Jacques Barzuns
"*Begin Here : The Forgotten Conditions of Teaching and Learning*"
The University of Chicago Press - 1991
Extract Pages 83 - 95:

The Urge to Be Pre-Posterous

Notes for Seminar on Theory of Education,
Columbia University Teachers College, 1969

Some of you may know what I mean by the word preposterous when applied to education. It stands for a tendency not commonly perceived; that is why it has no official name in educational theory. It is simply: the cart before the horse. The great example in the American school is the look-say method by which reading has been taught as if beginners were practiced readers. I say practiced, because not all adults who can read see the shape of a word at a glance as if it were a Chinese character.

A second, more recent, example is the New Math: it is the subject I want to use as a starting point for our discussion. Why do serious, educated people intent on planning or improving education so often turn pre-posterous? Here is a witness who shows us that the failing is widespread and anything but new: "This warning would not be needed if it were not that most teachers, through ostentatious haste, begin where they ought to end." That was written nineteen hundred years ago by the Roman teacher Quintilian in his great book on education.

What does his explanation by "ostentatious haste" imply? It suggests that the teacher wants to show off results too quickly-a great temptation when previous results have been poor and a new hand is put in charge. The creators of the New Math were called in to correct the ineffective teaching of their subject. They observed one bad mistake in the current ways of presenting arithmetic, geometry, and algebra: pupils were taught procedures but were never given any reasons for going through the motions, were never shown how their work with numbers and figures was part of a unified system, based on equivalent ways of dealing with symbols of magnitude. Certainly they were never told what fun it is to play with numbers and discover their properties.

From seeing that the teaching of arithmetic could be made more interesting and challenging by a dose of imagination and reasoning, the makers of the new program concluded that teaching calculation was trivial and must be replaced by "conceptual work." They taught "Commutativity" and "Associativity" as part of addition and multiplication and went on to prescribe difficult feats of a kind that belongs to pure mathematics, has no daily utility, and may even undermine it. For instance, they asked pupils who could barely cipher in our common system built on the base 10 to construct and work with systems based on 12 and 8. Most teachers were themselves taxed beyond their powers and would-be helpful parents skirted nervous breakdowns.

This demand was only one among others of the same kind: number theory, sets, relations, probability, and other delightful aspects of numeration were drawn on to flex the muscles of beginners. The group planning the new math at MIT was having a good time, because these large subjects naturally interest them, whereas multiplying fractions and extracting square roots are dull and can be left to hand calculators. How to cut up the new complexities for child consumption was the attractive task. It was as good as a game. If the game succeeded, it would be a great leap in school performance, visibly due to the intervention of high professionals in the lower-school curriculum.

That feeling was natural enough; it is the glow of ostentation that Quintilian noted a while ago. But there are other motives behind the modern desire to "begin where the teaching should end." One is the fear of being incomplete and inaccurate-too far behind the point that "the profession" has reached. In short, it springs from a misplaced regard for scholarship.

How else explain some of the grammars handed to youngsters of 12 to 16? They are books of four to five hundred pages, filled with terms special to themselves and illustrated with quasi algebraic formulas. They propound in practice one of the competing doctrines of modern linguistics-structuralist, transformationist or other. They shun the use of such words as noun, object, preposition, which might enable the students to understand what most people continue to say when dealing with sentences. For those words are "inexact" and "unscientific." The advance of linguistic theory after Henry Sweet, Saussure, and Jespersen has made them obsolete.

With this attitude goes the abandonment of two related ideas that up to now have never been absent from the theory of education. One is the notion of rudiments. The other is expressed by the word pedagogy. "Rudiments" comes from the root for "tear apart." They are the portions of a subject torn apart from the rest to serve as points of entry into the field. Thus the letters of the alphabet are torn from the word and sounded to show the child how to read and spell. Likewise, the so-called parts of speech are convenient groupings to display the elements of a sentence.

What bothers the superstitious modern mind is that these and other rudiments falsify-and they are not the whole story. Just think: using the alphabet by itself in phonics is a fraud; the same letters do not always mean the same sound; and the parts of speech similarly overlap and fail to explain everything that goes on in human discourse. Poor children, who from the word go (literally) are misled! The fact that phonics teaches them how to read and oldfashioned grammar helps them to write acceptably seems a crude kind of success compared to the righteousness of total disclosure of what's what from the start-as if there would never be another chance to modify and expand knowledge later on. It is this compulsive scientism that makes for the nationwide failure to teach the so-called basics the all-important rudiments-from the kindergarten onward.

The second blunder wrapped up in this misplaced effort explains why the word pedagogy ("child-leading") has disappeared: the child has also disappeared. About the turn of the last century thoughtful people found that schools were often little more than places of torture for the young. Nothing done there seemed rational. The rote learning, the unimaginative classes and teachers, and the humiliating punishments must be replaced by enlightened programs and methods. The progressive school was conceived, and as in the Declaration of Independence the child was proclaimed free and equal.

Many of the reforms were all to the good. But as everybody knows, the new conception of the child was utopian; it often went so far as to expect that he or she should decide what to study, supposedly in response to inner "needs." That was pure preposterism. It equated a desirable goal, the self-directing adult, with the child mind and will as yet undeveloped. This, again, was to skip the rudiments and jump to the full-blown achievement.

No doubt there has been a retreat from the anarchic ways of the Lincoln and Dalton Schools, but "the child" has never been the same. Notice that he is no longer called a pupil but a student, just as old arithmetic has been inflated into mathematics, a palpable misnomer. Discipline is also passé as a word and a fact. At home, out of that same egalitarian feeling, the child is treated as an adult very early in life; he is not compelled to act against his wishes but is bribed, or reasoned with, regardless of his ability to follow reasoning; and from puberty on, he is very likely to be master of his own life and a power in the household.

There are of course economic and social factors in this transformation of the family, but the school, which now complains of youthful arrogance-extending at time to armed revolt-must bear part of the responsibility. It taught the parents, in the PTA as well as in the classroom. Saturated with tender feeling, the institution abdicated its authority.

Worse still, its failure to teach denied the young the sense of accomplishment, of growing power, that they instinctively seek and have a right to expect in return for long years of restricted life. It is no wonder that, bored beyond endurance by fruitless schooling, they exercise power in the only way they know: indiscipline that often spills over into violence. Such is the price of preposterism.

It may seem a paradox that in parallel with the rise of the "adult child," the debased version of the progressive school introduced schoolwork-as-play. The contradiction disappears if instead of play one thinks of entertainment. The term means a mixture of serious and playful. It is for entertainment only that adults in groups let themselves be cooped up indoors for a couple of hours, and the same lure became part of the new "methods" solemnly taught at teachers' colleges-keeping the class amused through "imaginative devices" that break up continuity and bypass drudgery-in reality, the make-believe of dramatization, research, audio-visual machinery, and "projects" of all sorts. Such a blend of play with casual learning was indeed appropriate for the preschool years, but when prolonged it instilled incurably bad habits. Sesame Street, which succeeds by being a show, is said to create in many children the expectation that all learning will be fun in the same entertaining way.

Teachers are now impelled by these combined ideas and emotions until it seems as if they shared the pupil's dislike of hard work and looked to class time for the relief it brings by its varied "activities." Given the heavy burden of administrative duties that teachers carry, it is perhaps a forgivable weakness; but how costly in results, the country is beginning to notice.

Consider one example of "research" as observed. When talking about English composition, the teacher had explained the use of the dictionary and the way it is put together by a team of scholars. "All right, boys and girls, we'll now make a dictionary of our own." This called for getting the class to organize itself into teams-it wouldn't be right to assign the grouping. Then came the instructions: "You get together and choose the six words that you'll write up-try not to make it too simple, such as cat and cow. Now as I explained, you can't decide all by yourselves what your words mean-remember what I said about usage. So you'll have to ask each other, and other people too-at home, in the playground, anywhere-what your words really mean, and write that down each time. We'll take two days to do that, and when you think you know, on Wednesday, we'll use the period here to write some good definitions; I mean, you will get together and write them."

Such is the character of "research, of "independent work," and of "realistic practice in language arts." It hardly needs saying how preposterous it is, how false in its several pretenses. Usage is the most elusive of realities and defining is one of the most difficult acts of thought; it is a task for philosophers with a mastery of language.

Those painful or playful efforts of children cannot teach them anything useful, since a proper critique of their work would itself require explanations above their heads. In the event, the pupils were told to act as one another's critics themselves. They did find some flaws pretty quickly-as when they could not understand the definition. But had they each written an essay on a subject within their grasp, they would have learned just as much, if not more, and saved a great deal of time for further learning.

Though the fact may not be obvious at first glance, the cart before the horse is the principle of other school subjects and exercises now thought desirable. Social studies is one massive example. It is so by the very nature of that plural name. Originally, social studies, replacing history, were to be the bright up-to-date account of the way we live now-no more dreary reports of the dead past. All the social sciences would be enlisted in creating the panorama. The shift away from history was part of a widespread movement in scholarly opinion, and it was expected that the young would jump at it from the sheer joy of Relevance. But putting together fragments of half a dozen social sciences proved difficult for the planners and even more for the teachers. Economics-to take only one-is no joke; it cannot be improvised out of newspaper knowledge of the world.

So the projected synthesis failed, and under the same label a new kind of thing developed-a catch-all ushered in with horrendous jargon about "basic conceptual ideas" and the absurd aim of developing in the young "the powers of inquiry." The students, according to one theorist, were "to reflectively examine the problematic areas of American culture;" that is, become nothing less than little Lewis Mumfords and David Riesmans. This "problem approach" would foster "problem solving." What it means was collecting a host of facts from various sources and trying to relate their multiple meanings to one topic. Except when done by a ripe scholar, it is bound to be bits and pieces-no continuity and no context.

To appreciate the difficulty, take the adult profession of city planner. The knowledge it requires embraces items drawn from economics, sociology, demography, public health, architecture, landscaping, and engineering, as well as from law and government, local, state, and federal. The facts that are pulled out of these specialties can teach very little by themselves. Isolated, few will be remembered, and fitting them into a coherent pattern cannot be done by native wit alone.

Now most social studies courses did not even draw on such solid subjects; they made a hodgepodge of scattered data sprinkled with platitudes and pieties and then labeled so as to attract parents and youngsters: Family Living; Shopping and Community Resources; Values, Behavior, and Society. Whatever the stuffing, social studies reproduce this unworkable pattern. Even

the old, much abused civics course, with its weekly supplement of "curnivents," showed better organization and continuity. Whatever the substance, to learn from composite studies presupposes long years of systematic work and much experience of life.

It may surprise you if I mention next as yet another instance of the pre-post fallacy the use of multiple-choice tests. My reason is this: it takes pretty thorough knowledge to detect error. Remember that in those tests the three wrong answers are made to look plausible. They are a piece of subtle deception practiced on minds that have just begun to acquire the outlines of a subject. The students have no sizable store of details with which to surround and defeat the falsehood. A scholar or a well-read reviewer will quickly spot a misstatement in what he reads in his own field, the reason it stands out being that it goes against a whole cluster of familiar facts. As Banesh Hoffmann showed in his investigation of testing, even Ph.D.'s with tenure at his own college made mistakes on the official sample test he persuaded them to take. [" `Best Answers' or Better Minds?" The American Scholar, Spring 1959]. The student, the neophyte, is once again treated as a fully trained mind.

One last case: sex education. I am not concerned here with the question of giving or not giving such a course in public schools; that is another debate. I refer only to the way the subject is presented in some well-received programs. Teacher and textbook display to young people the whole range of adult sexuality, from its physiology and its personal, ethical, social, and medical consequences to the numerous variations it assumes in practice. All this is conveyed through film strips, color illustrations, and a surfeit of spoken words, for the manual tells the teacher to elicit opinions, preferences, expressions of feeling, and even confessions. It is hoped that by stimulating discussion as in group therapy, the teacher will put the members of the class at their ease on the great subject.

Now any adult who is familiar with the struggling emotions of late adolescence and its suspicion of inculcated facts, and who also reflects on the complexities of sexual behavior in civilized society, may well wonder at a program which not only invades privacy and promotes gossip, but which, in demanding selfanalysis and philosophic ease, puts first what may, with luck, come last.

Having shown the ways in which modern schooling has been lured again and again to defy common sense, I must in fairness give some attention to what might be done instead. This means giving thought to the rudiments and the pedagogy that are being neglected-indeed, suppressed. And since mathematics has suffered the latest of the innovations I find harmful, it is the school subject on which I shall venture to offer some positive suggestions.

To begin with what I said earlier, the New Math includes one excellent idea: learners ought to be told the why of what they are asked to do. Endless operations done by rote are deadening. But of course the age of the pupil limits the kind and amount of reason that can be given. Good pedagogy says: to show connections is the best teaching, and connections imply something already present with which to link the new. So the first requisite in a math program is that each step should be mastered before going on to the next, just as each lesson ought to be next in some intelligible way.

The first step was decided on long ago: after learning the digits, the pupil is shown how to add, subtract, multiply, and divide. He or she must work by hand until these operations are done with the utmost facility-and the simpler ones mentally. The blanket objection to all rote learning and to frequent drilling is foolish. At the appropriate time, the multiplication table has to be learned, and the only way is by rote. No mastery in any subject is possible without much memorizing and practicing, from playing the piano to becoming a physician. But even with the multiplication table, noting some curious features can lend a bit of charm to the effort.

Nowadays any discussion of math in the schools raises an important question that must be met. The world of work complains that high school graduates can't do simple ciphering; corporations spend billions on remedial training. At the same time, the world of science often argues (though not always) that this "consumer math" is a waste of time. Now that hand calculators are cheap, let them do the operations while the young mind grapples with true mathematical difficulties. The boy or girl who will work in the supermarket can count on a cash register that adds and makes change; and the other pair, who will work in Bell Laboratories, will have had a proper grounding in the science of numbers.

This is the old quarrel between pure and applied mathematics. The famous Hilbert, at a world congress of mathematicians, opened the session by declaring that applied mathematics had nothing to do with pure mathematics, it never had had nor ever would have. When the New Math program was made public, it was avowedly an introduction to pure mathematics, and several distinguished applied mathematicians attacked it as utopian and predicted its failure. Meanwhile, there has been a continual outcry: the prestige and the economic health of the country require a steady supply of scientists; these must be accomplished mathematicians; therefore training appropriate to their future career must begin from the earliest grade. In turn, this is disputed by engineers and electronics wizards, who say that innovation comes not from mathematical insight but from a sense of "how things work." Mathematics is the medium of the generalizer, not of the inventor.

It is obviously impossible to foretell who will check out groceries and who will turn lasers to some new use. In any case, the public school has no choice but to teach the traditional arithmetic and its sequels, going from the four operations to fractions, decimals, percentage, the area of figures, factoring, simple equations, graphs and variables, and so on. For it must not forget the American people's ordinary occupations, including the mechanical trades, which are shamefully neglected in all the talk about public education.

The best reason for keeping hand calculators and computers out of the classroom is that their use leads to a know-nothing kind of ability, and a particularly crippling one. A calculator will go through steps rapidly and a computer will both solve complex equations and give quick results for changes in any of the terms. But the manipulative skill by which problems are fed to the machine does nothing to familiarize the learner with the successive forms that the step-by-step computation takes. Working out these steps by hand gives the mind that "feel of the material" which is essential to mastery in any art or trade. Schooling is meant to implant knowledge and skill, not the habits of the trained animal. Unless children are brought to see what they are doing when computing, the shopkeeper won't be able to tell when his cash register runs wild, and the artisan won't know which calculations

could reduce his guesses to figures when he wants to save time, money, or materials. And there is also the white-collar commuter whose daily paper confronts him with graphs: he should know how to read them and draw the right conclusions.

As for the reasons by which the handling of numbers is to be justified so as to create interest and incentive, they fall into two groups-one is the finding of unknowns, a great set of tricks that is truly astonishing when well displayed. The other is the exposure of common fallacies-for example, the belief that a boundary line of a certain length will enclose the same area no matter what its shape. The teacher draws a square 10 inches to a side: the area is 100 square inches; then a rectangle 1 inch wide and 19 inches long. The latter has the same boundary length as the square: 40 inches, but its area is not 100, it is 19 square inches.

Advanced work consisting of geometry, algebra, and trigonometry is more effectively taught in parallel and overlapping fashion, as is done abroad, than one at a time in successive years. Connections are then more obvious, variety helps sustain interest, the methods of one science (e.g. algebra) when used in another are strengthened, and the underlying notions of logic, symmetry, and so on are seen as persuasive. Planning such a combined course to cover three years also reduces the amount of each component to its essentials, and the resulting saving of time may leave room in high school for a semester of calculus.

The creators of the new math were clear that their aim was to improve the teaching of science as well as that of arithmetic. But reform in that field did not follow and complaints continue as before. It is agreed fairly widely that "General Science" is as bad as Social Studies-a hodgepodge dished up, all too often, by incapable teachers. Yet public schools must in one sense remain "general;" they cannot specialize in the training of future scientists by giving them courses of professional quality. The school could neither require them nor expect more than a few to elect them.

The result of the present shoddy compromise is that most citizens are deplorably ignorant of the simplest scientific facts and ideas. They know nothing of the principles on which their familiar domestic machines work and they know less than nothing of the ways of the universe, for their minds often harbor ancient superstitions. They've heard of Newton and Einstein and there an end. The people of the despised Middle Ages knew more of their world-system than that, thanks to word-of-mouth tradition and church windows and sculpture that portrayed the great moments of the Christian religion.

The pivotal idea here is: world-system. Modern science forms a system, just as history forms a stream, and in both subjects the bits-and-pieces program is fatal to learning anything. There is no such thing as "general science" but there is a systematic way of introducing the sciences. One excellent plan has been devised and tested by Wendell H. Taylor and his colleagues at the Lawrenceville School; it would be easy to adopt or adapt it, especially since they wrote a textbook for their own use.

Beginning in the seventh grade, that science curriculum takes the student in six years from the earth sciences through physics, chemistry, and biology, with electives at the end that permit an advanced course to be taken in any of these branches or their extension, e.g. astrophysics, genetics, meteorology. The necessary mathematics is given in parallel.

The logic of the plan is clear: one goes from the planetary system to matter as found on the earth (geology) to its behavior when handled and analyzed (mechanics, hydrostatics, electricity, etc.); then, to its inner composition (chemistry, inorganic and organic), and finally to its still higher organization in living things (biology). True, in one year only the rudiments of each science can be taught, but at the end these rudiments hang together, and the consecutive view of how matter behaves when looked at in different forms and places and with different techniques affords an intellectual experience of the cosmos as well as that rare thing nowadays, a body of knowledge.

For the future scientist, solid foundations are worth more than a scattering of miscellaneous information, no matter how far and wide the fragments may have reached. And for the citizen threading his way among an every-enlarging jungle of mechanical devices, it should be some satisfaction to know why they workwhen they do. At present, he or she is probably unable to explain why one can grip an object harder with a pair of pliers than with the bare fingers, and how the use of electricity in a doorbell differs from its use in the television set.

As for what is meant by salt, acid, and base; how energy may be atomic and biology molecular, what is meant by composition of forces, magnetic field, or ultra-violet light, the answers would strike most people as taking them beyond what a normal human being should aspire to know. Yet a properly elementary treatment of the four sciences associated as at Lawrenceville would enable this vast public to see a host of familiar phenomena so to speak from the inside. Their workings would be remembered without effort, because their embodiments are on every side.

This pedagogical view, by the way, was the prevailing one early in this century, when physical science was touted as "organized common sense" and its proponents appealed to simple curiosity about the trees and the heavens, the steam engine and the telephone. Granted that this no longer suffices and the public thinks Newton's four laws have been "repealed," the former scheme has the merit of feasibility. Newton's laws are still on the books and ought to be in many minds.

What needs to be added to that earlier curriculum is an indication of the historical development of science-accounts of pivotal discoveries and formulations, of great figures and inspired guesses. It not only lends human interest to the work, but it shows the many ways the mind can take to reach data and frame laws. The road is not straight nor the advance steadily forward. Wrong assumptions, negative results have been important too. But all the while the goal has been single: to simplify and unify. All phenomena must be accounted for as parts of a system in which a few forces act uniformly. All particular differences will then be explained by position, time, and quantity.

The goal of schooling bears a direct relation to this great goal of the scientist. Remember that schooling should begin at the beginning and not set out with hopeful endings; that it should make use of reasons and ideas, but not neglect memory and practice; that it should concentrate on rudiments so as to give a body of knowledge to some and the foundations of higher studies to others-well, what is the goal of such schooling? It is to turn out men and women who are not wide-eyed strangers in a world of wonders, but persons whose understanding of what they see makes them feel more at home in our inescapably double environment, natural and man-made.