"There is the same sort of advantage in having conceptual frameworks manufactured and on hand in advance of actual occasions for their use, as there is in having tools ready instead of improvising them when need arises."—John Dewey

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John Dewey: Beyond the Centennial

I

THE most comprehensive value criterion Dewey would have us build into our conceptual framework as teachers still stands as a dynamic challenge to education: "The educational process has no end beyond itself; it is its own end. . . . Since in reality there is nothing to which growth is relative save more growth, there is nothing to which education is subordinate save more education." ¹ This value criterion "must find universal and not specialized limited application." ² The full range of experiences and problems available must be confronted if growth in one direction is seen in its relation to "continuing growth in new directions."

But those of us who are concerned to fashion a curriculum must have more to go on if we are to determine the kinds of experiences or problems to include and the kinds not to include under the "growth for the sake of further growth" criterion. What Dewey calls "intermediary propositions" are needed in order that the proposed "universal" criterion effectively guides the selection and rejection of curriculum—even report card—content. And if we undertake such research, then we must focus upon the theory of thought, intelligence and learning upon which the growth criterion was built and to which it must finally submit. But here, too, Dewey leaves work to be done.

In discussing thought and one kind of its workings he tells us that he has "touched only upon the fringes of a complex subject" and that he will be satisfied if he has directed our attention to "neglected" aspects of the problem of thought. Dewey's conclusions on these two interrelated matters suggest that we can proceed more adequately not simply by mastering and applying, but also by reconstructing and extending his own theories. The task is no less than that of sharpening our most important "tool"—our conceptual framework.
II

For Dewey intelligence is a procedure, activity or function rather than some thing located inside some other thing. It is a behavior which is directed by purposes, ends or goals. "Ends are foreseen consequences . . . which are employed to give activity added meaning and to direct its further course." As such, ends are not "terminal points of activity" but rather "redirecting pivots in action." And they are ends only when fashioned in terms of the means to their achievement.

To have purpose—anticipation or expectation—fashioned in terms of the means to its achievement is to have symbols. The process or activity of ordering means to ends is symbolic—a case where a future, a non-present, is represented in the present. "A being which can use given and finished facts as signs of things to come; which can take given things as evidences of absent things, can, in that degree, forecast the future; it can form reasonable expectations. It is capable of achieving ideas: it is possessed of intelligence." 4

These notions can be illustrated as follows:

<table>
<thead>
<tr>
<th>Symbols or Method</th>
<th>Interpretant</th>
<th>Referent (or Object)</th>
</tr>
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<tbody>
<tr>
<td>Means</td>
<td>Interpreta</td>
<td>Referent (or Object)</td>
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<td>Ends</td>
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<td>Past . . . . . . .</td>
<td>Present . .</td>
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<td></td>
<td>Future</td>
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In developing his conception of symbols and their interrelations Dewey notes quite often his indebtedness to Peirce. According to this view there are three requirements to be met in order that a symbol be present. First, there must be something which represents; second, there must be something which is represented; and third, there must be something which makes the connection between the two. In the words of Peirce, "A Sign or Representamen, is a First which stands in such genuine triadic relation to a Second, called its Object, as to be capable of determining a Third, called its Interpretant . . ." 5

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entiates between symbols or conceptions on the one hand and "existential matters" on the other. Symbols may represent symbols or they may represent non-symbols. The terms "laws of logic" represent "abstractions" or symbols in the form of rules while the term "apple" represents something other than, but in another situation capable of becoming, a symbol.

Operations, to anticipate, fall into two general types. There are operations that are performed upon and with existential material. . . . There are operations performed with and upon symbols. But even in the latter case, "operation" is to be taken in as literal a sense as possible. *

Here Dewey is rejecting two historical traditions: First, there is that tradition which exhausts intelligence in knowledge and deductions therefrom; and, second, there is that tradition which depreciates ideas or theory save where those ideas or that theory lead directly to "practice," which, in its turn, is conceived as something other than practice with and upon ideas. The former arbitrarily limits intelligence to knowledge while the latter dangerously approaches "anti-intellectualism." What Dewey is holding is that there are means, ends and methods which are symbolic, ideational or theoretical; but also there are means and ends which are not symbolic, ideational or theoretical, but which are serviced by method which is symbolic, ideational or theoretical.

Intelligence, then, is not the exclusive property of those who work focally with "signs and number." The full act of intelligence also may include things, materials and tools. It is evidenced not only as the mathematician or philosopher but also as the carpenter, fisherman, housewife or automobile mechanic goes about ordering means to ends characteristic of his or her respective experiences. At the point of method, however, symbols are generic to all instances.

According to this Deweyan account of intelligence, a creative education would be organized around problem situations. Without an end-in-view there would be no problem. Without a problem there would be no learning. Method would receive primary emphasis with full recognition of the fact that it always entails ends and means and cannot operate in a vacuum. And since the conception of symbol, located at the heart of method, has been fashioned in light of "that experimental method by which all the successful sciences . . . have reached the degree of certainty that are severally proper to them today," the method of intelligence is one with the method of empirical inquiry. Critical and creative thinking is one with the procedures of scientific thinking. Thus the "growth for the sake of further growth" criterion comes to include the method of science—or the method of critical thinking—as one, if not the, major principle of selection.

III

Dewey made much of the point that a symbol in isolation has no meaning, that reasoning as a process of "develop- (Continued on page 38)


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ing the meaning-content” of ideas “neces-
sitates the noting of relations of symbols
to one another the formulated relation
constituting a proposition.” To accept a
proposition is to commit oneself to “such
and such other relations of meanings
because of their membership in the same
system.” * Such a system he would label
a “universe of discourse.” And although
Dewey left it to others to spell this out
we may note with him that the terms
physiology, biology, psychology, chemis-
try and sociology may be taken to repre-
sent distinguishably different “universes
of discourse” and have become cate-
gories by means of which we structure
curriculums.

But the point to be made for educa-
tional theory is that these terms are dif-
ferentiations of theoretical or symbolic
means, ends and methods. That is to say,
there are ends, means and methods
which are theoretical or conceptual and
which may be labelled psychological or
biological. A psychological end, or prob-
lem is a theoretical end or problem gen-
erally and an end or problem made up
of psychological theory particularly. The
means or “needs” of psychology are sym-
ols or propositions; and the method of
psychology is broadly that of the method
of science. To say that someone has psy-
chological or, for that matter, biological
problems, needs or “wants” is to say
either that someone is a psychologist or
biologist or requires knowledge provided
by these disciplines. To say that the in-
fant is born with biological needs is to
say that the infant is born a biologist or
requires for some other purpose knowl-
dge provided by the science of biology.

The above is not intended to be whims-
sical. It should be taken as technical and


important for a Deweyan based theory
of learning and problem solving. First,
the rather popular practice of assuming
that the individual, child or adult, is
partitioned in the same manner in which
we can catalogue the various sciences
cannot be supported either by a single
science or by a collection of several
sciences. The same holds true with re-
spect to the three Rs. Only books, li-
braries, curriculums and conceptualizing
can be so partitioned. Second, to use the
term psychological, biological or phys-
iological to qualify something other
than knowledge, knowledge gaining, or
objects located and described by ter-
minology distinguishing these universes
of discourse is to beg an important ques-
tion: “Within what science or universe
of discourse is this claim substantiated?”

Plainly no hard and fast lines can be
drawn between universes of discourse.
Many established generic meanings—
“overlappings”—are to be found. But
failure to recognize at least the distinc-
tion permits one to “jump theoretical
fences” or to “hop, skip and jump”
around the various sciences to come up,
possibly, with an assertion like this:
“Learning is an affair in which the emo-
tional strain between the orbit of Mars
and the gold-holdings of France during
any given fiscal year manifests itself in
the mutation of genes of the Socialist
State.” Indeed, this is a rather extreme
version of the very theoretic incompre-
hensibility of which some educational
theory is accused. The problem is really
one of locating and building a universe
of discourse, a conceptual framework,
or a commonly understood “system of
meanings,” distinguishable as educational
theory.

Throughout his writings Dewey at-
ttempts to avoid—and he tells us as he
does this—a misuse of symbols. His was
a *methodological* "system of meanings" as if to suggest that the quest for an educational discipline was one with the refinement and extension of methodological discourse. Sourced in Aristotle this discipline directs itself to those activities which exhibit and yield to, or are formed by, controlling agencies of a self-imposed sort.

Methodological discourse is distinguished by such concepts as *means, ends, methods, order, control, symbol and mediation*, as against, for example, biological discourse which is distinguished by such concepts as *organism, environment, reproductive organs, and mutation*. And since methodology aims at providing knowledge explicitly about activities and the manner in which they may be ordered or methodized, then it does hold promise of releasing the teacher in his professional capacity. Whatever the case, the "growth for the sake of further growth" criterion is helped only at the point of differentiations of method-of-science problems. No new principle can, thus far, be added to that of the method of science or critical thinking within the conceptual framework.

**IV**

In discussing another kind of intelligence and learning with methodological language, Dewey provides the means for the reconstruction and extension of his own theory—and for the inclusion of another "growth" principle. He rejects as inappropriate such terms as *feelings, habits, emotions and attitudes* when describing what there is that is *more than symbols*, thus far conceived, yet *also of thought and intelligence*. He claims that we *think* qualitatively as well as "in terms verbal and mathematical."

A case in point, he tells us, is the thinking that goes on in artistic endeavors. "The doing and making is artistic when the perceived result is of such nature that its qualities as perceived have controlled the question of production." An end may be a quality and, "as perceived," it enters to "control" activity. That is, quality operates as an end and it operates as method. Further, "Thought that is artistic is as much a case of genuine thought as that expressed in scientific and philosophical matters."

Now traditionally the term *quality* has been taken to signify a property, attribute or component of an object or event, e.g., "This apple has a red quality." Or it has been taken to signify a standard of excellence—a value criterion, e.g., "We mustn't sacrifice quality for quantity." But while honoring these meanings, Dewey is using the term within the context of methodology and thus attributing to it another meaning. However, it remained for some students of Dewey to

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9 John Dewey. *Art as Experience*. New York: Minton, Balch & Co., 1934. p. 48. Elsewhere in his writings Dewey does equate the method of intelligence with the method of science and leaves the problem of accounting for *more than this* that is yet human to psychology, sociology and biology. But the problem here is not to make Dewey consistent, nor to speculate what he "really" meant. Rather it is to develop a major theme in his writings which has been largely neglected.


give the term further methodological precision, to link it up with Dewey's general theory of intelligence and learning and with the growth criterion.

According to this methodological extension of Dewey's thought, qualities, too, are symbols. In order to gain or have, for example, the quality we designate with the term "white," we must institute a relationship of contrast between that quality and some other quality. A relationship of contrast must be instituted in order that the "it" we label "white" be present. In common sense language we might say that if all were white there would be no white. Thus, qualities are symbols by virtue of constructed contrasts. A qualitative symbol is to be distinguished from a theoretical symbol by the fact that a quality presents itself by representing the relationship out of which it emerges or by means of which it gains distinctiveness. A theoretical symbol, on the other hand, can be had without its referent also being present. Such qualities as those designated by the terms "anger," "joviality," "indignation," "formality," "permissiveness," "Gothic," "Cubism," and "circus" are symbols. They require for their occurrence the construction of a relationship of contrast.

Quality operates as an end. An architect may seek to achieve a structure capable of being labelled "Classical." A dramatist may seek to gain the structure (himself) capable of being labelled "indignation." And a painter may seek a canvas capable of being labelled "Cubism." Quality as end may be termed "Total Quality."

Quality operates as means. In order to gain the quality we call "Classical," the architect selects as means such other qualities as horizontality, angularity, fluted column, and porch. The drama student presses into service a qualitative kind of voice, stance, gesture and term as means to gaining indignation. The painter utilizes a qualitative kind of line, plane, texture, color and proportion as means to the end called "Cubism." Conceived as means such qualities may be termed "Component Qualities."

Another principle of selection—qualitative method—may now join with the method of science under the "growth for the sake of further growth" criterion.

We may now locate descriptions of relationships between theory and quality—between theoretical intelligence and qualitative intelligence—for purposes of applying the growth criterion to curriculum construction. Four relationships may be noted: 12

Theoretical Predominance is a case where theory is ordered to gain theory. (A child asks a question or seeks to answer a question; a philosopher gives a

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12 After Villemain.
lecture or writes an article; and a group undertakes a discussion.) In this case quality is an inescapable “background.” That is, theorizing cannot go on save in a qualitative setting and along with such qualities as permissiveness, concentration or hesitation. In such cases qualities are to be evaluated in the extent to which they help forward the theorizing.

**Qualitative Predominance** is a case where quality is ordered to gain a quality but where there is theory functioning in an instrumental role. Theoretical symbols are to be found as children count and chant while skipping rope or bouncing rubber balls, as a “caller” functions at a barn dance or as one extends sympathy to another person. Theoretical symbols of one sort rather than another are pressed into service to help gain the quality of cynicism, depression, levity, frolic, friendliness, sorrow or a poetic form. In such cases theoretical symbols are to be evaluated in the extent to which they help forward the qualitative means-ends abroad in the situation.

**Reciprocity** is a case where both theory and quality function as means, ends and method. A bulletin board is a qualitative total, yet contains also theorizing in the form of information, descriptions or “copy.” A dinner situation may involve those orderings of qualities we call manners and informality, yet be constitutive also of theorizing moving to conclusions about the present political state of affairs. “Group Process” in education is another illustration. In such cases both theoretical and qualitative methods constitute the controls, the means and ends.

**Qualitative Independence** is to be found in those means, ends and methods which entail no theorizing. A painting, sculpture, temper tantrum, a moment of affection, a whirling-dancing presence or a ripple of laughter in the classroom are cases in point. (Indeed, a person doesn’t lose control when he becomes angry or “mad.” He gains—employs—anger as a control.) In such cases only pervasive quality operates as the method.

Dewey’s point to the effect that no experience can proceed without qualities is here joined with the contention that some experiences can proceed without theory. All teachers, then, are potentially art teachers. They become art teachers when they single out, point out to others, provide for or institute qualitative relations. Further, qualities must be presented in order to function as method—in order to be learned—in the classroom situation. Thus, in replacing the emotional theory, the theory of qualitative intelligence at once makes more exacting demands upon and more adequately releases the work of the professional teacher. The notion of “inner forces” inhibited, repressed or undeveloped, but nevertheless inside somewhere, is hereby replaced by the theory of qualitative method. Qualities are public and sharable. They are to be confronted, evaluated and re-composed, whether in the form of indignation, home life, “classroom atmospheres,” or our cities.

V

The reconstructed theory of intelligence proposed above claims to join the problem set forth in the introduction. The amalgam of means-ends abroad in the human situation to be evaluated by the growth criterion may now be differentiated into: (a) theory to gain theory with quality in service; (b) non-theory or quality to gain quality with theory in service; (c) theory and quality to gain
theory and quality; and (d) quality to gain quality. This covers the full sweep of matters to be addressed by the growth criterion. Educators are brought that much closer to choosing and orchestrating the plethora of means-ends—learnings—in such a way that growth in one direction is seen in its relation to "continuing growth in new directions."

A creative curriculum would rest upon an esthetic foundation. For in the long haul Dewey would "award the palm," not to science, but to art experience. "Art—the mode of activity that is charged with meanings capable of immediately enjoyed possession—is the complete culmination of nature, and ... 'science' is properly a handmaiden that conducts natural events to this happy issue."

And, "Esthetic experience is a manifestation, a record and celebration of the life of a civilization, a means of promoting its development, and is also the ultimate judgment upon the quality of a civilization." 14

But a creative education in theory and quality carries with it the courage and responsibility to relinquish, if necessary, some of our current and, in some cases, closely guarded conceptions.

For, if the hypothesis herein advanced is tested and found to hold, then we must be willing to give up the emotional theory, the notion that art experience is restricted either to the "fine arts" or to departments of art education, the view that theory is of value only when it leads immediately to non-theory (practice) and the conception that removes from the domain of public education those qualitative moments of sympathy, sor- row, "celebration of ideals realized" so precious to shared living and so important to sustaining us during turning points in our personal lives. It remains to be seen whether or not we will pay the price.


Science and Mathematics
(Continued from page 27)

McCloy 12 stated the point well in his admonition to scientists and those who survive in a world of science:

You have to do more than sign an intermittent manifesto from the isolation of your laboratory demanding of the government some immediate course of action. It requires added knowledge, added reading, added thinking and added experience, all inspired by the scientific spirit. It requires dealing, incidentally, with subjects wherein the variables are apt to be far more numerous and baffling than in any scientific problem you have thus far encountered.

The implication is clear. Science does not end with logical analysis of the holes in knowledge, with the logical search for logical materials to be logically ordered. It involves a broader dimension of analysis, synthesis and recombination, all of which constitute creativity. Without such creativity, the atmosphere of science can at best be sterile and humid.

As stated by Charles Kettering, "Logic enables you to go wrong systematically." Creativity is the key to the escape from our older misconceptions.
