Section IV outlines a way for inquiry to provide new paths for educational experience.

Education Is Always Happening

The continuity of experience places demands on the scope of a critical approach to a progressive pedagogy: growth, for better or worse, is the product of an organism in interaction with the environment, but there are no explicit boundaries about which to say where the environment begins and where it ends. This is inherently problematic, as even celestial events, such as eclipses, meteors, supernova and the like, can be said to have a direct impact on the goings on of day to day living. The ‘environment’ extends to an indefinite degree, and Dewey’s notion of the situation, while it may not be intended to imply absolutely everything in the universe, has a fuzzy boundary at best, determined, as it is, by the problem at hand (see, for example, though it can be found in many places throughout Dewey’s work, his response to Russell in “Experience and Empirical Method

in Philosophy” LW vol.14 pp.14ff). To attempt to account for as complete environment as the cosmos is beyond absurd, but it just as impossible to create totally separated environments: the walls of a school, no matter how thick, are themselves necessarily a product of forces outside their border.

We cannot then take our start from the whole, but instead must take our start from the part, but with the explicit caveat to treat the part as a part, and to aim to increase our scope just as the narrow picture comes in to focus.

We must start then, on the small scale, at the level of the organism: the individual student. One could, of course, begin an investigation at an even smaller scale, taking the human body as an environment unto itself, but to do so is to enter the realm of medicine. While such a cellular revolution might someday come to pass in education, until it does our critique of educational practice need only begin at the level of a functioning human being. Our position here is that *education* is a practice whose central problematic is the growth of students, and that such a problematic is best understood as relating to individual students, who as human beings can best be understood as organisms in an environment. We should also caution though against taking such an approach to be *individualistic*: students, as students, are always already deeply entangled in social situations and communities both inside and outside the school, and the focus on individual students should never be allowed to obscure the complex relations between those individuals and the wider community. The habits of an individual student,

problematized and worked upon by educational practice, form the center of a problematic situation which is always embedded in a social, cultural, and natural environment

At the level of the individual student, we find immediately a movement through a number of sub-environments, in the simplest instance of public schooling we have at least the home and the school. The rhythm of such movement, and its degree of complexity, must be taken into account in a fashion that is unnecessary for a traditional education. The habits that students develop and the ends that they pursue cannot, let alone should not, be restricted to the school alone.

But then we must, remaining still at the level of the individual student, pay careful attention to the complexity of these rhythms of movement between this location and that: the micro-rhythms of the activities engaged in and their patterns of repetition will make up the subject matter of our investigation. It is in the irregularities amongst those patterns that we will find the breakdowns of habit that constitute problems, and hence will be the site where we might discover new habits in formation.

The immediately experienced world of the individual student, here reduced to home and school as an abstract minimum, must then be recognized as indirectly affected by the surrounding world. The school as an institution is a product of public policy and the home nestled in a community, must, in the end, become objects of critique as well. For no matter how isolated an educational process might be, it will retain its windows onto the

exterior world. What begins at the small scale is in constant play with the surrounding environment.

Thankfully, one need not completely re-structure the world in order to re-structure a piece of it, but a small start, perhaps only covering the span of a single activity in a single classroom, is just that, a small start. The critique that might lead to a truly progressive education is necessarily always unfinished, always seeking to broaden its scope, to take into account further consequences, for the full set of consequences, and hence the potential for problematic conflicts of every action is infinite.

We begin then from the patterns of activity of a particular individual as they move between the various environments of their immediately experienced world, and then by successive iterations of the same process of investigation, seek to widen our view.

The emphasis places here on patterns of activity shapes the perspective we will be taking: at each level of zoom, from the smallest to the largest, what we are looking at and looking for are patterns of activity, or what are broadly called habits.

It may be of some use to introduce here a small but important distinction that is only implicit in Dewey's work but that will clarify some of the inherent ambiguity in the word 'habit'; the difference between a habit pure and simple, and a habit of habits. The first, the habit pure and simple, or perhaps the micro-habit, is the simplest form of a habit, the repetition of a particular function of the body. At this level one finds the beating of the

heart, the intake and outburst of air through the lungs, as well as nervous tics, the movement of the leg in the course of walking or running and the like. While these micro habits will be seen to have ends, in the sense of moments where the sequence of action has reached its conclusion, they may not be said to have ends-in-view.

As a premise, all organized activity of living things must at bottom be composed of these micro-habits. But such micro habits are themselves organized into habits-of-habits, and without such organization not even bees could get along. Habits-of-habits are organizations of habits towards some end-in-view, that which gives sense and purpose to the micro-habits so organized. This level of organization and the possibility of combining habits-of-habits into habits-of-habits-of-habits and so on make possible the vast complexity of human behavior. For this reason, what might be considered a 'problem' if there were only micro-habits is already accounted for within the complex of habit and need not involve any creation of new habit in order to be resolved.

Dewey makes it clear that once we move beyond the automatic functions of the body that habits take on a life of their own, proliferating themselves throughout those communities they arise in. One might even see something of a precursor to Dawkin's notion of the meme in passages such as this:

The nature of habit is to be assertive, insistent, self-perpetuating. There is no miracle in the fact that if a child learns any language he learns the language that those about him speak and teach, especially since his ability to speak that language is a pre-condition of his entering into effective connection with them,

making wants known and getting them satisfied. Fond parents and relatives frequently pick up a few of the child's spontaneous modes of speech and for a time at least they are portions of the speech of the group. But the ratio which such words bear to the total vocabulary in use gives a fair measure of habit in forming custom in comparison with the part played by custom in forming individual habits. (MW Vol.14 pp.43)

We can see here that Dewey considers the individual words to be habits, and that then the complex habit of speaking must be made up of a multitude of such little habits, the habits of individual words linking up with habits of sentence formation and so on.

We will illustrate with a small example: navigation from one part of a campus to another is not a micro-habit, but a macro-habit organized by ends-in-view and composed of many habits of lower level. If some event, such as construction, blocks the normal path by which one habitually makes way from point A to point B, a new path is found and taken by making use of the complexes of habit that make possible the general navigation of that particular campus. Crucial to our thesis here is that learning only really takes place when this whole complex of habit breaks down: when one is truly lost, one must learn *something* in order to get back along one's way. In the case of campus navigation, the problems of understanding maps, reading street signs, making sense of directions provided by strangers and so on are, under normal circumstances for the majority of campus-navigators, problems that have already been solved, lessons already learned, and so what seems to be a 'problematic situation' in the case of a blocked path is already accounted for in the macro-habit that will lead one to point B with a minimum of trouble.

In this case, the habit-parts that make up the macro habit are themselves also macro-habits composed of parts themselves, and each of them must have been acquired at some point through confrontation of a problem that had not yet been solved: human beings do not read maps innately, but must learn to use them through a confrontation with actual maps of some sort. It can also be seen here that ‘flexible habits’ must by necessity be of the macro-habit sort. In general, when we use the word habit in this text, we refer to the macro-habit sort.

With this in mind then the patterns of activity, the habits discovered in the immediate experience of some particular student, are to be thought of as products, as productions of the surrounding environment in interaction with the human actor. This production of habit will be broken into two kinds: production of techniques, and production of technologies. While the first corresponds in a fairly obvious way to the discussion of habit that we have covered so far, technique here being synonymous with purposefully ordered human action, the second bears some need of explanation.

‘Technologies’ is used here in the broad sense of those material products of human effort that are left behind when the humans move on to something else. They need not be intentionally created, though the organization of human life is often centered on their intentional production. What separates a technology from, say, a waste product, is the future use to which the technology can be put: technologies, like techniques, open up the possibility of new patterns of activity. This is perhaps best illustrated with an example: a

trail develops along the path habitually taken between two locations. Such a trail may be the unintended product of a pattern of human activity, a habit, and still opens up the possibility of new organization of that activity. A technology, in this sense, is the useful material outcome of a habit, while a technique is the useful pattern of activity, a useful habit.

This distinction is my own, derived from, though not directly found in Dewey's work. It is also not in any way an absolute distinction, as we could perhaps find boarder cases, or cases where the material produced and the method of production were so intertwined that they could not be separated. The intent here is to provide a useful heuristic for discovering the interruptions that must be a part of any pedagogical practice that induces change in the habits of students: if Dewey's model of educational experience holds water, then every practice of education must interrupt the flow of student's habits in order to inspire change.

Keeping an eye on the intersection of techniques and technologies is useful in our study of patterns of activity within an environment. New technologies imported from the exterior world will change the efficacy of old techniques, just as new techniques brought to bear on old technologies open up new consequences of their use. It is important to remember that the technological products of some set of habits go on to make possible new habits. Technologies, as ends of meaningful activity, make possible new ends-in-view and new patterns of activity.

Hoeing, to take one vivid example, is a technique that makes use of technology. One cannot hoe without a hoe, though hoeing is not the only technique that might make use of hoes. One might build a sculpture out of farming equipment just as easily as one puts that equipment to use on the farm. There is no inherent connection between any technology and any one technique, though *many techniques are only possible in connection with some particular technology*. Hammering cannot be done without hammers, but hammering is not the only thing one can do with a hammer.

An educational system produces both techniques and technologies, and makes use of both, and it is conflict among the multiplicity thereof that may bring growth to an immature end.

Products — Flows — Interruptions

We have now a sort of schematic field, centered on the student found within the environment of the current stage of investigation, populated by patterns of activity divided into techniques and technologies, both views as productions of habit. Our goal, from the outset, is to examine a given educational practice in terms of the growth it produces, in order to determine whether that growth encourages or discourages future growth. This problem can only be approached by an analysis of the products of the growth in question in relation to the environment that they are situated in: we must ask in what way will those techniques and technologies come into conflict with the techniques and technologies already in play in the wider world. It is for this reason that the task is an

infinite one, as the full set of consequences of a set of habits it itself infinitely propagated outwards into the environment.

It has been taken for granted up to this point that education, even of the individual, takes place within a community, within a society. While we center our attention on an individual, the patterns of activity that the individual engages in will inevitably often involve other people just as much as it involves other things within the environment.

Conflicts that crop up between the ends-in-view of one individual, or group, and another may be prevented in so far as those conflicts are determined by the habits involved. The social ends of education are thereby accounted for: an individual whose habits are bound to come into conflict with the wider community has grown into a blind alley;

pickpocketing is a technique that may be produced by certain patterns of activity and so considered growth, but one who pickpockets runs the risk of having further opportunities for growth shut down by the wider community.

This particular example can be expanded upon to make sense of the concepts we wish to deploy here. Pickpocketing is a technique, and as such is the product of certain patterns of activity within some given environment. It does not spring into being all on its own, but requires a whole host of conditions in order to make its appearance on the scene.

Once it does appear, as a technique employed by some particular individual, the habit becomes a flow: the end-in-view of the pocket picked is habitually pursued, achieved and repeated. The flow of habit can be interrupted, once a target is decided upon, some problem may stop the normal sequence of action shy of the end, perhaps the wallet

sought is attached to a wallet chain, a heretofore unencountered problem. When this happens, inquiry starts up; if it is successful, it will be successful insofar as a new technique is produced such that the problem here encountered is overcome, and may be overcome in similar fashion in the future.

The successful overcoming of the problem and the production of a new pattern of activity, a new habit, is growth. But the whole art of pickpocketing itself interrupts the ends pursued by other individuals. Those who are pickpocketed now encounter an interruption of their own habits. The pickpocket in turn becomes a factor in a problem to be solved, a hidden indeterminacy to be clarified by a process of inquiry. The growth that makes the pickpocket a better pickpocket leads, once the surrounding community becomes involved, to the production of techniques for catching and detaining pickpockets. Such growth is a dead end road: it produces its own termination.

Examining the production, flow and interruption of techniques and technologies in search of conflicts that will stop the continuity of growth will be the primary method of our critique. If it were possible to peer into the minds of human individuals to discover their ends-in-view, such an elaboration might not be necessary; we could then set up a chart of the ends-in-view of all those in the community and compare them in order to discover potential conflicts to head off future problems in advance. Ends-in-view though are only apparent to those pursuing them, and even our own ends may remain wholly unconscious.

Without direct access to ends-in-view then, we must discover them indirectly by way of their tangible results as production of techniques and technologies. Given an educational practice, we must discover in what way it interrupts the usual flow of habitual action, the background pattern of activity, and what will be produced when that interruption is overcome. We have then a simple matrix of possibilities of minimal situations which may be investigated in this way, each to be illustrated below: either a technique or a technology is interrupted by either a technique or a technology, resulting in each case in environmental change and the production of new patterns of activity, new habits, new growth. A given educational practice, in so far as it is capable of producing growth at all, will for us fall into one of the following four patterns, or some complex thereof.

Technique & Technique

In the first case we find a pattern of human action interrupted by another pattern of human action intended to change the first. The lecture can stand as a classic example. Intervening in the habits that relate to the subject matter covered in the lecture, the speaker seeks to create changes in the listener. The background pattern of activity is the listener's habit with regard to the subject matter, and a successful lecture will create changes in those habits by way of communication.

The lecture is similar in structure to another common instance of this corner of our matrix that is familiar to any parent: scolding. When a child's activity calls for an intervention, it often manifests in the form of a mini-lecture given on the subject of the activity in question. Scolding is of course intended to bring about a global change in behavior, but it

can do so only insofar as it succeeds in blocking off the troubling activity or directing the impulse that inspired it through another route.

Technique & Technology

A technological intervention into a particular technique will involve the introduction of a new technology into the immediate environment of some actor in order to change the activity that takes place in that environment. The addition of a computer to the classroom provides a kind of billboard example here: merely by bringing in a piece of equipment, a whole new set of activities becomes possible. The background techniques that are interrupted change as they interact with the newly augmented environment. While it may not be advisable, merely allowing students to interact with a new device without any kind of instruction will invariably produce new kinds of activity that could not take place in the absence of the device, precisely because it was not present before. The indeterminacy of old habits acting on new technology initiates the process of inquiry by way of the consequences of those established patterns of activity acting on the new equipment.

This quarter of our matrix is then also where we will find the ongoing flow of new technologies into the global environment of the immediately experienced world. From staplers to cell-phones and from automobiles to inter-state highways, the addition of a new technology into an environment alters the course of the old patterns of activity that it interrupts.

Technology & Technique

The intervention of a new technique into the ongoing function of an old technology may be given an example case in the creation of new kinds of content by way of an old medium. The innovations of expressionist painting in the 20th century should give a vivid idea as to what is meant here: the technologies that were made use of had been in existence for quite some time, but with a change in the techniques associated with them, a broad range of new effects was created.

The ongoing development of new software, and new *kinds* of software for computers may provide an example that might be more readily seen to relate directly to the classroom: the material tools remain the same, but by a change of technique, new styles of programming for example, the old technology creates new changes within the patterns of activity within the environment where it is found.

Technology & Technology

In our final instance, a new technology comes to change the global effect of some old technology. In recent years, motion-sensing controls have come into combination with interactive computers in such a way as to produce completely new sorts of activity. Often the results of such interventions are new complexes of technology: the personal computer is made up of a rather large number of independent technologies that have come together as a coherent whole.

Frequently enough, a new technology will obsolesce an old technology: the DVD player has largely eliminated the VHS, cloud-computing and networked storage is slowly eliminating the need for physical portable media, automobiles replaced the horse and carriage and so on. While it might almost never be the case that an obsolete technology disappears entirely, it is that its role in the complex interaction of patterns of activity has changed, and in normal cases diminished dramatically that qualifies it as obsolete.

We should be careful not to think that any particular technology *or* technique has any kind of independent existence: technologies are produced by human beings engaged in projects great and small and so are intimately related to human techniques. Techniques in turn are very often, if not nearly always, related to technologies that make them possible. The key here, for the purposes of investigating pedagogical practice, is to look for changes in the educational environment: to that end, we have built a kind of lens to look for two particular sorts of changes, to highlight them, as it were.

We will then in the course of our investigations mark out particular interventions in relation to what old patterns of activity they come to interrupt. Having done so, we may begin to analyze the consequences of such an interruption: how will the old patterns change? How will those changes interact with the other patterns of activity already present in the environment? What foreseeable conflicts might arise? We may then, if such conflicts are discovered, begin to think about changes that might be made to the intervention, or perhaps further interventions that might be made in order to avoid such conflicts.

New Paths — New Products

Our technique here then involves the use of intelligence to look ahead towards the foreseeable consequences of our present course of action, the current state of our environment and the patterns of activity that go along with it. We find ourselves in the midst of an environment that undergoes continuous change, bringing about new and changing the meaning of old complexes of habit. In the course of education, we intentionally introduce new techniques and new technologies into the experience of students with the intent of bringing about changes in their own habits. As the environment the encompassing the school evolves, the patterns of activity inside the schools walls must either adapt or risk producing students whose habits come into serious conflict with the patterns of activity prevalent in the wider world.

This on its own should not be news to anyone, but a truly progressive education has need for a truly systematic approach to the continuous change that makes up the world at large, and ongoing investigation into the consequences of the interventions it employs to instill useful habits in its students.

It is then the cycle that produces new habits, as a cycle, that we must focus our attention on: an interruption of old patterns of activity gives rise to student inquiry that leads to the production of new techniques and technologies. These productions in turn are eventually interrupted by some problematic situation in the world that is a result of conflicts between that pattern's normal course of operation and the continual flux of the situation at hand. In the case of conflicts that we can foresee, we would do well to nip them in the bud, in

so far as those conflicts would cut short further growth. In the inevitable case of conflicts that we cannot foresee, the macro-habit of inquiry itself will stand as of central importance, and it is the habits that make up that habit complex that must be paid special attention if the continuity of growth is to be maintained.

A number of caveats must be kept in mind: it is not the case, to begin with, that only the intended consequences of a given intervention will come to pass. We must be on the lookout for the possibility of ongoing patterns of activity, bad habits as it were, that will nullify the effects of a given intervention. We must also pay special attention to the social reality of every educational situation: no student exists in a world all their own, with need only for survivalist habits of self-preservation. The complex web of social interaction made up of both techniques and technologies must be taken into account: habits of interaction with other people must not be ignored in favor of only technological interests, and the plurality of differing sets of habits within a given community must be taken into account when considering the consequences of the development of some new skill set.

The real possibility of conflicts of ends within a community necessitates ongoing work to ensure the continuity of growth. The social aspect of inquiry, the need to have techniques for resolving problems that crop up as a result of conflicts between people, should not be overlooked. The environment is always already social, just as much as it is always already technological, and so patterns of activity can only in the rarest of cases be reduced to the activity of a single individual.

Educators furthermore, whether progressive or conservative, find themselves always in the midst of education that does not begin or end within their view. The students within their care are, thanks to the continuity of experience, always already engaged in pursuing ends and working out the solutions to problems that stand in the way of their ends-in-view. Those progressive educators who have championed the central importance of teaching the habits of self-reflective inquiry are right to do so, for while the ability overcome problems through inquiry is the natural inheritance of the human race (as an elaboration of an ability that even simple creatures must possess), it is the ongoing improvement of one's own habits of problems solving, the ability to problematize one's own process of inquiry that makes growth possible when otherwise a dead end might be reached. That self-reflection might ideally in the end include an account of the new habits produced by the solution of old problems, and a continual investigation into their probable interactions with the other patterns of activity that occur in the social, technological world.

Finally it should be recalled that this process of critique is an iterative one, starting from even just a single practice of intervention, working out its consequences, improving upon its technique, and then enlarging our scope to include still more. Because the single intervention we focus on is embedded in a broader context, we cannot get anywhere without taking elements of the environment into consideration as our investigation proceeds. The thematized intervention is the problem at the center of the situation which we investigate. Each step in the process, each iteration, can be carried out only so far as consequences can be foreseen, but should be widened to the full extent of our ability, and

then, when we can proceed no further, we may take up the new, reconstructed situation and begin again.

For now we must content ourselves with a single, small example of the mechanics of this apparatus. We will approach an example from Douglas Llewellyn's *Inquire Within*, working out the nature of a particular intervention into the ongoing experience of a student. Due to the nature and scope of this particular project, it must remain a kind of thought experiment, but we intend that these procedures may be implemented in the wild of the lived world just as much as they might be imagined in the laboratory of the mind.

CHAPTER IV
INQUIRE WITHIN

Limits and Choice

Given the limits of this current project, it is impossible to go through the full process of the analysis outlined above as it might be carried out in the wild; there is no live process of education with which to experiment, the consequences of changes cannot be observed, there is not even a specific environment to base any analysis on. Without a concrete laboratory, we are left to operate in an ideal space, much of the work to be accomplished must take part primarily in the imagination.

While this will set off the demonstration to follow from any concrete analysis that might be based on it, it will not prevent us from being able to perform such a demonstration. For our purposes here, a complete lesson plan and some information about how that lesson plan was in fact enacted on at least one occasion should be enough to show the methodology in action. It will though restrict that demonstration to the first stage of analysis, in which we break down a process of education into the interruptions that make it up, and the second, in which we examine those interruptions in order to discover what it is that they interrupt and what changes we might expect to be brought about. This will allow us to begin the third stage, which must remain incomplete: we will be able to propose possible changes that might avoid foreseen conflicts that would develop out of the new habits produced by the interruptions of old habits, but we will not be able experiment with these changes, and we will then be closed off from broadening our perspective from the small scope it must begin with.

We are left then to examine on the micro-scale events that transpire within one classroom, following one lesson plan. We are unable to include any but the most general assumptions about the life of students outside the classroom, and we are furthermore unable to even examine in great detail the actual products that students create in the process of the experience in question. This leaves us with only the bare beginnings of a proper analysis.

These bare beginnings though should still serve as enough of an introduction to make clear just what is involved in applying the apparatus we have here constructed, and will then hopefully be strongly suggestive of just how the analysis would proceed thereafter. The iterative nature of our procedure should facilitate this vision: this chapter will make up one repetition, while each successive repetition, each broadening the scope and becoming ever more inclusive of the borderless environment will be an application of the same methods on a larger scale.

The recursive nature of our apparatus, taking its own output as its next input, makes it possible for us to demonstrate here on the very small scale what would in the wild become a vast project. This should be seen to be a consequence of our recursive understanding of growth: it is not growth-itself that is to be sought, but the continuity of growth, growth that facilitates further growth. Such a goal, in a world that continually changes and evolves over time, necessarily brings with it an endless task, though not a task without ends. Each iteration, while never completing the project and always

demanding further investigation of the consequences of any new development, should still, at the local level at the very least, bring about changes that avoid conflicts that would have otherwise been confronted accidentally and haphazardly. This first turn of the crank should then serve as enough to allow us to see that the crank could be turned once more and then once more, each repetition allowing us to widen our view, without any need for an expectation that some total view will ever be reached.

With these limits in mind then, there is some need for us to justify the choice of our example here, a single lesson plan, though one that involves several days of ongoing activity, given as an introductory example in Douglas Llewellyn's *Inquire Within*. It may seem a counter-intuitive, or even counter-productive choice: wouldn't it make more sense to examine a more widely practiced pedagogy? We can imagine, for example, bringing our analysis to bear on the practice of standardized testing, or on the introduction of new media into the classroom; any number of flashy, trendy examples could be obtained from recent articles and debates within the education community. Choosing an example that was obviously a product of a conservative approach to education would make an easy target for criticism, opting for an example that is currently creating controversy would perhaps allow us to see how this approach might help us find our way in those debates. We will, in the end, once we have established the function of our apparatus, return to the topic of testing, but at the moment, we must answer the question, of why we have chosen an example that is unapologetically progressive, that cites Dewey as an influence, and that already aims to encourage inquiry based learning?

We have selected Llewellyn's work not in spite of, but because of these characteristics. Our motivation is the drive to perform something of an internal critique: a critique of what is ostensibly a contemporary Deweyan approach to education should show the robustness of our technique. It is easy to have a critical eye when you are faced with an opponent, but it is far more difficult to bring that same critical eye to a look in the mirror. If our apparatus is capable of opening up possibilities for improvement of a process of education that already is attempting to implement inquiry as the central model of educational experience, then we will have good reason to believe that it should also be able to do its work on educational practices that are far and away from a Deweyan paradigm.

Of the many possible choices that then fit the above criteria (an example that is unapologetically progressive, that cites Dewey as an influence, and that already aims to encourage inquiry based learning), we have chosen Llewellyn for his typicality and banality, rather than anything that makes his approach stand out. *Inquire Within* is, in many ways, an unremarkable text. For its intended audience, those unacquainted with inquiry based education, it may serve as a good general introduction, and it has received little or no critical attention, though it gets cited somewhat regularly, occasionally alongside a range of other texts that also encourage inquiry based education.¹ If there is a particular feature that attracted us specifically to *Inquire Within*, it is Llewellyn's rich

¹(Marchell, et al 2007, gives the following list: Bransford et al., 1999; Bybee et al., 2006; Donovan & Bransford, 2005; Llewellyn, 2002; National Commission on Excellence in Education, 1983; National Commission on Mathematics and Science Teaching, 2000; NCTM, 2000).

descriptive account of the goings on in the classroom that serves to aid our imagination in the process of reconstructing the situation that we intend to examine.

These caveats in mind, we will then turn to Llewellyn's account of what serves as the primary, that is, first example of *Inquire Within*: the Ice Hands.

The Ice Hands, Llewellyn's Account

Real classroom stories often show how inquiry-based lessons progress. This is the story of a fourth-grade teacher who introduces an exploration to her class that (a) allows them to investigate the properties of ice and (b) provides them with opportunities to generate more questions to investigate. (Llewellyn 17)

The second chapter of *Inquire Within* is dedicated to the telling of the above-mentioned story. Having given a general introduction to the concept of inquiry as well as a smaller example story in his first chapter, Llewellyn gives us a vivid portrait of his notion of inquiry-based education in practice as it takes place in a single fourth-grade classroom. The experience in question is a week-long activity developing out of an initial encounter with *ice hands*, “‘I hope they’re ready,’ Ms. Camille Perlo thought as she opened the freezer door. There, she saw seven frozen hands. Actually, they were *ice hands* she had made the night before by filling latex surgical gloves with water and tying the ends with twist ties.” (17) The introduction of these ice hands into the classroom is then the inauguration of a weeklong investigation into the properties of ice.

The ice hands activity broadly follows Llewellyn’s outline of the process of inquiry, as adapted for classroom use. The outline itself (c.f. fig 1) may be broken into two phases, the introductory phase, which is primarily teacher driven, and then the recursive, circular inquiry cycle, which is primarily student driven.

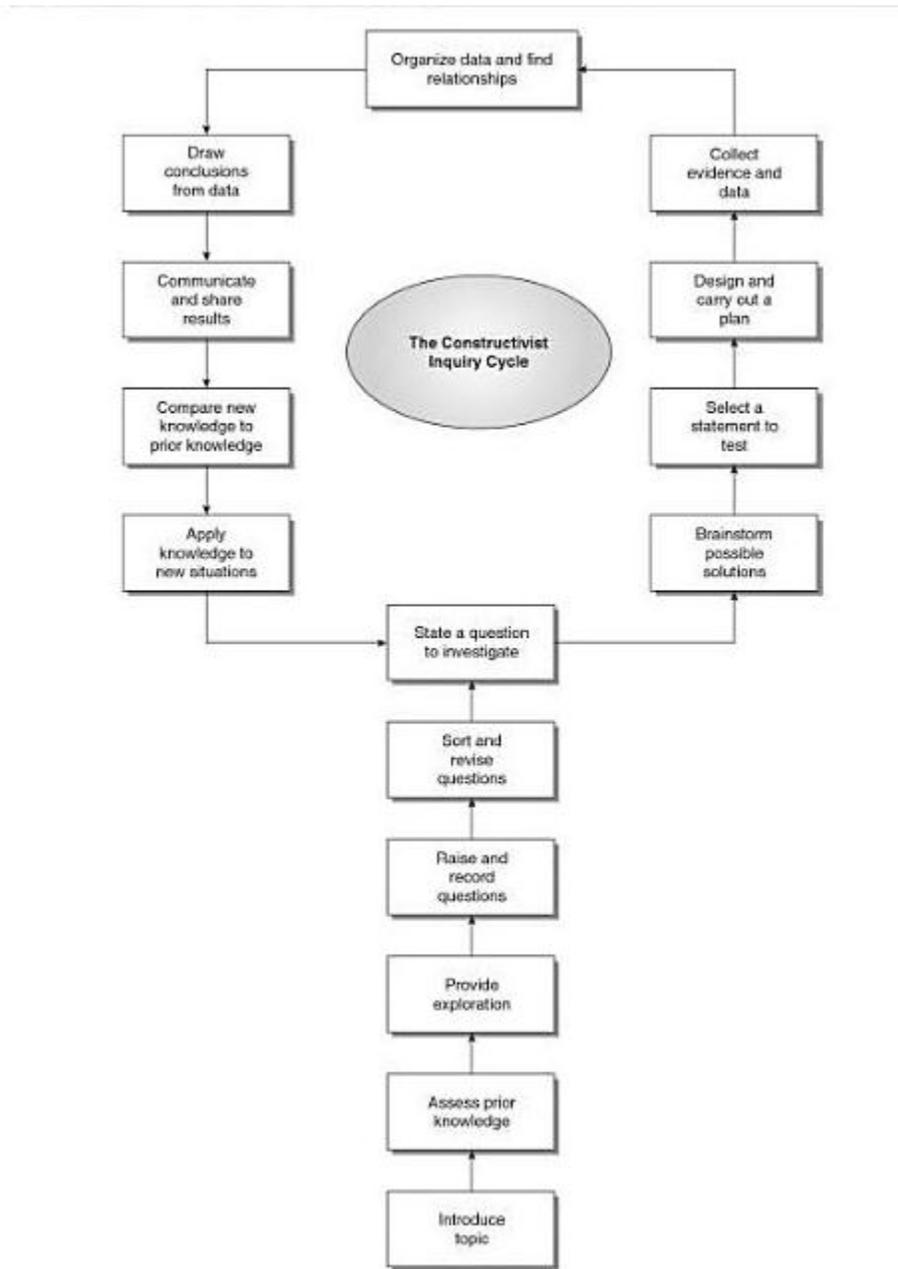


fig. 1. The Constructivist Inquiry Cycle (pg. 47 in Llewellyn)

We can see here the way in which the process breaks down into two parts, the first serving to get the second started, as it were, and the second looping back into itself, presumably allowing for an indefinite number of repetitions, each allowing for further investigation by way of another go around the loop.

The first day of the ice hands project deals with the first phase of inquiry in its entirety. It begins with the introduction of the ice hands into the classroom as a way of *introducing the topic*, the properties of ice.

“Today,” Ms. Perlo said, “we are going to start a special science unit. We are going to investigate ice hands and see what we can discover about ice. This is going to be a very special unit because all of you are going to become real scientists and do the things scientists do. To start us off, let’s first think about what we already know about ice. Take out your science journals and write down five things you know about ice.” (17)

The introduction then segues directly into the second step of *assessing prior knowledge*. After the children have been given sufficient time to write down their ideas, the Ms. Perlo asks individual students to share what they have written with the class. As they share, the teacher constructs a concept map of their ideas (c.f. fig 2)

Once the students have shared their ideas about ice and the concept map has been constructed, the students are allowed a period of *exploration* as the third step of the introductory phase. The students are encouraged write down observations and to use rulers and magnifying glasses to make measurements or closer observations. The students

are further encouraged to think about, and write down, *questions* that they may be interested in investigating, thus the fourth step coincides in this instance with the third.



fig. 2. *The Concept Map for Ice* (pg.18 in Llewellyn)

At the end of the time designated for free exploration, Ms. Perlo allows the class to share their observations and questions with the rest of the class, writing down the questions on the chalkboard. Thus begins the fifth step of this first phase: “After all the questions were recorded on the board, she reviewed each question and with the students’ help, sorted them into categories that (a) were ready to be investigated, (b) needed further revision, and (c) could not be answered without assistance from an outside *expert*.” (20) Once the questions had been properly sorted, the final step of the first phase, and the transition into

the cycle of inquiry could take place, “The class formed groups consisting of three or four students for each of the questions to be investigated” (21). With the introductory phase complete, the students were bid adieu until their return the following day.

The second day of the ice hands activity is dedicated to the planning of the investigation, which makes up the next three steps of the Llewellyn’s inquiry cycle: *brainstorming possible solutions, selecting a statement to test, and designing a plan*. While the groups are allowed to operate independently for the most part, Ms. Perlo circulates through the room, checking in on the student’s progress and coaching them along the way, encouraging them, for example, to think about the sort of data they are going to collect, reminding them to, “think about how you are going to organize your results in a data table or chart” (21).

The third step of the inquiry cycle, *design and carry out a plan*, carries over into the third day, which is dedicated to carrying out the plan devised on the second day. The third day is devoted entirely to just this step and the next, the *collection of data*, which differs according to the experiments carried out by each group.

The following two steps, *organizing the data and drawing conclusions* make up the activity of the fourth day, which takes the form of creating display boards intended for the purpose of *communicating the results* to the rest of the class. The presentation is expected to be organized by a three-fold division,

“The left of your display boards should state the question you were investigating and your hypothesis,” [Ms. Perlo] explained. “The middle section lists the materials used and the steps of the investigation. The right side of the board lists the data table and the results. Don’t forget to write a concluding statement about your hypothesis,” she added. “Be ready to give your presentation tomorrow.” (24)

The fifth and final day is then dedicated to the last three steps of Llewellyn’s outline, *communicating results, comparing new knowledge to prior knowledge, and applying knowledge to new situations*. The first of these is just the presentation the students have prepared. The second consists, in this example, of going back to the original concept map and adding to it the new discoveries created by the experiments, and finally the new information opens up a whole series of new questions that the new knowledge might be applied to.

With this summary of the ice hands activity in place, we may now proceed to break down this series of activities into a series of interruptions of old patterns of activity. This breakdown will differ somewhat from Llewellyn’s own account as it comes from a different viewpoint, along with different ends-in-view.

Interruption Breakdown

In actual practice, the ice hands activity consists of an ongoing string of interruptions into the patterns of activity engaged in by the students, though the vast majority of those interruptions are not included in Llewellyn’s account: during those periods where the students are engaged in their own self-driven investigation, the teacher circulates between

groups and intervenes when it makes sense to. We can imagine a pair of students playing with rulers as if they were swords or a group having trouble coming up with ideas for an experiment, an individual having difficulties communicating with their group members, or any number of other situations that would call for the teacher to step in and break the current pattern in order to alter the patterns of activity of the students thus interrupted.

This active, ongoing process of intervention is safely assumed to be a normal part of any teacher's repertoire. It would almost seem strange for Llewellyn to go into much detail about such things, so we should not be surprised that we find no account of such routine teaching. Despite the lack of such fine grain detail however, Llewellyn's account does allow us to pick out several macro-interventions, directed not at individual students, but at the class as a whole. We will focus on a small set of these, each illustrating different types of interruptions: the introduction of the ice hands into the classroom, the construction of the concept map and the categorization of student's questions, and finally the tri-fold display and the event of the presentation.

We will in this section focus exclusively on the way in which each of these interruptions can be seen as either falling into one of the four types we outlined in the previous chapter, or else how they might be understood as a complex thereof. Once this has been taken care of, we will then turn to an analysis of the kinds of new habits we might expect to come about as a result of the overcoming of the indeterminate situations induced by the interruption of old habits in the following section, and finally look to changes that might

help to head off problematic situations that we might expect to develop as a result of those habits.

In the first instance then, the ice hands themselves are introduced into the classroom environment. This is what we would consider a new technology being introduced that interrupts old techniques. The ice hands themselves are distributed throughout the classroom and the students are allowed to explore them by way of whatever habits they already have in place.

We must note here that the ice hands will only stand as an interruption in so far as they strike the students as something *strange*. Having presumably encountered ice cubes and other forms of ice before, there would be little reason for the ice hands to create any sort of disturbance of the students' old patterns of activity if it were not for the unusual form of the ice. While the format of presentation and the entire complex situation of the introduction of the ice *as an object of investigation* might be enough to transform, say, regular old ice cubes into something unusual that will cause new patterns of activity to emerge out of the old, it is with good sense that Ms. Perlo has transformed what would otherwise be mundane into something bizarre. The emphasis here is on the strangeness of the ice hands. The goal is to introduce something that will be of indeterminate nature for the class, such that it will inspire inquiry. The bizarreness of the ice hands is an aid to that goal, as the meaning of the ice is transformed by its shape. Again, simple ice cubes, or even icicles merely collected from the outside world could serve such a purpose, but it is

more likely in those cases that students will operate on familiar objects by way of old habits, treating them as already fully determined and in no need of inquiry.

The introduction of this new product into the classroom environment then stands as a technological interruption of old techniques only insofar as the students bring their attention to the ice hands as something fundamentally *new*. Ms. Perlo's announcement that they will now have the opportunity to be 'real scientists' and the focus on the hands as objects of investigation aid to create a situation that is fundamentally unlike other situations that the children have experienced, changing the effect of their old patterns of activity by bringing them to bear on something unlike their normal field of operation.

As a second example, we consider two similar interruptions: the construction of the concept map and the categorization of the students' questions. Each of these we will consider as a new technique brought to bear on a particular technology produced by the students: statements in the first case and questions in the second. In both of these instances the student's current habits, their old techniques, are allowed to create products in a mostly free manner. It is readily assumed that the students have written statements and asked questions before. These products, as things that are left behind by the students' activity, are then acted upon by the teacher's technique.

In the case of the concept map, the statements of knowledge the students have written are brought into relation with one another: this is then a technique which takes technological products from the students, their statements, and produces a new technology from them,

the concept map itself. Without the teacher's intervention, no such map would form of its own accord: the statements produced by the students would remain dead on the page, each in their own journal, unrelated to any others. This technique then alters what would be the effects of the student's productions, transforming one sort of technological product into another.

The situation is similar to the questions which are set into categories: taking up the products that the students have produced, the teacher transforms them into a new product, an organized whole. This transforms the relations of the questions to one another just as much as it changes the students' relation to their own questions. A new technology is produced by the technique of running old technological products through a system of categorization. New possibilities for action on the part of the students are thus opened up.

In both the case of the concept map and the categorization, we can see how the interruption in the form of a technique in turn becomes an interruption in the form of a new technology: the technique creates a new product with which the students are then in interaction. We have then a complex of interruptions that are intimately related; our third example will further show the sort of complexity that is here possible.

The presentation of the tri-fold boards on the fifth day is itself only a part of Ms. Perlo's technique of orienting the students towards the presentation as their end-in-view throughout the week-long activity. It is itself a complex made up of both the introduction of technologies, such as the tri-fold boards, and techniques, the smaller interventions into

the activities of individual groups as they progress towards the end of a presentation. The introduction of the idea of the presentation then, and all the mini-interruptions that bring the class towards that goal make up an overarching interruption into the students old patterns of activity, their old techniques.

This interruption then also produces technological products, the finished presentation boards themselves; as well as techniques, the presentations that each group performs. We might note that the boards, as technologies, need not be accompanied by any act of presentation, though the presentations themselves rely on the technology of the boards.

Within the structure outlined by Llewellyn for inquiry based learning, these new products should, at the very least potentially, form the basis for a new round of investigation. The plurality of different results produced by the individual groups is intended to inspire further questioning, and indeed we can see that this fits well with our account of the ice hands experience in terms of technical interruptions: the presentations, each created separately by the individual groups are interruptions in their own right. The apparent effect on the regular patterns of activity will become apparent if inquiry is allowed, as Llewellyn suggests it may, to continue from the basis of the discourse that results from the students' public performances.

We might now turn to each of these interruptions with a more critical eye, to imagine just what sorts of new habits they might produce.

Foreseeable Problems

At this stage we are required to utilize more imagination than previously for the following reason: we are neither familiar with Ms. Perlo's students nor the community where their school is located. Llewellyn does not dwell in any serious way on such matters. It is the activity that draws his eye, that which can be borrowed and used by another teacher in another context. That which is most readily imagined to be context-less. In order to proceed, however, we must think about the old patterns of activity that our example interruptions come to interrupt. For it is the *changes* they produce in ongoing behavior, rather than, say, the knowledge they create in the mind of some subject, that we are interested in and change must change *something*.

This should not be a terrifically dangerous obstacle; we must only keep in mind that we are operating behind a veil of abstraction. So long as our imaginings are not excessively wild, the example should serve its purposes with little ill effect.

We begin then with the introduction of the ice hands themselves. The intended transformation of behavior here is, explicitly, to get students to think of themselves as "real scientists and do the things scientists do." This end-in-view orients the whole of the ice hands activity. Individual students will, by virtue of their differences, each approach this common goal from a variety of starting points; the transformation of old patterns is not here decided by what the old patterns themselves are, but by the ideal of the scientist.

The particular introduction of the ice hands and the period of free exploration allowed is an alteration of the students' environment that changes the meaning of their old patterns of activity. However, this relies in part, as we observed above, on the strange form of the ice hands: the object of investigation is intended to strike students as out of the ordinary, to encourage curiosity. So long as it does, things may proceed wonderfully. But an incredulous student, unimpressed with ice or uninterested in the project of being a 'real scientist' will be faced with an indeterminate situation of a different sort: while the initial question intended to be investigated is 'what are the properties of ice?' the resistant student is faced with the activity itself as a problematic situation that stands between the student and their own ends-in-view.

Inquiry may of course be used in solving this problem just as much as the intended question of the activity. The habits that will result from such an inquiry though are likely to themselves be problematic: the student may participate minimally, engage in unrelated activities (playing with rulers as swords perhaps), or even actively attempt to disrupt the rest of the class. These results of the process of inquiry taken to the activity itself as a problem may go on to build up a habit-complex of opposition.

Many of these habits of resistance would, in the normal run of things, be observed and further interrupted by a good teacher; this is a safely unspoken assumption of Llewellyn's account. However, we should see that in so far as these patterns of activity come into being as a result of the ice hands as interruption, they are techniques as products of that pedagogical strategy. The ice hands themselves are intended to organize student activity

by inspiring a particular end-in-view, being scientists by discovering the properties of ice. But the ice hands cannot force students to take up that end-in-view as their own. Their strange form is already a gesture towards the necessity of indeterminacy for any change of habit: it would otherwise be sufficient to use ice in a form already familiar to students.

This disconnect between the intended end-in-view and what may in fact be the end-in-view of some particular student, or group of students (whole communities of resistance may spring up readily enough depending on the broader environment...) can be seen to cascade through the rest of the ice hands activity. The concept map and question-categorization are both wonderfully useful tools for those students who are engaged in the project of discovering the properties of ice. But for those who have, for any of a multitude of possible reasons, not taken up that project, the time for building these pedagogical technologies will be spent developing a habit of internal resistance to communal activity.

The culminating presentation, itself an end-in-view that organizes many of the patterns of activity into the habit-complex of what is called a 'real scientist', creates a whole set of problems that students must overcome to reach the goal and those who set out to achieve that goal will undoubtedly acquire a whole range of new techniques of social interaction, cooperation, reflective inquiry, and so on. But group work is just as amenable to communal resistance as it is to communal cooperation, and it would be quite the mistake to forget that while some students develop their skills as scientific investigators and

presenters, others may be building up habits that discourage communal inquiry all together.

It is, admittedly, a virtue of inquiry-based education, just as Llewellyn's Ms. Perlo performs it, that students are all the *more* likely to take up the intended ends-in-view as their own, as they are allowed to actively participate, asking their own questions and creating their own experiments and all the rest. It is however for just this reason that the still present possibility of student resistance is assumed to be a minor detail that will be taken care of by the teacher's proactive intervention. We may, however, by keeping this possibility before us, suggest changes to the activity that might avoid some occurrences of this problem.

Changes

The problem of just how to get students' ends-in-view to harmonize with the ends-in-view of their community, whether at the level of the project group or the classroom, the village or the state, might in the end be one of the central problematics of a progressive, or for that matter any, education. The success or failure of an educational system is in many ways gauged just by its ability to bring students' aims into line with the goals of the community at large. Dewey, responding to the ancient Greek concerns regarding the new practice of sophistry near the end of *Democracy and Education* reminds us in a string of questions that this problem is not in the least new, "Was not the only true, because the only moral, life gained through obedient habituation to the customary practices of the

community? And was not the new education an enemy to good citizenship, because it set up a rival standard to the established traditions of the community?" (MW Vol.9 pp.340).

It would be over-zealous at the very least then to presume that we might solve this problem once and for all. However, it is possible to see ways in which the situation at hand might be improved, if not entirely repaired. The question of the moment is the relation of the students to the entire ice hands activity: there are a confluence of environmental factors that encourage the students to take up the community ends as their own, but there remain wide cracks through which a resistant student might slip.

To patch just one of these cracks then, we would do well to think about the unusual need for the bizarre quality of the object of investigation: aside from the pre-existing institutional environment, it is all that Ms. Perlo has to rely on to capture her students' curiosity. This is the case for a reason that breaks the activity in question quite a bit away from its goal of allowing students to become 'real scientists': there is no broad communal end-in-view that has come up against a problem that requires an inquiry into the properties of ice.

That the classroom community does not have an already complete understanding of ice, as established by the concept-map and the categorized questions, may be a step in the right direction, but does not yet establish any need for the inquiry that follows. Real scientists engage in inquiry to solve problems, if there is anything that we might learn

from Dewey at all, that we face in the real world, above and beyond mere holes in some ideal total system of knowledge.

The ice hands project then might be seen to be an absolutely ideal activity for a classroom in Banff Alberta, a community whose very existence depends directly on the element in question: ice. A community whose water source and economic centerpiece consists of great masses of ice will have a much more direct reason to investigate the properties of ice. The inquiry will there appear as the result of a real problem faced by the community at large: the ice is melting, what can be done? The old habits face an imminent threat of interruption unless something can be done about the disappearing glaciers. While we cannot reasonably expect that even this community would not include some degree of resistance to the transition of students' ends-in-view to the inquiry into ice, the connection of the activity in the classroom to a real problem that calls for that particular inquiry would overwhelm the need for the object of investigation to simply be strange enough to peak students' interest.

What is required then, in this case as in any other, is an account of the students' ongoing life, their movement to and from the school to the home and back again, the broad scope of patterns of activity that make up their lives such that the activity in the school might make use of those ends-in-view that are already a part of the student's life. This first small change may reasonably be expected to encourage students to engage more intently in their inquiries, as it will allow them to work towards solutions to problems that they already face in the wider world. The artificial disconnect of the classroom from the

surrounding environment is itself a break that will create distance between the intended effects of the ice hands interruption and its eventual products. It is only when the students' old patterns of activity already lead them towards the inquiry that takes center stage in a school activity that they can be expected to take part without risk of resistance.

CHAPTER V
CONCLUDING REMARKS

But...Why?

That there is a disconnection between the wider environment and the classroom in the ice hands project may not come as an incredible surprise. Truth be told, it is common enough for classroom experience to have little or no *obvious* connection to the lives of students beyond the structured time spent sitting at a desk, to say nothing of the complex communities and ongoing endeavors that students may be engaged in outside the walls of the school.

The time honored cliché of the student who pesters the teacher with questions as to why this particular material is necessary right this minute might act as a kind of symbol for the problematic situation that has here been brought into view: in so far as students do not take up the ends-in-view that motivate the organization of classroom projects, assignments inside the classroom or out will stand as problematic situations for students to overcome on their way towards their own projects, whatever those might be and in whatever way is most successful in overcoming those obstacles.

We have suggested that the ice hands project might make more sense situated in a community where ice itself is already an element of an ongoing inquiry into an indeterminate situation. We do not in any way expect this to fully resolve the problem at hand, but only wish to show that once such a problem has been brought into view, we can begin the work of inquiry to produce improved pedagogical strategies. We must be clear

though that we do believe that the ever-present possibility of student resistance to the programs put forth by their teachers is a problematic situation that is not in any way restricted to the ice hands experiment, nor only to Llewellyn's *Inquire Within*.

In fact, it should be said that Llewellyn's project gets much correct with regard to this particular problem: the ice hands project includes within itself a variety of techniques employed to encourage students to take up their assignment as their own project, and aims in the end to create an ongoing discourse within the classroom as to what questions will be of interest to that little community going forward. The teacher driven stem of Llewellyn's chart of the inquiry cycle (fig 1) would then, ideally, fall off, leaving the community within the cycle of inquiry such that further projects emerge organically out of those already completed. This is a lofty goal, but a noble one, and it would be a shame to miss what is done so well by focusing only on what cracks we have discovered in the facade.

However, the goal of ongoing community based inquiry in the case of the ice hands driven by the results of previous inquiries is a lofty one precisely because it takes its start from an origin that is foreign to any concrete interests whatsoever, however many connections to possible real-world applications we might discover afterwards. A primary goal of the ice hands activity is to introduce students to the process of inquiry itself, and in so far as it does that it may be a wonderful success. But the plan for the ice hands lacks any motivating problematic situation that calls for inquiry in the first place, and so is one step further removed from the world than need be. Educators would be well advised then,

as Dewey suggests, to inquire into the actual conditions of the community in which they will be educating, to better ground their teaching in the concrete projects and problems that face the community as a whole.

We have then suggested a move that would connect the ice hands in all their strangeness back up with a real world indeterminate situation that would give call for an inquiry into the properties of ice. This is only a small change, but it is intended to bring out just what is at stake in the gap between the projects that students engage in while they are inside the school's walls and their lives outside its well-defined boundaries.

The lives students live outside of the school however are not nearly so simple as to be resolvable into a single line drawn between a classroom activity and an indeterminate situation faced by the community. The terrifically complex interconnections between a student who passes in and out of the school's front doors several times a week and their own horizon-bound environment, both cultural and natural, are cause of an enormous multitude of large scale habit-complexes, each organized by their very own ends-in-view. These organized sets of habits are in no way destined or guaranteed to intersect at any grand unifying end-in-view, so while a great number of pressures might be exerted by a given classroom's organization of technologies and a given teacher's skillful techniques of intervention to reconnect a student's habits with the larger scale projects of the wider community, there are an unlimited number of ways in which that effort might itself break down.

We might also note here that the tools that students are encouraged to use to investigate their ice hands are themselves a reminder that Ms. Perlo's classroom is itself a space cut off from the exterior world: rulers and magnifying glasses are technologies which might strike us as quaint in a world where, "As of September 2009, 58% of 12 year-olds have a cell phone, compared with 73% of 13 year-olds." (Pew 2010) While Ms. Perlo is dealing with 9 and 10 year olds, it can be well expected that at least a few of them would, today anyhow (smaller percentages for 2001 of course!), have on their person a personal computer that fits in the palm of their hand. It is irresponsible, at the least, to engage in any sort of educational practice that does not take into account the influx of new technologies into the lives of students. Artificial limitations of the tools available for inquiry further removes classroom activity from the environment it is situated within, creating breaks through which students will slip. The computer that is not a tool becomes instead a toy, a distraction, an addiction, or any other manner of 'bad' habit.

Those bad habits that are born out of the breakages between the classroom and the rest of a student's experienced world are especially problematic because they may in some cases make no appearance within the classroom, given that at least some of the strategies that students develop to overcome what stand as problematic situations within their current set of projects will involve avoiding the teacher's notice all together: an ongoing conflict between the ideal ends-in-view of the teacher and the ends-in-view of the student can result in a sort of technological arms race.² This conflict will, in so far as it is not resolved in such a way as to bring about true cooperation between the student and the teacher

² Dewey discusses the problems of ideal ends-in-view in some detail, c.f. "Ends and Values" in *Theory of Valuation* (LW Vol.13 pp.220-226)

towards a collaborative end, result in the production on both sides of techniques and technologies, each responding in kind to the new developments that they are opposed to.

As a result, it is apparent that the amount of attention that a teacher can devote to individual students is crucial to the quality of the education those students receive. It is only by careful observation *and* interaction that a teacher might discover the relationship between assigned projects and students' ends. As class sizes swell, teachers are left only with the option of performing a kind of triage, focusing their attention on those students who have already taken up the ends-in-view of the educational program whatever it may be, without any way of dealing with those students who are disconnected with such projects.

While this may not be apparent from the single example we have here examined in detail, it can be brought into high relief if we examine a parallel case, one that has become an integral part of the contemporary educational paradigm, and which poses this very same problem of an educational project that is only somewhat likely to be taken up in any authentic way by students whom are required to take it up. We will turn here briefly then to the issue of standardized testing, to see in what way, and to what extent the specific indeterminate situation that has come into focus through the application of our apparatus might be usefully generalized.

Test Strategies

We will begin here by noting that the standardized test will show up beneath the lens of our apparatus as primarily a technological intervention, a technology introduced into the classroom upon which students bring to bear the habits that they have built up prior to its appearance within their environment. In normal situations, a test is meant to specifically target the detailed articulation of some set of habits. Performing addition, completing analogies, answering questions with respect to a text; each variety of test structure is intended to produce a record of student activity in a narrowly defined field. Testing itself normally occurs within an environment that is already structured by the idea of test taking and a whole set of techniques is employed to guarantee students' participation in the test taking: confining students to their seats, maintaining silence, interrupting lines of sight that have crept across towards the work of other students, and so on. There are of course a wide variety of test taking situations, and the techniques employed may vary a considerable deal, but it is never the case that the test all on its own is enough to inspire the collective student body to complete the particular problem set.

The multiple choice test, in particular, in a somewhat obvious way introduces an indeterminate situation: which of the possible answers is correct? This indeterminate situation is designed with the intent of initiating a process of inquiry for the student who must choose exactly one response for each question. There is an implicit expectation in the design of any such test that students will take up as their own end-in-view the quest to answer each question correctly by way of inquiry within the rules laid down by the proctor. One may not complete the inquiry by glancing at the answer sheet of a fellow

test-taker, for example, and the most carefully structured tests are purposefully designed with the intent of making those strategies impossible (e.g. by systematically varying the tests that individual students receive).

For those test-takers who do take up the ends-in-view that are already implicit in the test taking situation, the test may do its job wonderfully: a student will engage in honest inquiry to resolve the indeterminate situation presented by each problem of the test. In doing so, the habits that make up the student's own pattern of inquiry will be, to some degree at least, exposed. Regular errors may be discovered, or unique mishaps, or in rare but wonderful cases entirely new ways of solving problems may be found to drive the students towards the correct response. It is then possible for the teacher who analyses the test results to employ techniques of intervention to discourage those habits of inquiry that result in mistaken responses, or encourage those that work out as desired.

The test itself, however, stands to any student who is taking it first and foremost as a problematic situation that must be overcome in order to return to those ongoing projects organized by the student's own ends-in-view, and those ends-in-view, as a result of the complex environment that the student inhabits both inside and outside of the school, may or may not have anything to do with completing every problem with the correct response. Again a range of techniques is employed to encourage students to take up that end-in-view as their own, by way of grades, competitive communities, explanation of the impact of the test on the student's future and so on. But unless these techniques are successful in directing a student's ends, the inquiry that students engage in to overcome the test-as-

problematic-situation may result in an entire menagerie of ‘bad’ habits, in the first and most obvious instance, those test taking strategies that are called cheating.

Cheating on tests involves a set of techniques that students invent or acquire as a result of successful inquiries into the test-as-a-problem. They qualify, then, as a kind of growth, though of the problematic, non-recursive kind, akin to the growth of a pickpocket who has become better at picking pockets. We can see here though the need to look at the habits produced by some particular growth with respect to their influence on future growth: possession of successful cheating strategies make students less likely to take up the ends-in-view of learning the material covered in the test, instead only strategies to complete the test without learning the material are honed and insofar as those strategies operate without regard to the content of the particular test they are employed to defeat, the student’s habits become narrower rather than wider: the cheat can only cheat, whereas the student who does not cheat but is successful on many differing tests has a different set of habits for each differing test.

That cheating is not the sort of growth we wish to promote as educators will surprise no one, but perhaps it should come as a surprise that the very technology of the test itself is the problematic situation that inspires inquiry to produce the habits of cheating in the first place. Cheating is what we have here called a kind of resistance, and it should be noted that it is produced by the entire complex situation of the student taking the test in the school within the community, and further that it is not in any way limited to the actions of an individual student, but that cheating itself can become a uniting cause for a community

of students, a sub-culture as it were, whose ends-in-view are united against those of the educational system they are found in.

This is a far from ideal situation, though it has its own history because cheating itself is a problematic situation that has become the subject of inquiries into techniques and technologies that might make it impossible, an ongoing arms race that will persist so long as there are tests and students whose interests drive them to consider the test as a problem to be solved by means other than those intended by the creators of the exam. There are other, less obvious modes of resistance though that are more difficult to detect, more difficult then to interrupt, in particular, the habit of doing the bare minimum, of not taking up the project of completing the test in the correct manner at all, but of doing just enough to avoid notice, those habits that remove the test as obstacle but accomplish nothing more.

The Silent Generation

Despite this somewhat troubling situation, and for a whole host of well-intentioned reasons, universal standardized testing has become a dominant paradigm in the world of education. In our current political and economic climate, it seems likely that cuts to educational funding and disruptions of the organization of educators will increase, rather than decrease the importance of such testing within our schools. This strikes us as a traumatic, even catastrophic turn of events.

The end-in-view of scoring well on a standardized test may be taken up by a range of students, though there is plenty of documentation that a wide variety of students from what might somewhat ironically be called ‘non-standard’ backgrounds struggle with standardized tests (see, for example, Good 2003, which deals with ‘performance gaps’ associated with Black, Hispanic, and low income students as well as with girls vs. boys). Approaches that focus on improving the situation with regard to each group that might be statistically identified and then problematized are necessary within the current paradigm, but they fall short of dealing with the more global issue that is a result of the very nature of the test as a technology in its own right.

There have, on the other hand, been several genealogical studies, in the wake of Foucault, on the exam as a technology (e.g. Ball 1990). These serve as a step in the right direction, as they problematize the exam itself, but they fall short, as genealogies might be expected to, of giving us anything in the way of a solution for the problematic situation they announce.

The real scope of the issue however, and the need for radical effort to resolve the situation, can only become truly manifest for those students living through an education is centered squarely upon the standardized test. I myself watched the high school I attended transform as the state of Colorado adopted No Child Left Behind policy. Whatever it might appear to be from the perspective of those who have dedicated themselves to the noble work of education, from the perspective of the students, the

standardized test becomes a symbol of the total disconnect between the ends of the educational institution and the ends that the students might call their own.

To begin with, the skills that such tests seek to put on display are often skills that have become obsolete in the technological environment of modern student life. It is only a dedication to the social structure that one finds oneself in that could lend any reason to adopting as an end-in-view the mastering of skills that one will need never make use of in light of readily available technology. The vacuum-sealed, technology-free space of the exam already announces the test's tangential relationship with reality. The ease with which even a simple cell phone might be used to overcome whatever problem the test might pose is a testament to gaping void between the ideal conception of the test and its awkward reality.

If our analysis here is anywhere close to truth, one would expect a wave of students who treat the entire educational system, insofar as it has become dominated by testing that must strike at least some portion of the student body as counter to their own ends, as itself a problematic situation to be overcome. This ranges from the obviously problematic students who take up the goal of scoring well on such tests without also aligning themselves with the purposes of the test, resulting in the wide variety of strategies of cheating, to those students who simply understand that committing the bare minimum of effort is often the easiest way to overcome whatever obstacle that school might become.

There is then a critical mass of apathetic students that can be reached such that an informal agreement to avoid all participation becomes the status quo. I would not venture such a hypothesis without having witnessed the event, not only once, and not only in one state, or one level of education. I have watched helplessly as entire classes became battles between teachers who could only at times resort to begging students to react at all. Such a problem can develop without any individual or group planning or executing anything like a well-formed strategy. Instead the collective resistance seems to grow out of the ever-increasing silence that hangs behind the speech that issues from the mouth at the head of the classroom. Day by day as that silence grows, it becomes less and less attractive for any individual student to break it, until it becomes apparently the teacher's responsibility to call out individuals and force them to participate.

This disturbing pattern is, on my view, a result of the disconnection between students' activities in the classroom, organized by ends-in-view that are decided ahead of time and for the general population, and their lives beyond the school's walls, teeming with complexity and organized by a plurality of ends-in-view that differ not only by the individual but within the individual as well. We might re-emphasize that swelling class sizes mean that these issues are beyond the reach of teachers swamped with more students than they can give attention to.

The tension between the school and the students confined to it will only grow so long as the problem is taken up as one that can be solved within the very paradigm that is its root cause. As student resistance to the educational program is problematized and inquired

into without an eye towards the intervention that inspires the problematic growth in the first place, a technological war between students and the educational system develops while calls of blame shift from teachers to parents to the students themselves.

This is neither a problem caused entirely by standardized testing, nor one resolvable simply by removing that particular object from the classroom. The standardized test is instead only symptomatic of an eroding canyon that marks the space between the institutional world of the school and the complex life that surrounds the school grounds. That widening gap though is of terrible importance: as more and more students find themselves subject to a process that they have no active stake in, the potential for dramatic consequence increases. Students whose ends are in obvious conflict with the ends that their school intends them to take up are more likely to drop out, cheat, subvert or worse. That my generation has given birth to the disturbing and as of yet unexplained pattern of violence committed by students upon their peers is a haunting reminder that an environment that alienates students from their caretakers and from their peers is an environment that harbors a potential for horrific rupture.

The technologies of security meant to stave off such violence such as video-surveillance, monitored attendance, armed security guards, metal detectors and the like might be relied upon to prevent particular instances of violent rupture, but they are far and away from addressing anything like the root cause that makes such catastrophes possible in the first place. Only by recognizing that bad habits emerge as the result of the environments they occur within can we begin the process of a reevaluation and reconstruction of educational

practice that will confront the monstrous possibilities that have only just recently erupted onto the scene.

Barring collective student revolt, albeit perhaps of the hollow men, “not with a bang but a whimper” variety, and a full scale inward collapse of the current educational system, we can only sketch out the beginnings of an inquiry that might lead us away from such hazards.

Another Way

While Dewey’s analysis of human experience might give us the foundations for a thorough criticism of educational practice, the inquiry that follows the institution of this particular problem points towards a deep inquiry into the nature of cooperation. Any systematic, generalized approach to education is bound to become entangled in the dialectic of student resistance. If Dewey’s model of human experience bares a coherent relationship with reality, such that learning and growth are always the result of inquiry into indeterminate situations, any educational paradigm that is not first and foremost cooperation with the students will inevitably include the possibility of conflicting ends and the production of habits of resistance. We must recognize that in so far as education is standardized there will be some degree of conflict between students' and teachers' ends, and that ignoring such conflicts is a dangerous thing. Well educated students will have ends-in-view that connect well with their circumstances: they will have grown in ways that allow them to continue to grow in their environment, and in so far as that environment is a social one, that growth necessitates cooperation.

Dewey himself places cooperation at the heart of his *Ethics*, and we would do well to recall his careful formulation,

Cooperation implies a common end. It means that each is interested in the success of all. This common end forms then a controlling rule of action, and the mutual interest mean sympathy. Cooperation is therefore one of nature's most effective agencies for a social standard and a social feeling. (MW Vol.5 pp.44)

Cooperation is only possible in light of a shared end. Until such an end has been established, cooperation is impossible. Once it has been established on the other hand, education is inevitable, as interested parties work together to solve a problem they share. Education is, at its heart, cooperation towards the common end of growth that encourages further growth. It is the production of new technologies and techniques for overcoming obstacles that block the progress of collective projects. And insofar as it is imposed from on high as a technological solution to human beings as inherently problematic material which must be worked into the shape of some set of ideals (the scientist as we saw in Ms. Perlo's ice hands, but also the performer, the athlete, the artist and so on) it will consist of an increasingly complex arms-race between the institution and its wards. Risk, in this case as others, can only be reduced in statistical likely-hood, never to zero, and with the most catastrophic possibilities remaining as inconceivable shadows until the day they make their sudden appearance.

A student population engaged in indolent resistance is no one's fantasy. Unless we work to close the gap that separates the classroom from the surrounding environment however,

we face towards this perhaps overly maudlin image. Cooperation isn't easy of course. It requires the recognition of the real complexity of student life beyond the boundaries of the school, specific to not only the particular community but all the way to the individual student. At the first sign that there is a separation between the interests of the teacher and the interests of the student, the dialectic of resistance begins. To avoid this entanglement requires something like a move from what Mary Parker Follett called integration. Her pioneering work on conflict resolution might be usefully applied in the classroom:

I have different wants to integrate; you have different wants to integrate. Then there are your wants and my wants to be joined. But the process is not that I integrate my desires, you yours, and then together we unite the results; I often make my own integration through and by means of my integration with you.

(Follett1924)

Or perhaps we might look towards the pragmatic phenomenology that Megan Craig builds out in *Levinas and James*, engaging in the destabilizing interruptions that make up education by, "Responding to such instances with careful, nonviolent attention and staying awake to their indeterminate possibilities" (Craig 191). Following folks like Dewey, Follett and Craig, we might build out a cooperative ethics of education, this would have to stand in for what would otherwise be provided for in a universal plan for educational procedure.

We must here recall the piece of Dewey that opens our first chapter:

A philosophy of education, like any theory, has to be stated in words, in symbols. But so far as it is more than verbal it is a plan for conducting education. Like any

plan, it must be framed with reference to what is to be done and how it is to be done. (LW Vol.13 pp.13)

A cooperative ethics of education would then answer to the 'how it is to be done' part of a plan for conducting education, but in the end, we must leave it at that, for what is to be done will depend upon the myriad of particularities of the individual educational situation a teacher finds themselves in. What is to be done can no more be decided in advance than in medical practice. One must diagnose the situation, discover the patterns of behavior that persist within the unique environment, their modes of production and the conflicts they result in. Only then can we begin the real hard work of designing an intervention that will result in productive growth, eliminating current conflicts of ends. It is perhaps only this sort of intervention that might truly deserve the title of progressive education.

Coda

Extension of the qualities that make up the scientific attitude is quite a different matter than dissemination of the results of physics, chemistry, biology and astronomy, valuable as the latter may be. The difference is the reason why the issue is a moral one. The question of whether science is capable of influencing the formation of ends for which men strive or is limited to increasing power of realizing those which are formed independently of it is the question whether science has intrinsic moral potentiality. Historically, the position that science is devoid of moral quality has been held by theologians and their metaphysical allies. For the position points unmistakably to the necessity for recourse to some other source of moral guidance. That a similar position is now taken in the name

of science is either a sign of a confusion that permeates all aspects of culture, or is an omen of ill for democracy. If control of conduct amounts to conflict of desires with no possibility of determination of desire and purpose by scientifically warranted beliefs, then the practical alternative is competition and conflict between unintelligent forces for control of desire. The conclusion is so extreme as to suggest that denial in the name of science of the existence of any such things as moral facts may mark a transitional stage thoughtlessly taken to be final. It is quite true that science cannot affect moral values, ends, rules, principles as these were once thought of and believed in, namely, prior to the rise of science. But to say that there are no such things as moral facts because desires control formation and valuation of ends is in truth but to point to desires and interests as themselves moral facts requiring control by intelligence equipped with knowledge. Science through its physical technological consequences is now determining the relations which human beings, severally and in groups, sustain to one another. If it is incapable of developing moral techniques which will also determine these relations, the split in modern culture goes so deep that not only democracy but all civilized values are doomed. Such at least is the problem. A culture which permits science to destroy traditional values but which distrusts its power to create new ones is a culture which is destroying itself. War is a symptom as well as a cause of the inner division. (LW Vol.13 pp.171-2)

The French poet was wrong when he said: "Expel nature, she comes back at the double". There is no expelling her, she is there all the time. We have dwelt on the

question of the transmissibility of acquired characteristics. It is highly improbable that a habit is ever transmitted; if this does occur, it is owing to a combination of many favorable conditions so accidental that it will certainly not recur often enough to implant the habit in the species. It is in customs, institutions, even in language, that moral acquisitions are deposited; they are then transmitted by unceasing education; it is in this way that habits which pass on from generation to generation end by being considered hereditary. But everything conspires to encourage the wrong explanation: misdirected pride, superficial optimism, a mistaken idea of the real nature of progress, lastly and above all, a very widespread confusion between the inborn tendency, which is indeed transmissible from parent to child, and the acquired habit that has frequently become grafted on to the natural tendency. (Bergson 1935)

“Accordingly, when, lying awake at about half-past five on the morning of April 18 in my little ‘flat’ on campus of Stanford, I felt the bed begin to waggle, my first consciousness was one of gleeful recognition of the nature of the movement. ‘By Jove,’ I said to myself, ‘here’s B.’s old earthquake after all!’ And then, as it went *crescendo*, ‘And a jolly good one it is too!’ I said...

“The emotion consisted wholly of glee and admiration; glee at the vividness which such an abstract idea or verbal term as ‘earthquake’ could put on when translated into sensible reality and verified concretely; and admiration at the way in which the frail little wooden house could hold itself together in spite of such a shaking. I felt no trace whatsoever of fear; it was pure delight and welcome.

“‘Go it’, I almost cried aloud, ‘and go it *stronger!*’... (James *Memories and Studies*, quoted by H.M. Kallen in *Why Religion*, quoted by Bergson at great length in *Two Sources of Morality and Religion*, 1935)

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