

Alfred North Whitehead

Alfred North Whitehead (1861-1947) never wrote a comprehensive work in philosophy of education, but he occasionally delivered lectures concerned with educational policy. These incisive talks are collected in his book *The Aims of Education and Other Essays*.

Whitehead and Dewey were contemporaries, and their ideas are in some notable respects similar. Like Dewey, Whitehead stresses the importance of utilizing knowledge, the need to interest students in their work, and the dangers of indiscriminating discipline.

But to what extent are Whitehead's emphases on the concept of "style" and the theory of "The Rhythm of Education" consistent with Dewey's position? The two thinkers display different approaches, which are partially accounted for by their different social and academic backgrounds. Whitehead, an Englishman, was educated and taught at Cambridge University. Dewey was born in Vermont and educated at the University of Vermont. He taught high school in Pennsylvania before embarking on his career in graduate education.

Among Whitehead's compelling thoughts is that "one secret of a successful teacher is that he has formulated quite clearly in his mind what the pupil has got to know in precise fashion." An inexperienced teacher often hesitates to present material in an easily understandable fashion for fear that doing so may rob students of their initiative or creativity. Such a teacher soon learns that the presentation of material in a disorganized, confusing manner results in disorganized, confused students. As Whitehead notes, "a certain ruthless definiteness is essential in education." One further point should be emphasized. Whitehead expresses the view that "A merely well-informed man is the most useless bore on God's earth." He does not say, nor does he believe, that information is useless. Whitehead was himself one of the best-informed persons of his time.

The Aims of Education and Other Essays*

THE AIMS OF EDUCATION

Culture is activity of thought, and receptiveness to beauty and humane feeling. Scraps of information have nothing to do with it. A merely well-informed man is the most useless bore on God's earth. What we should aim at producing is men who possess both culture and expert knowledge in some special direction. Their expert knowledge will give them the ground to start from, and their culture will lead them as deep as philosophy and as high as art. We have to remember that the valuable intellectual development is self-development, and that it mostly takes place between the ages of sixteen and thirty. As to training, the most important part is given by mothers before the age of twelve. A saying due to Archbishop Temple illustrates my meaning. Surprise was expressed at the success in afterlife of a man, who as a boy at Rugby had been somewhat undistinguished. He answered, "It is not what they are at eighteen, it is what they become afterwards that matters."

In training a child to activity of thought, above all things we must be-wary of what I will call "inert ideas"—that is to say, ideas that are merely received into the mind without being utilized, or tested, or thrown into fresh combinations.

In the history of education, the most striking phenomenon is that school of learning, which at one epoch are alive with a ferment of genius, in a succeeding generation exhibit merely pedantry and routine. The reason is, that they are overlaid with inert ideas. Education with inert ideas is not only useless: it is, above all things, *harmful—Corruptio optimi, pessima*. Except at rare intervals of intellectual ferment, education in the past has been radically infected with inert ideas. That is the reason why uneducated clever women, who have seen much of the

world, are in middle life so much the most cultured part of the community. They have been saved from this horrible burden of inert ideas. Every intellectual revolution which has ever stirred humanity into greatness has been a passionate protest against inert ideas. Then, alas, with pathetic ignorance of human psychology, it has proceeded by some educational scheme to bind humanity afresh with inert ideas of its own fashioning.

Let us now ask how in our system of education we are to guard against this mental dryrot. We enunciate two educational commandments, "Do not teach too many subjects," and again, "What you teach, teach thoroughly."

The result of teaching small parts of a large number of subjects is the passive reception of disconnected ideas, not illumined with any spark of vitality. Let the main ideas which are introduced into a child's education be few and important, and let them be thrown into every combination possible. The child should make them his own, and should understand their application here and now in the circumstances of his actual life. From the very beginning of his education, the child should experience the joy of discovery. The discovery which he has to make, is that general ideas give an understanding of that stream of events which pours through his life, which is his life. By understanding I mean more than a mere logical analysis, though that is included. I mean "under-standing" in the sense in which it is used in the French proverb, "To under-stand all, is to forgive all." Pedants sneer at an education which is useful. But if education is not useful, what is it? Is it a talent, to be hidden away in a napkin? Of course, education should be useful, whatever your aim in life. It was useful to Saint Augustine and it was useful to Napoleon. It is useful, because under-standing is useful.

I pass lightly over that understanding which should be given by the literary side of education. Nor do I wish to be supposed to pronounce on the relative merits of a classical or a modern curriculum. I would only remark that the understanding which we want is an understanding of an insistent present. The only use of a knowledge of the past is to equip us for the present. No more deadly harm can be done to young minds than by depreciation of the present. The present contains all that there is. It is holy ground; for it is the past, and it is the future. At the same time it must be observed that an age is no less past if it existed two hundred years ago than if it existed two thousand years ago. Do not be deceived by the pedantry of dates. The ages of Shakespeare and of Moliere are no less past than are the ages of Sophocles and of Virgil. The communion of saints is a great and inspiring assemblage, but it has only one possible hall of meeting, and that is, the present; and the mere lapse of time through which any particular group of saints must travel to reach that meeting-place, makes very little difference.

Passing now to the scientific and logical side of education, we remember that here also ideas which are not utilized are positively harmful. By utilizing an idea, I mean relating it to that stream, compounded of sense perceptions, feelings, hopes, desires, and of mental activities adjusting thought to thought, which forms our life. I can imagine a set of beings which might fortify their souls by passively reviewing disconnected ideas. Humanity is not built that way—except perhaps some editors of newspapers.

In scientific training the first thing to do with an idea is to prove it. But allow me for one moment to extend the meaning of "prove"; I mean—to prove its worth. Now an idea is not worth much unless the propositions in which it is embodied are true. Accordingly an essential part of the proof of an idea is the proof, either by experiment or by logic, of the truth of the propositions. But it is not essential that this proof of the truth should constitute the first introduction to the idea. After all, its assertion by the authority of respectable teachers is sufficient evidence to begin with. In our first contact with a set of propositions, we commence

by appreciating their importance. That is what we all do in after-life. We do not attempt, in the strict sense, to prove or to disprove anything, unless its importance makes it worthy of that honor. These two processes of proof, in the narrow sense, and of appreciation, do not require a rigid separation in time. Both can be proceeded with nearly concurrently. But in so far as either process must have the priority, it should be that of appreciation by use.

Furthermore, we should not endeavor to use propositions in isolation. !. Emphatically I do not mean, a neat little set of experiments to illustrate Proposition I and then the proof of Proposition I, a neat little set of experiments to illustrate Proposition II and then the proof of Proposition II, and so on to the end of the book. Nothing could be more boring. Interrelated truths are utilized *en bloc*, and the various propositions are employed in any order, and with any reiteration. Choose some important applications of your theoretical subject; and study them concurrently with the systematic theoretical exposition. Keep the theoretical exposition short and simple, but let it be strict and rigid so far as it goes. It should not be too long for it to be easily known with thoroughness and accuracy. The consequences of a plethora of half-digested theoretical knowledge are deplorable. Also the theory should not be muddled up with the practice. The child should have no doubt when it is proving and when it is utilizing. My point is that what is proved should be utilized, and that what is utilized should—so far as is practicable—be proved. I am far from asserting that proof and utilization are the same thing.

At this point of my discourse, I can most directly carry forward my argument in the outward form of a digression. We are only just realizing that the art and science of education require a genius and a study of their own; and that this genius and this science are more than a bare knowledge of some branch of science or of literature. This truth was partially perceived in the past generation; and headmasters, somewhat crudely, were apt to supersede learning in their colleagues by requiring left-hand bowling and a taste for football. But culture is more than cricket, and more than football, and more than extent of knowledge.

Education is the acquisition of the art of the utilization of knowledge. This is an art very difficult to impart. Whenever a textbook is written of real educational worth, you may be quite certain that some reviewer will say that it will be difficult to teach from it. Of course it will be difficult to teach from it. If it were easy, the book ought to be burned; for it cannot be educational. In education, as elsewhere, the broad primrose path leads to a nasty place. . . .

We now return to my previous point, that theoretical ideas should always find important applications within the pupil's curriculum. This is not an easy doctrine to apply, but a very hard one. It contains within itself the problem of keeping knowledge alive, of preventing it from becoming inert, which is the central problem of all education.

The best procedure will depend on several factors, none of which can be neglected, namely, the genius of the teacher, the intellectual type of the pupils, their prospects in life, the opportunities offered by the immediate surroundings of the school, and allied factors of this sort. It is for this reason that the uniform external examination is so deadly. We do not denounce it because we are cranks, and like denouncing established things. We are not so childish. Also, of course, such examinations have their use in testing slackness. Our reason of dislike is very definite and very practical. It kills the best part of culture. When you analyze in the light of experience the central task of education, you find that its successful accomplishment depends on a delicate adjustment of many variable factors. The reason is that we are dealing with human minds, and not with dead matter. The evocation of curiosity, of judgment, of the power of mastering a complicated tangle of circumstances, the use of theory in giving foresight in special

cases—all these powers are not to be imparted by a set rule embodied in one schedule of examination subjects.

I appeal to you, as practical teachers. With good discipline, it is always possible to pump into the minds of a class a certain quantity of inert knowledge. You take a textbook and make them learn it. So far, so good. The child then knows how to solve a quadratic equation. But what is the point of teaching a child to solve a quadratic equation? There is a traditional answer to this question. It runs thus: The mind is an instrument, you first sharpen it, and then use it; the acquisition of the power of solving a quadratic equation is part of the process of sharpening the mind. Now there is just enough truth in this answer to have made it live through the ages. But for all its half-truth, it embodies a radical error which bids fair to stifle the genius of the modern world. I do not know who was first responsible for this analogy of the mind to a dead instrument. For aught I know, it may have been one of the seven wise men of Greece, or a committee of the whole lot of them. Whoever was the originator, there can be no doubt of the authority which it has acquired by the continuous approval bestowed upon it by eminent persons. But whatever its weight of authority, whatever the high approval which it can quote, I have no hesitation in denouncing it as one of the most fatal, erroneous, and dangerous conceptions ever introduced into the theory of education. The mind is never passive; it is a perpetual activity, delicate, receptive, responsive to stimulus. You cannot postpone its life until you have sharpened it. Whatever interest attaches to your subject-matter must be evoked here and now; whatever powers you are strengthening in the pupil, must be exercised here and now; whatever possibilities of mental life your teaching should impart, must be exhibited here and now. That is the golden rule of education, and a very difficult rule to follow.

The difficulty is just this: the apprehension of general ideas, intellectual habits of mind, and pleasurable interest in mental achievement can be evoked by no form of words however accurately adjusted. All practical teachers know that education is a patient process of the mastery of details, minute by minute, hour by hour, day by day. There is no royal road to learning through an airy path of brilliant generalizations. There is a proverb about the difficulty of seeing the wood because of the trees. That difficulty is exactly the point which I am enforcing. The problem of education is to make the pupil see the wood by means of the trees.

The solution which I am urging, is to eradicate the fatal disconnection of subjects which kills the vitality of our modern curriculum. There is only one subject-matter for education, and that is Life in all its manifestations. Instead of this single unity, we offer children—Algebra, from which nothing follows; Geometry, from which nothing follows; Science, from which nothing follows;

History, from which nothing follows; a Couple of Languages, never mastered; and lastly, most dreary of all, Literature, represented by plays of Shakespeare, with philological notes and short analyses of plot and character to be in substance committed to memory. Can such a list be said to represent Life, as it is known in the midst of the living of it? The best that can be said of it is, that it is a rapid table of contents which a deity might run over in his mind while he was thinking of creating a world, and has not yet determined how to put it together. . . .

Fortunately, the specialist side of education presents an easier problem than does the provision of a general culture. For this there are many reasons. One is that many of the principles of procedure to be observed are the same in both cases, and it is unnecessary to recapitulate. Another reason is that specialist training takes place or should take place—at a more advanced stage of the pupil's course, and thus there is easier material to work upon. But undoubtedly the chief reason is that the specialist study is normally a study of peculiar interest

to the student. He is studying it because, for some reason, he wants to know it. This makes all the difference. The general culture is designed to foster an activity of mind; the specialist course utilizes this activity. But it does not do to lay too much stress on these neat antitheses. As we have already seen, in the general course foci of special interest will arise; and similarly in the special study, the external connections of the subject drag thought outwards.

Again, there is not one course of study which merely gives general culture, and another which gives special knowledge. The subjects pursued for the sake of a general education are special subjects specially studied; and, on the other hand, one of the ways of encouraging general mental activity is to foster a special devotion. You may not divide the seamless coat of learning. What education has to impart is an intimate sense for the power of ideas, for the beauty of ideas, and for the structure of ideas, together with a particular body of knowledge which has peculiar reference to the life of the being possessing it.

The appreciation of the structure of ideas is that side of a cultured mind which can only grow under the influence of a special study. I mean that eye for the whole chess-board, for the bearing of one set of ideas on another. Nothing but a special study can give any appreciation for the exact formulation of general ideas, for their relations when formulated, for their service in the comprehension of life. A mind so disciplined should be both more abstract and more concrete. It has been trained in the comprehension of abstract thought and in the analysis of facts.

Finally, there should grow the most austere of all mental qualities; I mean the sense for style. It is an aesthetic sense, based on admiration for the direct attainment of a foreseen end, simply and without waste. Style in art, style in literature, style in science, style in logic, style in practical execution have fundamentally the same aesthetic qualities, namely, attainment and restraint. The love of a subject in itself and for itself, where it is not the sleepy pleasure of pacing a mental quarter-deck, is the love of style as manifested in that study.

Here we are brought back to the position from which we started, the utility of education. Style, in its finest sense, is the last acquirement of the educated mind; it is also the most useful. It pervades the whole being. The administrator with a sense for style hates waste; the engineer with a sense for style economizes his material; the artisan with a sense for style prefers good work. Style is the ultimate morality of mind.

But above style, and above knowledge, there is something, a vague shape like fate above the Greek gods. That something is Power. Style is the fashioning of power, the restraining of power. But, after all, the power of attainment of the desired end is fundamental. The first thing is to get there. Do not bother about your style, but solve your problem, justify the ways of God to man, ad-minister your province, or do whatever else is set before you.

Where, then, does style help? In this, with style the end is attained with-out side issues, without raising undesirable inflammations. With style you attain your end and nothing but your end. With style the effect of your activity is calculable, and foresight is the last gift of gods to men. With style your power is increased, for your mind is not distracted with irrelevancies, and you are more likely to attain your object. Now style is the exclusive privilege of the expert. Whoever heard of the style of an amateur painter, of the style of an amateur poet? Style is always the product of specialist study, the peculiar contribution of specialism to culture.

English education in its present phase suffers from a lack of definite aim, and from an external machinery which kills its vitality. Hitherto in this address I have been considering the aims which should govern education. In this respect England halts between two opinions. It has not decided whether to produce amateurs or experts. The profound change in the world which

the nineteenth century has produced is that the growth of knowledge has given foresight. The amateur is essentially a man with appreciation and with immense versatility in mastering a given routine. But he lacks the foresight which comes from special knowledge. The object of this address is to suggest how to produce the expert without loss of the essential virtues of the amateur...

When one considers in its length and in its breadth the importance of this question of the education of a nation's young, the broken lives, the defeated hopes, the national failures, which result from the frivolous inertia with which it is treated, it is difficult to restrain within oneself a savage rage. In the conditions of modern life the rule is absolute, the race which does not value trained intelligence is doomed. Not all your heroism, not all your social charm, not all your wit, not all your victories on land or at sea, can move back the finger of fate. Today we maintain ourselves. Tomorrow science will have moved forward yet one more step, and there will be no appeal from the judgment which will then be pronounced on the uneducated.

We can be content with no less than the old summary of educational ideal which has been current at any time from the dawn of our civilization. The essence of education is that it be religious.

Pray, what is religious education?

A religious education is an education which inculcates duty and reverence. Duty arises from our potential control over the course of events. Where attainable knowledge could have changed the issue, ignorance has the guilt of vice. And the foundation of reverence is this perception, that the present holds within itself the complete sum of existence, backwards and forwards, that whole amplitude of time, which is eternity.

CHAPTER III

THE RHYTHMIC CLAIMS OF FREEDOM AND DISCIPLINE

. . . The antithesis in education between freedom and discipline is not so sharp as a logical analysis of the meanings of the terms might lead us to imagine. The pupil's mind is a growing organism. On the one hand, it is not a box to be ruthlessly packed with alien ideas: and, on the other hand, the ordered acquirement of knowledge is the natural food for a developing intelligence. Accordingly, it should be the aim of an ideally constructed education that the discipline should be the voluntary issue of free choice, and that the freedom should gain an enrichment of possibility as the issue of discipline. The two principles, freedom and discipline, are not antagonists, but should be so adjusted in the child's life that they correspond to a natural sway, to and fro, of the developing personality. It is this adaptation of freedom and discipline to the natural sway of development that I have elsewhere called The Rhythm of Education. I am convinced that much disappointing failure in the past has been due to neglect of attention to the importance of this rhythm. My main position is that the dominant note of education at its beginning and at its end is freedom, but that there is an intermediate stage of discipline with freedom in subordination: Furthermore, that there is not one unique threefold cycle of freedom, discipline, and freedom; but that all mental development is composed of such cycles, and of cycles of such cycles. Such a cycle is a unit cell, or brick; and the complete stage of growth is an organic structure of such cells. In analyzing any one such cell, I call the first period of freedom the "stage of Romance," the intermediate period of discipline I call the "stage of Precision," and the final period of freedom is the "stage of Generalization."

Let me now explain myself in more detail. There can be no mental development without interest. Interest is the *sine qua non* for attention and apprehension. You may endeavor to excite interest by means of birch rods, or you may coax it by the incitement of pleasurable activity. But without interest there will be no progress. Now the natural mode by which living organisms are excited towards suitable self-development is enjoyment. The infant is lured to adapt itself to its environment by its love of its mother and its nurse; we eat because we like a good dinner: we subdue the forces of nature because we have been lured to discovery by an insatiable curiosity: we enjoy exercise: and we enjoy the unchristian passion of hating our dangerous enemies. Undoubtedly pain is one subordinate means of arousing an organism to action. But it only supervenes on the failure of pleasure. Joy is the normal healthy spur for the *elan vital*. I am not maintaining that we can safely abandon ourselves to the allurements of the greater immediate joys. What I do mean is that we should seek to arrange the development of character along a path of natural activity, in itself pleasurable. The subordinate stiffening of discipline must be directed to secure some long-time good; although an adequate object must not be too far below the horizon, if the necessary interest is to be retained.

The second preliminary point which I wish to make, is the unimportance—indeed the evil—of barren knowledge. The importance of knowledge lies in its use, in our active mastery of it—that is to say, it lies in wisdom. It is a convention to speak of mere knowledge, apart from wisdom, as of itself imparting a peculiar dignity to its possessor. I do not share in this reverence for knowledge as such. It all depends on who has the knowledge and what he does with it. That knowledge which adds greatness to character is knowledge so handled as to transform every phase of immediate experience. It is in respect to the activity of knowledge that an over-vigorous discipline in education is so harmful. The habit of active thought, with freshness, can only be generated by adequate freedom. Undiscriminating discipline defeats its own object by dulling the mind. If you have much to do with the young as they emerge from school and from the university, you soon note the dulled minds of those whose education has consisted in the acquirement of inert knowledge. Also the deplorable tone of English society in respect to learning is a tribute to our educational failure. Furthermore, this overhaste to impart mere knowledge defeats itself. The human mind rejects knowledge imparted in this way. The craving for expansion, for activity, inherent in youth is disgusted by a dry imposition of disciplined knowledge. The discipline, when it comes, should satisfy a natural craving for the wisdom which adds value to bare experience.

But let us now examine more closely the rhythm of these natural cravings of the human intelligence. The first procedure of the mind in a new environment is a somewhat discursive activity amid a welter of ideas and experience. It is a process of discovery, a process of becoming used to curious thoughts, of shaping questions, of seeking for answers, of devising new experiences, of noticing what happens as the result of new ventures. This general process is both natural and of absorbing interest. We must often have noticed children between the ages of eight and thirteen absorbed in its ferment. It is dominated by wonder, and cursed be the dullard who destroys wonder. Now undoubtedly this stage of development requires help, and even discipline. The environment within which the mind is working must be carefully selected. It must, of course, be chosen to suit the child's stage of growth, and must be adapted to individual needs. In a sense it is an imposition from without; but in a deeper sense it answers to the call of life within the child. In the teacher's consciousness the child has been sent to his telescope to look at the stars, in the child's consciousness he has been given free access to the glory of the heavens. Unless, working somewhere, however obscurely, even in the dullest child, there is this

transfiguration of imposed routine, the child's nature will refuse to assimilate the alien material. It must never be forgotten that education is not a process of packing articles in a trunk. Such a simile is entirely inapplicable. It is, of course, a process completely of its own peculiar genus. Its nearest analogue is the assimilation of food by a living organism: and we all know how necessary to health is palatable food under suitable conditions. When you have put your boots in a trunk, they will stay there till you take them out again; but this is not at all the case if you feed a child with the wrong food.

This initial stage of romance requires guidance in another way. After all the child is the heir to long ages of civilization, and it is absurd to let him wander in the intellectual maze of men in the Glacial Epoch. Accordingly, a certain pointing out of important facts, and of simplifying ideas, and of usual names, really strengthens the natural impetus of the pupil. In no part of education can you do without discipline or can you do without freedom; but in the stage of romance the emphasis must always be on freedom, to allow the child to see for itself and to act for itself. My point is that a block in the assimilation of ideas inevitably arises when a discipline of precision is imposed before a stage of romance has run its course in the growing mind. There is no comprehension apart from romance. It is my strong belief that the cause of so much failure in the past has been due to the lack of careful study of the due place of romance. Without the adventure of romance, at the best you get inert knowledge without initiative, and at the worst you get contempt of ideas—without knowledge.

But when this stage of romance has been properly guided another craving grows. The freshness of inexperience has worn off; there is general knowledge of the groundwork of fact and theory: and, above all, there has been plenty of independent browsing amid firsthand experiences, involving adventures of thought and of action. The enlightenment which comes from precise knowledge can now be understood. It corresponds to the obvious requirements of common sense, and deals with familiar material. Now is the time for pushing on, for knowing the subject exactly, and for retaining in the memory its salient features. This is the stage of precision. This stage is the sole stage of learning in the traditional scheme of education, either at school or university. You had to learn your subject, and there was nothing more to be said on the topic of education. The result of such an undue extension of a most necessary period of development was the production of a plentiful array of dunces, and of a few scholars whose natural interest had survived the car of Juggernaut. There is, indeed, always the temptation to teach pupils a little more of fact and of precise theory than at that stage they are fitted to assimilate. If only they could, it would be so useful. We—I am talking of schoolmasters and of university dons—are apt to forget that we are only subordinate elements in the education of a grown man; and that, in their own good time, in later life our pupils will learn for themselves. The phenomena of growth cannot be hurried beyond certain very narrow limits. But an unskillful practitioner can easily damage a sensitive organism. Yet, when all has been said in the way of caution, there is such a thing as pushing on, of getting to know the fundamental details and the main exact generalisations, and of acquiring an easy mastery of technique. There is no getting away from the fact that things have been found out, and that to be effective in the modern world you must have a store of definite acquirement of the best practice. To write poetry you must study metre; and to build bridges you must be learned in the strength of material. Even the Hebrew prophets had learned to write, probably in those days requiring no mean effort. The untutored art of genius is—in the words of the Prayer Book—a vain thing, fondly invented.

During the stage of precision, romance is the background. The stage is dominated by the inescapable fact that there are right ways and wrong ways, and definite truths to be known. But romance is not dead, and it is the art of teaching to foster it amidst definite application to appointed task. It must be fostered for one reason, because romance is after all a necessary ingredient of that balanced wisdom which is the goal to be attained. But there is another reason: The organism will not absorb the fruits of the task unless its powers of apprehension are kept fresh by romance. The real point is to discover in practice that exact balance between freedom and discipline which will give the greatest rate of progress over the things to be known. I do not believe that there is any abstract formula which will give information applicable to all subjects, to all types of pupils, or to each individual pupil; except indeed the formula of rhythmic sway which I have been insisting on, namely, that in the earlier stage the progress requires that the emphasis be laid on freedom, and that in the later middle stage the emphasis be laid on the definite acquirement of allotted tasks. I freely admit that if the stage of romance has been properly managed, the discipline of the second stage is much less apparent, that the children know how to go about their work, want to make a good job of it, and can be safely trusted with the details. Furthermore, I hold that the only discipline, important for its own sake, is self-discipline, and that this can only be acquired by a wide use of freedom. But yet—so many are the delicate points to be considered in education—it is necessary in life to have acquired the habit of cheerfully undertaking imposed tasks. The conditions can be satisfied if the tasks correspond to the natural cravings of the pupil at his stage of progress, if they keep his powers at full stretch, and if they attain an obviously sensible result, and if reasonable freedom is allowed in the mode of execution.

The difficulty of speaking about the way a skillful teacher will keep romance alive in his pupils arises from the fact that what takes a long time to de-scribe, takes a short time to do. The beauty of a passage of Virgil may be rendered by insisting on beauty of verbal enunciation, taking no longer than prosy utterance. The emphasis on the beauty of a mathematical argument, in its marshaling of general considerations to unravel complex fact, is the speediest mode of procedure. The responsibility of the teacher at this stage is immense. To speak the truth, except in the rare case of genius in the teacher, I do not think that it is impossible to take a whole class very far along the road of precision without some dulling of the interest. It is the unfortunate dilemma that initiative and training are both necessary, and that training is apt to kill initiative.

But this admission is not to condone a brutal ignorance of methods of mitigating this untoward fact. It is not a theoretical necessity, but arises because perfect tact is unattainable in the treatment of each individual case. In the past the methods employed assassinated interest; we are discussing how to reduce the evil to its smallest dimensions. I merely utter the warning that education is a difficult problem, to be solved by no one simple formula.

In this connection there is, however, one practical consideration which is largely neglected. The territory of romantic interest is large, ill-defined, and not to be controlled by any explicit boundary. It depends on the chance flashes of insight. But the area of precise knowledge, as exacted in any general educational system, can be, and should be, definitely determined. If you make it too wide you will kill interest and defeat your own object: if you make it too narrow your pupils will lack effective grip. Surely, in every subject in each type of curriculum, the precise knowledge required should be determined after the most anxious inquiry. This does not now seem to be the case in any effective way. For example, in the classical studies of boys destined for a scientific career—a class of pupils in whom I am greatly interested—What is the Latin vocabulary which they ought definitely to know? Also what are the grammatical rules and

constructions which they ought to have mastered? Why not determine these once and for all, and then bend every exercise to impress just these on the memory, and to understand their derivatives, both in Latin and also in French and English. Then, as to other constructions and words which occur in the reading of texts, supply full information in the easiest manner. A certain ruthless definiteness is essential in education. I am sure that one secret of a successful teacher is that he has formulated quite clearly in his mind what the pupil has got to know in precise fashion. He will then cease from half-hearted attempts to worry his pupils with memorizing a lot of irrelevant stuff of inferior importance. The secret of success is pace, and the secret of pace is concentration. But, in respect to precise knowledge, the watchword is pace, pace, pace. Get your knowledge quickly, and then use it. If you can use it, you will retain it.

We have now come to the third stage of the rhythmic cycle, the stage of generalization. There is here a reaction towards romance. Something definite is now known; aptitudes have been acquired; and general rules and laws are clearly apprehended both in their formulation and their detailed exemplification. The pupil now wants to use his new weapons. He is an effective individual, and it is effects that he wants to produce. He relapses into the discursive adventures of the romantic stage, with the advantage that his mind is now a disciplined regiment instead of a rabble. In this sense, education should begin in research and end in research. After all, the whole affair is merely a preparation for battling with the immediate experiences of life, a preparation by which to qualify each immediate moment with relevant ideas and appropriate actions. An education which does not begin by evoking initiative and end by encouraging it must be wrong. For its whole aim is the production of active wisdom.

In my own work at universities I have been much struck by the paralysis of thought induced in pupils by the aimless accumulation of precise knowledge, inert and unutilized. It should be the chief aim of a university professor to exhibit himself in his own true character—that is, as an ignorant man thinking, actively utilizing his small share of knowledge. In a sense, knowledge shrinks as wisdom grows: for details are swallowed up in principles. The details of knowledge which are important will be picked up *ad hoc* in each avocation of life, but the habit of the active utilization of well-understood principles is the final possession of wisdom. The stage of precision is the stage of growing into the apprehension of principles by the acquisition of a precise knowledge of details. The stage of generalizations is the stage of shedding details in favor of the active application of principles, the details retreating into subconscious habits. We don't go about explicitly retaining in our own minds that two and two make four, though once we had to learn it by heart. We trust to habit for our elementary arithmetic. But the essence of this stage is the emergence from the comparative passivity of being trained into the active freedom of application. Of course, during this stage, precise knowledge will grow, and more actively than ever before, because the mind has experienced the power of definiteness, and responds to the acquisition of general truth, and of richness of illustration. But the growth of knowledge becomes progressively unconscious, as being an incident derived from some active adventure of thought.

So much for the three stages of the rhythmic unit of development. In a general way the whole period of education is dominated by this threefold rhythm. Till the age of thirteen or fourteen there is the romantic stage, from fourteen to eighteen the stage of precision, and from eighteen to twenty and twenty the stage of generalization. But these are only average characters, tinging the mode of development as a whole. I do not think that any pupil completes his stages simultaneously in all subjects. For example, I should plead that while language is initiating its stage of precision in the way of acquisition of vocabulary and of grammar, science should be in

its full romantic stage. The romantic stage of language begins in infancy with the acquisition of speech, so that it passes early towards a stage of precision; while science is a late comer. Accordingly a precise inculcation of science at an early age wipes out initiative and interest, and destroys any chance of the topic having any richness of content in the child's apprehension. Thus, the romantic stage of science should persist for years after the precise study of language has commenced.

There are minor eddies, each in itself a threefold cycle, running its course in each day, in each week, and in each term. There is the general apprehension of some topic in its vague possibilities, the mastery of the relevant details, and finally the putting of the whole subject together in the light of the relevant knowledge. Unless the pupils are continually sustained by the evocation of interest, the acquirement of technique, and the excitement of success, they can never make progress, and will certainly lose heart. Speaking generally, during the last thirty years the schools of England have been sending up to the universities a disheartened crowd of young folk, inoculated against any outbreak of intellectual zeal. The universities have seconded the efforts of the schools and emphasized the failure. Accordingly, the cheerful gaiety of the young turns to other topics, and thus educated England is not hospitable to ideas. When we can point to some great achievement of our nation—let us hope that it may be something other than a war—which has been won in the classroom of our schools, and not in their playing-fields, then we may feel content with our modes of education....