Modes of Thought

In the development of his philosophy Whitehead deliberately introduces a new terminology, for the reason that the older terminologies, based on earlier attempts to frame a coherent, logical, necessary system of general ideas, are inadequate to convey his newer scheme. For a basic language of subjects and predicates, substance, attribute, and so on, he substitutes such terms as 'pre-hension,' 'eternal object,' and 'ingression.' Since his new terminology affects the most basic concepts of his philosophy, it is clear that attempts to translate his terms into an older philosophical vocabulary are fraught with the dangers of distortion and misinterpretation. Indeed, such an attempt is an invitation to by-pass the essential originality of Whitehead's own thinking.

Whitehead's approach to definitions is that of a formal logician. Each new concept is defined in terms of some previously defined concept, until ultimately there remain those primitive concepts, undefined formally in the system, which are the fundamental defining concepts for the system. If the given system is a subordinate one, included in a larger system, then the basic, undefined ideas of the subordinate system can be explained in the context of the larger system. However, if the system in question is intended to be the all-inclusive one, then there can be no appeal to outside sources for the illumination and interpretation of either the undefined primitive concepts or the concepts defined in terms of them.

In such a case it is possible only to deal with the system of ideas as a whole and to explore how that system derives meaning from the way in which it analyzes, categorizes, and organizes the elements of our experience. Whitehead continually contrasts his basic ideas with those of other philosophers; in fact, his exhibition of a basic difficulty in some classical system is his normal jumping-off point for the introduction of a new basic concept.

It is therefore fallacious to define Whitehead's basic concepts in the terms appropriate to other philosophers, because his conceptual reorganization is designed to avoid the shortcomings inherent in the older cosmologies. Instead, what we shall attempt here is a summary of the way in which Whitehead introduces the reader to some of his basic concepts, using only his own words as a guide.

EXPERIENCE

Whitehead defines speculative philosophy as 'the endeavor to frame a coherent, logical, necessary system of general ideas in terms of which every element of our experience can be interpreted' (pp. 567, 841). He identifies the meaning of 'experience' in the following paragraph (p. 845):

In order to discover some of the major categories under which we can classify the infinitely various components of experience, we must appeal to evidence relating to every variety of occasion. Nothing can be omitted, experience sober, experience sleeping and experience waking, experience drunk and experience wide-awake, experience self-conscious and experience self-forgetful, experience intellectual and experience physical, experience religious and experience sceptical, retrospective, experience happy and experience grieving, experience dominated by emotion and experience under self-restraint, experience in the light and experience in the dark, experience normal and experience abnormal.
Whitehead's Terminology

The system of general ideas, or 'categorical scheme,' is outlined in Chapter II of Process and Reality (pp. 584 ff.). The three basic notions of the scheme are introduced together in the following passage (p. 608):

'The actualities constituting the processes of the world are conceived as exemplifi-
cations of definiteness for any actual existence. The things which are temporal arise
by their participation in the things which are eternal. The two sets are mediated by
what is potential. The final entity is the divine element in the world, by which the
envelope of potential enshrines the identity of the ultimate process. This ideal
conception is realized in ideal actuality. Thus the process of actuality is the
metaphysical principle whereby the actual to specific types of emergent order. By reason of the actuality of this primal
valuation of potential, each eternal object has a definite, effective, relevant
property in the passage of types of emergent reality, and attains the ends proper
between the primordial nature of God and the consequent
nature of God is explained in Chapter III of Part I of Process and Reality
and is developed in Part V of the same work.

Actual Entity

The term is introduced on p. 585 as follows:

'Actual entities'—also termed 'actual occasions'—are the final real things of
which the world is made up. There is no going behind actual entities to find an-
thing more real. They differ among themselves: God is an actual entity, and so is
the most trivial puff of existence in the empty space. But though there are gradua-
tions of importance, and diversities of function, yet in the principles which actually
exemplifies all are of the same level. The final facts are, all alike, actual entities;
and these actual entities are reserved for the complex and interdependent.

A terse summary of the notion of actual entity is given in 'The Categories of
Explanation,' beginning on p. 589.

Concrescence

The word Concrescence is a derivative from the familiar Latin verb, meaning
'growing together.' It also has the advantage that the participle 'concrescence' is frequently
used for the notion of complete physical reality. Thus Concrescence is useful to
convey the notion of many things acquiring complete complex unity. (P. 855.)

Prehension

The first analysis of an actual entity, into its most concrete elements, discloses
it to be a concrescence of prehensions, which have originated in its process of
becoming (p. 591).

The relation of prehensions to actual entities or actual occasions is explained
in the paragraph entitled 'Prehensions' on pp. 799-800. Compare with this
the following passage (p. 907):

Now as a first approximation the notion of life implies a certain absolutedness of
self-enjoyment. This must mean a certain immediate individuality, which is a
complex process of appropriating an unity of existence the many data of the
actual, individual being. The term 'prehension' arises out of the process of appropriating I have, in my recent
writings, used the word 'prehension' to express this process of appropriation. Also
I have termed each individual act of immediate self-enjoyment an 'occasion'
(experience) that I hold that these unities of existence, these occasions of
experience, are the really real things which in their collective unity compose the evolving universe,
ever plunging into the creative advance.

The term 'prehension' is introduced in the discussion on pp. 425-429. A
similar introduction occurs on p. 852, where it is explained that the technical
term 'prehension' stands to the common word 'apprehension' in the same
relationship as the common word 'perception' stands to Leibniz's term 'appre-
cension.'

The Categories of Explanation' (pp. 589 ff.) sketch the use of the term,
and Part III of Process and Reality develops the Theory of Prehension.
The basic kinds of prehension are introduced as follows (p. 591):

Prehensions of actual entities—i.e., prehensions whose data involve actual entities
—are termed 'physical prehensions'; and prehensions of eternal objects are termed
'conceptual prehensions.' Consciousness is not necessarily involved in the sub-
jective forms of either type of prehension.

There are two species of prehensions: (a) 'positive prehensions' which are

For the introduction of the term 'God' consider the following passage on

'God is identified on p. 873 as 'that factor in the universe whereby there is

importance, value, and ideal beyond the actual.'
Whitehead's Terminology

termed 'feelings,' and (b) 'negative prehensions' which are said to 'eliminate from its datum as inoperative in the progressive concrescence of prehensions constituting the unity of the subject.

EVENT

Wherever and whenever something is going on, there is an event (p. 252).

This term plays the role in Whitehead's early work which is later played by the term 'actual occasion' or 'actual entity.' The terms are not synonymous, however, for they belong to two different kinds of thinking, as explained on pp. 201-202:

We are thinking 'homogeneously' about nature when we are thinking about it without thinking about thought or about sense-awareness, and we are thinking 'heterogeneously' about nature when we are thinking about it in conjunction with thinking either about thought or about sense-awareness or about both.

'Event' is the homogeneous term, and 'actual occasion of experience' or 'actual entity' the heterogeneous term.

For the relation of 'event' to 'prehension' consider the following passage on p. 429. The term 'prehension'

was introduced to signify the essential unity of an event, namely, the event as one entity, and not as a mere assemblage of parts or of ingredients. It is necessary to understand unities. But the word event just means one of these spatio-temporal unities. Accordingly, it may be used instead of the term 'prehension' as meaning the thing prehended.

OBJECT

This term is common to both types of thinking, homogeneous and heterogeneous.

Objects are elements in nature which do not pass (p. 280).

This character of objects is called their 'eternity,' which is illustrated as follows (p. 422):

A colour is eternal. It haunts time like a spirit. It comes and it goes. But where it comes, it is the same colour. It neither survives nor does it live. It appears when it is wanted.

On p. 613 Whitehead compares eternal objects with Platonic forms; and on p. 623, with Locke's 'ideas.' He contrasts them with 'universals' on pp. 618 and 737. For a full discussion of the term consult the chapters 'Objects' (pp. 280 ff.) and 'Objects and Subjects' (pp. 798 ff.). Part II of The Principles of Natural Knowledge, not included in this anthology, is also important for a full study of the theory of 'objects.'

Some basic types of objects are: sense-objects (pp. 285, 315, and 427), perceptual objects (p. 288), physical objects (p. 289), and scientific objects (pp. 291 and 319). See also Chapter VII of The Principles of Natural Knowledge.

INGRESSION

This term denotes 'the general relation of objects to events' (p. 281) or 'the particular mode in which the potentiality of an eternal object is realized in a particular actual entity, contributing to the definiteness of that actual entity' (p. 590).
Whitehead’s Philosophy

Alfred North Whitehead’s philosophical system ranks as one of the great intellectual achievements of the twentieth century. According to Hosinski (1993), Whitehead’s system of metaphysics expresses and harmoniously relates assumptions made about reality in natural and human sciences, in poetry and art, in religion, and in everyday living and common sense. With extraordinary thinking, Whitehead touched deeply into our ordinary experience; and with a most uncommon humility, he tried to satisfy the legitimate demands of common sense. He had a sharp insight and a keen aesthetic awareness for human life. Pittenger (1969) notes that he was both a scientist and a humanist, and that he respected both aspects of human experience.

Whitehead’s Metaphysics

Whitehead views that metaphysics is composed of two areas: ontology and cosmology. Ontology tries to identify the nature, the essential properties, and the relations of things. Cosmology explains the fundamental relationships, interactions, and processes within the totality of the cosmos. “Thus the goal of metaphysics is to produce both an ontology and a cosmology which are consistent with each other and which together enable us to understand philosophically any individual thing and the relationships between all things” (Hosinski, 1993). Whitehead further claims that “the goal of metaphysics is to develop a scheme of interpretation, a set of ideas sufficiently universal that they are exemplified by all entities and events. However, Whitehead recognized that this goal of metaphysics is only an ideal that cannot be thoroughly actualized. Therefore, in Whitehead’s view, “philosophy is much like science: there can be no final knowledge; there is only progress in discovering the limitations of our past understanding” (Hosinski, 1993).

Whitehead’s Philosophy of Science

For Whitehead, “the aim of science is to seek the simplest explanations of complex fact.” He further points out, “we are apt to fall into the error of thinking that the facts are simple because simplicity is the goal of our quest. To guiding motto in the life of every natural philosopher should be, seek simplicity and distrust it” (C.N. P.163). Here he hopes that a philosopher should not only be able to simplify the complex facts but also be able to think critically. In Whitehead’s view, our most exact knowledge of basic concepts is a systematic formulation from our direct experience, and this experience is universally related. Whitehead defines mathematics as a “science of order,” defines knowledge as ordering, asserts that without order nothing can be real, and presents human endeavors as a response to transcendent order.

Whitehead’s Philosophy of Religion

Whitehead defines “religion is what the individual does with his own solitariness.” This idea of solitude as basic to religion is very important. For Whitehead, “religion is the force of belief the man himself, and on what is permanent in the nature of things” (1929). According to Whitehead, God is the perfect ‘actual entity’. God’s perfection is not that of abstract being but is to be found in his capacity for, and actualization of, his relationships with that which is not himself. Further more, he believes that the mode for God is a richly related being whose innermost nature or quality is in his ceaseless participation and sharing. Hence, since love is relationship, sharing, being affected by, and caring, God essentially is Love (Pittenger, 1969)

Quoting: Whitehead’s definition of philosophy,

Philosophy asks the simple question, What is it all about? (PR, p.178)
Philosophy begins in wonder. And, at the end, when philosophic thought has done its best, the wonder remains. There have been added, however, some grasp of the immensity of things, some purification of emotion by understanding (M.T. p. 232)
References


The Aims of Education
and Other Essays

Alfred North Whitehead
Preface

The general topic of this volume is education on its intellectual side. One main idea runs through the various chapters, and is illustrated in them from many points of view. It can be stated briefly thus: The students are alive, and the purpose of education is to stimulate and guide their self-direction. It follows as a corollary from this premiss, that the teachers also should be alive with living thoughts. The whole book is a protest against dead knowledge, that is to say, against inert ideas. The separate chapters have, with the exception of Chapter IX, been delivered as addresses at various conferences of educational bodies and of scientific societies. They are the outcome of practical experience, reflections on the practice of education and some criticisms on the meaning of the topics constituting its content.

The references to the educational system concern England. The failures and successes of the system in that country are somewhat different from those in America. But such references are merely illustrative: the general principles apply equally to both countries.

The earliest of the addresses was delivered in the year 1912 to the Educational Section of the International Congress of Mathematicians, meeting at Cambridge, England, and the latest in the year 1928 at the Business School of Harvard University, Cambridge, Massachusetts. Chapters I, IV, VI, VIII, IX, and X have been published in my book, The Organisation of Thoughts (Williams and Norgate, London, 1917). Chapter II, The Rhythm of Education, has been published as a separate pamphlet (Christophers, London, 1922). In this republication there are omissions but no other alterations. In particular, the three final chapters of the present book, with some omissions, stand as published in 1917. They are
not to be constructed as commentaries on my writings since that
date. The converse relation is the true one.

My thanks are due to the Editor of The Hibbert Journal for
permission to republish Chapter III, *The Rhythmic Claims of
Freedom and Discipline*, and Chapter V, *The Place of Classics in
Education*; also to the Editor of The Atlantic Monthly for per-
mission to republish Chapter VII, *Universities and Their Pur-
pose*.

A. N. W.

Harvard University,
January, 1929.

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THE AIMS OF EDUCATION

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 Milton 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 half 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 utilised are positively harmful. By utilising 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 honour. 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 endeavour 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 utilised 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 utilising. My point is that what is proved should be utilised, and that what is utilised should—so far as is practicable—be proved. I am far from asserting that proof and utilisation 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 realising 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 utilisation 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 beburned; for it cannot be educational. In education, as elsewhere, the broad primrose path leads to a nasty place. This evil path is represented by a book or a set of lectures which will practically enable the student to learn by heart all the questions likely to be asked at the next external examination. And I may say in passing that no educational system is possible unless every question directly asked of a pupil at any examination is either framed or modified by the actual teacher of that pupil in that subject. The external assessor may report on the curriculum or on the performance of the pupils, but never should be allowed to ask the pupil a question which has not been strictly supervised by the actual teacher, or at least inspired by a long conference with him. There are a few exceptions to this rule, but they are exceptions, and could easily be allowed for under the general rule.

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. It 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 analyse 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 sunder 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 fatall, 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 generalisations. 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.

Let us now return to quadratic equations. We still have on hand the unanswered question. Why should children be taught their solution? Unless quadratic equations fit into a connected curriculum, of course there is no reason to teach anything about them. Furthermore, extensive as should be the place of mathematics in a complete culture, I am a little doubtful whether for many types of boys algebraic solutions of quadratic equations do not lie on the specialist side of mathematics. I may here remind you that as yet I have not said anything of the psychology or the content of the specialism, which is so necessary a part of an ideal education. But all that is an evasion of our real question, and I merely state it in order to avoid being misunderstood in my answer.

Quadratic equations are part of algebra, and algebra is the intellectual instrument which has been created for rendering clear the quantitative aspects of the world. There is no getting out of it. Through and through the world is infected with quantity. To talk sense, it is to talk in quantities. It is no use saying that the nation is large.—How large? It is no use saying that radium is scarce,—how scarce? You cannot evade quantity. You may fly to poetry and to music, and quantity and number will face you in your rhythms and your octaves. Elegant intellects which despise the theory of quantity, are but half developed. They are more to be pitied than blamed. The scraps of giberish, which in their school-days were taught to them in the name of algebra, deserve some contempt.

This question of the degeneration of algebra into giberish, both in word and in fact, affords a pathetic instance of the uselessness of
reforming educational schedules without a clear conception of the attributes which you wish to evoke in the living minds of the children. A few years ago there was an outcry that school algebra was in need of reform, but there was a general agreement that graphs would put everything right. So all sorts of things were extruded, and graphs were introduced. So far as I can see, with no sort of idea behind them, but just graphs. Now every examination paper has one or two questions on graphs. Personally I am an enthusiastic adherent of graphs. But I wonder whether as yet we have gained very much. You cannot put life into any schedule of general education unless you succeed in exhibiting its relation to some essential characteristic of all intelligent or emotional perception. It is a hard saying, but it is true; and I do not see how to make it any easier. In making these little formal alterations you are beaten by the very nature of things. You are pitted against too skilful an adversary, who will see to it that the pea is always under the other thimble.

Reformation must begin at the other end. First, you must make up your mind as to those quantitative aspects of the world which are simple enough to be introduced into general education; then a schedule of algebra should be framed which will about find its exemplification in these applications. We need not fear for our pet graphs, they will be there in plenty when we once begin to treat algebra as a serious means of studying the world. Some of the simplest applications will be found in the quantities which occur in the simplest study of society. The curves of history are more vivid and more informing than the dry catalogues of names and dates which comprise the greater part of that arid school study. What purpose is effected by a catalogue of undistinguished kings and queens? Tom, Dick, or Harry, they are all dead. General resurrections are failures, and are better postponed. The quantitative flux of the forces of modern society is capable of very simple exhibition. Meanwhile, the idea of the variable, of the function, of rate of change, of equations and their solution, of elimination, are being studied as an abstract science for their own sake. Not, of course, in the pompous phrases with which I am alluding to them here, but with that iteration of simple special cases proper to teaching.

If this course be followed, the route from Chaucer to the Black Death, from the Black Death to modern Labour troubles, will connect the tales of the mediaeval pilgrims with the abstract science of algebra, both yielding diverse aspects of that single theme, Life. I know what most of you are thinking at this point. It is that the exact course which I have sketched out is not the particular one which you would have chosen, or even see how to work. I quite agree. I am not claiming that I could do it myself. But your objection is the precise reason why a common examination system is fatal to education. The process of exhibiting the applications of knowledge must, for its success, essentially depend on the character of the pupils and the genius of the teacher. Of course I have left out the easiest applications with which most of us are more at home. I mean the quantitative sides of sciences, such as mechanics and physics.

Again, in the same connection we plot the statistics of social phenomena against the time. We then eliminate the time between suitable pairs. We can speculate how far we have exhibited a real causal connection, or how far a mere temporal coincidence. We notice that we might have plotted against the time one set of statistics for one country and another set for another country, and thus, with suitable choice of subjects, have obtained graphs which certainly exhibited mere coincidence. Also other graphs exhibit obvious causal connections. We wonder how to discriminate. And so are drawn on as far as we will.

But in considering this description, I must beg you to remember what I have been insisting on above. In the first place, one train of thought will not suit all groups of children. For example, I should expect that artisan children will want something more concrete and, in a sense, swifter than I have set down here. Perhaps I am wrong, but that is what I should guess. In the second place, I am not contemplating one beautiful lecture stimulating, once and for all, an admiring class. That is not the way in which education proceeds. No; all the time the pupils are hard at work solving examples, drawing graphs, and making experiments, until they have a thorough hold on the whole subject. I am describing the interspersed explanations, the directions which should be given to their thoughts. The pupils have got to be made to feel that they
are studying something, and are not merely executing intellectual
minuets.

Finally, if you are teaching pupils for some general examination,
the problem of sound teaching is greatly complicated. Have you
ever noticed the zig-zag moulding round a Norman arch? The
ancient work is beautiful, the modern work is hideous. The reason
is, that the modern work is done to exact measure, the ancient work
is varied according to the idiosyncrasy of the workman. Here it is
crowded, and there it is expanded. Now the essence of getting
pupils through examinations is to give equal weight to all parts of
the schedule. But mankind is naturally specialist. One man sees a
whole subject, where another can find only a few detached
examples. I know that it seems contradictory to allow for specialist
in a curriculum especially designed for a broad culture. Without
I am certain that in education wherever you exclude specialist
you destroy life.

We now come to the other great branch of a general mathematical
education, namely Geometry. The same principles apply. The
theoretical part should be clear-cut, rigid, short, and important.
Every proposition not absolutely necessary to exhibit the main
connection of ideas should be cut out, but the great fundamental ideas
should be all there. No omission of concepts, such as those of
Similarity and Proportion. We must remember that, owing to the
aid rendered by the visual presence of a figure, Geometry is a field of
unequalled excellence for the exercise of the deductive faculties of
reasoning. Then, of course, there follows Geometrical Drawing,
with its training for the hand and eye.

But, like Algebra, Geometry and Geometrical Drawing must be
extended beyond the mere circle of geometrical ideas. In an
industrial neighbourhood, machinery and workshop practice form
the appropriate extension. For example, in the London Polytechnics
this has been achieved with conspicuous success. For many second-
ary schools I suggest that surveying and maps are the natural
applications. In particular, plane-table surveying should lead pupils
to a vivid apprehension of the immediate application of geometric
truths. Simple drawing apparatus, a surveyor's chain, and a survey-
or's compass, should enable the pupils to rise from the survey and
mensuration of a field to the construction of the map of a small
district. The best education is to be found in gaining the utmost
information from the simplest apparatus. The provision of elaborate
instruments is greatly to be deprecated. To have constructed the
map of a small district, to have considered its roads, its contours,
its geology, its climate, its relation to other districts, the effects on
the status of its inhabitants, will teach more history and geography
than any knowledge of Perkin Warbeck or of Behren's Straits. I
mean not a nebulous lecture on the subject, but a serious investiga-
tion in which the real facts are definitely ascertained by the aid of
accurate theoretical knowledge. A typical mathematical problem
should be: Survey such and such a field, draw a plan of it to such
and such a scale, and find the area. It would be quite a good pro-
cedure to impart the necessary geometrical propositions without
their proof. Then, concurrently in the course, the proofs of
the propositions would be learnt while the survey was being made.

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 utilises 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 the study of the whole, not of details, 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: integrity of style. It is a habit of seeing, 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 achievement 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 men, administer your province, or do whatever else is set before you.

Where, then, does style help? In this, with style the end is attained without 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. Whose heard of the style of an amateur painter, of the style of an amateur poet? Style is always the product of special study, the peculiar contribution of specialization 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. The machinery of our secondary education is rigid where it should be yielding, and lax where it should be rigid. Every school is bound on pain of extinction to train its boys for a small set of definite examinations. No headmaster has a free hand to develop his general education or his specialist studies in accordance with the opportunities of his school, which are created by its staff, its environment, its class of boys, and its endowments. I suggest that no system of external tests which aims primarily at examining individual scholars can result in anything but educational waste.

Primarily it is the schools and not the scholars which should be inspected. Each school should grant its own leaving certificates, based on its own curriculum. The standards of these schools should be sampled and corrected. But the first requisite for educational reform is the school as a unit, with its approved curriculum based on its own needs, and evolved by its own staff. If we fail to secure that, we simply fall from one formalism into another, from one dung-hill of inert ideas into another.

In stating that the school is the true educational unit in any national system for the safeguarding of efficiency, I have conceived

Scope & Sequence on the local level
CHAPTER II

The Rhythm of Education

By the Rhythm of Education I denote a certain principle which in its practical application is well known to everyone with educational experience. Accordingly, when I remember that I am speaking to an audience of some of the leading educationalists in England, I have no expectation that I shall be saying anything that is new to you. I do think, however, that the principle has not been subjected to an adequate discussion taking account of all the factors which should guide its application.

I first seek for the baldest statement of what I mean by the Rhythm of Education, a statement so bald as to exhibit the point of this address in its utter obviousness. The principle is merely this—that different subjects and modes of study should be undertaken by pupils at fitting times when they have reached the proper stage of mental development. You will agree with me that this is a truism, never doubted and known to all. I am really anxious to emphasise the obvious character of the fundamental idea of my address; for one reason, because this audience will certainly find it out for itself. But the other reason, the reason why I choose this subject for discourse, is that I do not think that this obvious truth has been handled in educational practice with due attention to the psychology of the pupils.

The Tasks of Infancy

I commence by challenging the adequacy of some principles by which the subjects for study are often classified in order. By this I
mean that these principles can only be accepted as correct if they are so explained as to be explained away. Consider first the criterion of difficulty. It is not true that the easier subjects should precede the harder. On the contrary, some of the hardest must come first because nature so dictates, and because they are essential to life. The first intellectual task which confronts an infant is the acquirement of spoken language. What an appalling task, the correlation of meanings with sounds! It requires an analysis of ideas and an analysis of sounds. We all know that the infant does it, and that the miracle of his achievement is explicable. But so are all miracles, and yet to the wise they remain miracles. All I ask is that with this example staring us in the face we should cease talking nonsense about postponing the harder subjects.

What is the next subject in the education of the infant minds? The acquirement of written language; that is to say, the correlation of sounds with shapes. Great heavens! Have our educationists gone mad? They are setting babbling mites of six years old to tasks which might daunt a sage after lifelong toil. Again, the hardest task in mathematics is the study of the elements of algebra, and yet this stage must precede the comparative simplicity of the differential calculus.

I will not elaborate my point further; I merely restate it in the form that the postponement of difficulty is no safe clue for the maze of educational practice.

The alternative principle of order among subjects is that of necessary antecedence. There we are obviously on firmer ground. It is impossible to read Hamlet until you can read; and the study of integers must precede the study of fractions. And yet even this firm principle dissolves under scrutiny. It is certainly true, but it is only true if you give an artificial limitation to the concept of a subject for study. The danger of the principle is that it is accepted in one sense, for which it is almost a necessary truth, and that it is applied in another sense for which it is false. You cannot read Homer before you can read; but many a child, and in ages past many a man, has sailed with Odysseus over the seas of Romance by the help of the spoken word of a mother, or of some wandering bard. The uncritical application of the principle of the necessary antecedence of some subjects to others has, in the hands of dull people with a turn for organisation, produced in education the dryness of the Sahara.

Stages of Mental Growth

The reason for the title which I have chosen for this address, the Rhythm of Education, is derived from yet another criticism of current ideas. The pupil's progress is often conceived as a uniform steady advance undifferentiated by change of type or alteration in pace; for example, a boy may be conceived as starting Latin at ten years of age and by a uniform progression steadily developing into a classical scholar at the age of eighteen or twenty. I hold that this conception of education is based upon a false psychology of the process of mental development which has gravely hindered the effectiveness of our methods. Life is essentially periodic. It comprises daily periods, with their alternations of work and play, of activity and of sleep, and seasonal periods, which dictate our terms and our holidays; and also it is composed of well-marked yearly periods. These are the gross obvious periods which no one can overlook. There are also subtler periods of mental growth, with their cyclic recurrences, yet always different as we pass from cycle to cycle, though the subordinate stages are reproduced in each cycle. That is why I have chosen the term "rhythmic," as meaning essentially the conveyance of difference within a framework of repetition. Lack of attention to the rhythm and character of mental growth is a main source of wooden futility in education. I think that Hegel was right when he analysed progress into three stages, which he called Thesis, Antithesis, and Synthesis; though for the purpose of the application of his idea to educational theory I do not think that the names he gave are very happily suggestive. In relation to intellectual progress I would term them, the stage of romance, the stage of precision, and the stage of generalisation.

The Stage of Romance

The stage of romance is the stage of first apprehension. The subject-matter has the vividness of novelty; it holds within itself unexplored connexions with possibilities half-disclosed by glimpses and half-concealed by the wealth of material. In this stage
knowledge is not dominated by systematic procedure. Such system as there must be is created piecemeal ad hoc. We are in the presence of immediate cognisance of fact, only intermittently subjecting fact to systematic dissection. Romantic emotion is essentially the excitement consequent on the transition from the bare facts to the first realisations of the import of their unexplored relationships. For example, Crusoe was a mere man, the sand was mere sand, the footprint was a mere footprint, and the island a mere island, and Europe was the busy world of men. But the sudden perception of the half-disclosed and half-hidden possibilities relating Crusoe and the sand and the footprint and the lonely island secluded from Europe constitutes romance. I have had to take an extreme case for illustration in order to make my meaning perfectly plain. But construe it as an allegory representing the first stage in a cycle of progress. Education must essentially be a setting in order of a ferment already stirring in the mind: you cannot educate mind in vacuo. In our conception of education we tend to confine it to the second stage of the cycle, namely, to the stage of precision. But we cannot so limit our task without misconceiving the whole problem. We are concerned alike with the ferment, with the acquirement of precision, and with the subsequent fruition.

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The Stage of Generalisation

The final stage of generalisation is Hegel's synthesis. It is a return to romanticism with added advantage of classified ideas and relevant technique. It is the fruit of which has been the goal of the precise training. It is the final success. I am afraid that I have had to give a dry analysis of somewhat obvious ideas. It has been necessary to do so because my subsequent remarks presuppose that we have clearly in our minds the essential character of this threefold cycle.

The Cyclic Processes

Education should consist in a continual repetition of such cycles. Each lesson in its minor way should form an eddy cycle issuing in its own subordinate process. Longer periods should issue in definite attainments, which then form the starting-grounds for fresh cycles. We should banish the idea of a mythical, far-off end of education. The pupils must be continually enjoying some fruition and starting afresh—if the teacher is stimulating in exact proportion to his success in satisfying the rhythmic cravings of his pupils.

An infant's first romance is its awakening to the apprehension of objects and to the appreciation of their connexions. Its growth in mentality takes the exterior form of occupying itself in the co-ordination of its perceptions with its bodily activities. Its first stage of precision is mastering spoken language as an instrument for classifying its contemplation of objects and for strengthening its apprehension of emotional relations with other beings. Its first stage of generalisation is the use of language for a classified and enlarged enjoyment of objects.

This first cycle of intellectual progress from the achievement of perception to the acquirement of language, and from the acquirement of language to classified thought and keener perception, will bear more careful study. It is the only cycle of progress which we can observe in its purely natural state. The later cycles are necessarily tinged by the procedure of the current mode of education.
There is a characteristic of it which is often sadly lacking in subsequent education; I mean, that it achieves complete success. At the end of it the child can speak, its ideas are classified, and its perceptions are sharpened. The cycle achieves its object. This is a great deal more than can be said for most systems of education as applied to most pupils. But why should this be so? Certainly, a new-born baby looks a most unpromising subject for intellectual progress when we remember the difficulty of the task before it. I suppose it is because nature, in the form of surrounding circumstances, sets it a task for which the normal development of its brain is exactly fitted. I do not think that there is any particular mystery about the fact of a child learning to speak and in consequence thinking all the better: but it does offer food for reflection.

In the subsequent education we have not sought for cyclic processes which in a finite time run their course and within their own limited sphere achieve a complete success. This completion is one outstanding character in the natural cycle for infants. Later on we start a child on some subject, say Latin, at the age of ten, and hope by a uniform system of formal training to achieve success at the age of twenty. The natural result is failure, both in interest and in acquirement. When I speak of failure, I am comparing our results with the brilliant success of the first natural cycle. I do not think that it is because our tasks are intrinsically too hard, when I remember that the infant’s cycle is the hardest of all. It is because our tasks are set in an unnatural way, without rhythm and without the stimulus of intermediate successes and without concentration.

I have not yet spoken of this character of concentration which so conspicuously attaches to the infant’s progress. The whole being of the infant is absorbed in the practice of its cycle. It has nothing else to divert its mental development. In this respect there is a striking difference between this natural cycle and the subsequent history of the student’s development. It is perfectly obvious that life is very various and that the mind and brain naturally develop so as to adapt themselves to the many-hued world in which their lot is cast. Still, after making allowance for this consideration, we will be wise to preserve some measure of concentration for each of the subsequent cycles. In particular, we should avoid a competition of diverse subjects in the same stage of their cycles. The fault of the older education was un rhythmic concentration on a single undifferentiated subject. Our modern system, with its insistence on a preliminary general education, and with its easy toleration of the analysis of knowledge into distinct subjects, is an equally un rhythm ic collection of distracting scraps. I am pleading that we shall endeavour to weave in the learner’s mind a harmony of patterns, by co-ordinating the various elements of instruction into subordinate cycles each of intrinsic worth for the immediate apprehension of the pupil. We must garner our crops each in its due season.

The Romance of Adolescence

We will now pass to some concrete applications of the ideas which have been developed in the former part of my address.

The first cycle of infancy is succeeded by the cycle of adolescence, which opens with by far the greatest stage of romance which we ever experience. It is in this stage that the lines of character are graven. How the child emerges from the romantic stage of adolescence is how the subsequent life will be moulded by ideals and coloured by imagination. It rapidly follows on the generalisation of capacity produced by the acquirement of spoken language and of reading. The stage of generalisation belonging to the infantile cycle is comparatively short, because the romantic material of infancy is so scanty. The initial knowledge of the world in any developed sense of the word “knowledge” really commences after the achievement of the first cycle, and thus issues in the tremendous age of romance. Ideas, facts, relationships, stories, histories, possibilities, artistry in words, in sounds, in form and in colour, crowd into the child’s life, stir his feelings, excite his appreciation, and incite his impulses to kindred activities. It is a saddening thought that on this golden age there falls so often the shadow of the crammer. I am thinking of a period of about four years of the child’s life, roughly, in ordinary cases, falling between the ages of eight and twelve or thirteen. It is the first great period of the utilisation of the native language, and of developed powers of observation and of manipulation. The infant cannot manipulate, the child can; the infant cannot observe, the child can; the infant cannot retain
thoughts by the recollection of words, the child can. The child thus enters upon a new world.

Of course, the stage of precision prolongs itself as recurring in minor cycles which form eddies in the great romance. The perfecting of writing, of spelling, of the elements of arithmetic, and of lists of simple facts, such as the Kings of England, are all elements of precision, very necessary both as training in concentration and as useful acquirements. However, these are essentially fragmentary in character, whereas the great romance is the flood which bears on the child towards the life of the spirit.

The success of the Montessori system is due to its recognition of the dominance of romance at this period of growth. If this be the explanation, it also points to the limitations in the usefulness of that method. It is the system which in some measure is essential for every romantic stage. Its essence is browsing and the encouragement of vivid freshness. But it lacks the restraint which is necessary for the great stages of precision.

The Mastery of Language

As he nears the end of the great romance the cyclic course of growth is swinging the child towards an aptitude for exact knowledge. Language is now the natural subject-matter for concentrated attack. It is the mode of expression with which he is thoroughly familiar. He is acquainted with stories, histories, and poems illustrating the lives of other people and of other civilisations. Accordingly, from the age of eleven onwards there is wanted a gradually increasing concentration towards precise knowledge of language. Finally, the three years from twelve to fifteen should be dominated by a mass attack upon language, so planned that a definite result, in itself worth having, is thereby achieved. I should guess that within these limits of time, and given adequate concentration, we might ask that at the end of that period the children should have command of English, should be able to read fluently fairly simple French, and should have completed the elementary stage of Latin; I mean, a precise knowledge of the more straightforward parts of Latin grammar, the knowledge of the construction of Latin sentences, and the reading of some parts of appropriate

Latin authors, perhaps simplified and largely supplemented by the aid of the best literary translations so that their reading of the original, plus translation, gives them a grip of the book as a literary whole. I conceive that such a measure of attainment in these three languages is well within the reach of the ordinary child, provided that he has not been distracted by the effort at precision in a multiplicity of other subjects. Also some more gifted children could go further. The Latin would come to them easily, so that it would be possible to start Greek before the end of the period, always provided that their bent is literary and that they mean later to pursue that study at least for some years. Other subjects will occupy a subordinate place in the time-table and will be undertaken in a different spirit. In the first place, it must be remembered that the semi-literary subjects, such as history, will largely have been provided in the study of the languages. It will be hardly possible to read some English, French, and Latin literature without imparting some knowledge of European history. I do not mean that all special history teaching should be abandoned. I do, however, suggest that the subject should be exhibited in what I have termed the romantic spirit, and that the pupils should not be subjected to the test of precise recollection of details on any large systematic scale.

At this period of growth science should be in its stage of romance. The pupils should see for themselves, and experiment for themselves, with only fragmentary precision of thought. The essence of the importance of science, both for interest in theory or for technological purposes, lies in its application to concrete detail, and every such application evokes a novel problem for research. Accordingly, all training in science should begin as well as end in research, and in getting hold of the subject-matter as it occurs in nature. The exact form of guidance suitable to this age and the exact limitations of experiment are matters depending on experience. But I plead that this period is the true age for the romance of science.

Concentration on Science

Towards the age of fifteen the age of precision in language and of romance in science draws to its close, to be succeeded by a period
of generalisation in language and of precision in science. This should be a short period, but one of vital importance. I am thinking of about one year's work, and I suggest that it would be well decisively to alter the balance of the preceding curriculum. There should be a concentration on science and a decided diminution of the linguistic work. A year's work on science, coming on the top of the previous scientific study, should make every one understand the main principles which govern the development of mechanics, physics, chemistry, algebra and geometry. Understand that they are not beginning these subjects, but they are putting together a previous discursive study by an exact formulation of their main ideas. For example, take algebra and geometry, which I single out as being subjects with which I have some slight familiarity. In the previous three years there has been work on the applications of the simplest algebraic formula and geometrical propositions to problems of surveying, or of some other scientific work involving calculations. In this way arithmetic has been carefully strengthened by the insistence on definite numerical results, and familiarity with the ideas of literal formulæ and of geometrical properties has been gained; also some minor methods of manipulation have been inculcated. There is thus no long time to be wasted in getting used to the ideas of the sciences. The pupils are ready for the small body of algebraic and geometrical truths which they ought to know thoroughly. Furthermore, in the previous period some boys will have shown an aptitude for mathematics and will have pushed on a little more, besides in the final year somewhat emphasising their mathematics at the expense of some of the other subjects. I am simply taking mathematics as an illustration.

Meanwhile, the cycle of language is in its stage of generalisation. In this stage the precise study of grammar and composition is discontinued, and the language study is confined to reading the literature with emphasised attention to its ideas and to the general history in which it is embedded; also the time allotted to history will pass into the precise study of a short definite period, chosen to illustrate exactly what does happen at an important epoch and also to show how to pass the simpler types of judgments on men and policies.

I have now sketched in outline the course of education from babyhood to about sixteen and a half, arranged with some attention to

the rhythmic pulses of life. In some such way a general education is possible in which the pupil throughout has the advantage of concentration and of freshness. Thus precision will always illustrate subject-matter already apprehended and crying out for drastic treatment. Every pupil will have concentrated in turn on a variety of different subjects, and will know where his strong points lie. Finally—and this of all the objects to be attained is the most dear to my heart—the science students will have obtained both an invaluable literary education and also at the most impressionable age an early initiation into habits of thinking for themselves in the region of science.

After the age of sixteen new problems arise. For literary students science passes into the stage of generalisation, largely in the form of lectures on its main results and general ideas. New cycles of linguistic, literary, and historical study commence. But further detail is now unnecessary. For the scientists the preceding stage of precision maintains itself to the close of the school period with an increasing apprehension of wider general ideas.

However, at this period of education the problem is too individual, or at least breaks up into too many cases, to be susceptible of broad general treatment. I do suggest, nevertheless, that all scientists should now keep up their French, and initiate the study of German if they have not already acquired it.

University Education

I should now like, if you will bear with me, to make some remarks respecting the ideas for a University education.

The whole period of growth from infancy to manhood forms one grand cycle. Its stage of romance stretches across the first dozen years of life, its stage of precision comprises the whole school period of secondary education, and its stage of generalisation is the period of entrance into manhood. For those whose formal education is prolonged beyond the school age, the University course or its equivalent is the great period of generalisation. The spirit of generalisation should dominate a University. The lectures should be addressed to those to whom details and procedure are familiar; that is to say, familiar at least in the sense of being so congruous to
pre-existing training as to be easily acquirable. During the school period the student has been mentally bending over his desk; at the University he should stand up and look around. For this reason it is fatal if the first year at the University be frittered away in going over the old work in the old spirit. At school the boy painfully rises from the particular towards glimpses at general ideas; at the University he should start from general ideas and study their applications to concrete cases. A well-planned University course is a study of the wide sweep of generality. I do not mean that it should be abstract in the sense of divorce from concrete fact, but that concrete fact should be studied as illustrating the scope of general ideas.

**Cultivation of Mental Power**

This is the aspect of University training in which theoretical interest and practical utility coincide. Whatever be the detail with which you cram your student, the chance of his meeting in after-life exactly that detail is almost infinitesimal; and if he does meet it, he will probably have forgotten what you taught him about it. The really useful training yields a comprehension of a few general principles with a thorough grounding in the way they apply to a variety of concrete details. In subsequent practice the men will have forgotten your particular details; but they will remember by an unconscious common sense how to apply principles to immediate circumstances. Your learning is useless to you till you have lost your text-books, burnt your lecture notes, and forgotten the minutiae which you learnt by heart for the examination. What, in the way of detail, you continually require will stick in your memory as obvious facts like the sun and moon; and what you casually require can be looked up in any work of reference. The function of a University is to enable you to shed details in favour of principles. When I speak of principles I am hardly even thinking of verbal formulations. A principle which has thoroughly soaked into you is rather a mental habit than a formal statement. It becomes the way the mind reacts to the appropriate stimulus in the form of illustrative circumstances. Nobody goes about with his knowledge clearly and consciously before him.

Mental cultivation is nothing else than the satisfactory way in which the mind will function when it is poked up into activity. Learning is often spoken of as if we are watching the open pages of all the books which we have ever read, and then, when occasion arises, we select the right page to read aloud to the universe.

Luckily, the truth is far otherwise from this crude idea; and for this reason the antagonism between the claims of pure knowledge and professional acquirement should be much less acute than a faulty view of education would lead us to anticipate. I can put my point otherwise by saying that the ideal of a University is not so much knowledge, as power. Its business is to convert the knowledge of a boy into the power of a man.

**The Rhythmic Character of Growth**

I will conclude with two remarks which I wish to make by way of caution in the interpretation of my meaning. The point of the address is the rhythmic character of growth. The interior spiritual life of man is a web of many strands. They do not all grow together by uniform extension. I have tried to illustrate this truth by considering the normal unfolding of the capacities of a child in something favourable circumstances but otherwise with fair average capacities. Perhaps I have misconstrued the usual phenomena. It is very likely that I have so failed, for the evidence is complex and difficult. But do not let any failure in this respect prejudice the main point which I am here to enforce. It is that the development of mentality exhibits itself as a rhythm involving an interweaving of cycles, the whole process being dominated by a greater cycle of the same general character as it may or oddity. Furthermore this rhythm exhibits certain ascertainable general laws which are valid for most pupils, and the quality of our teaching should be so adapted as to suit the stage in the rhythm to which our pupils have advanced. The problem of a curriculum is not so much the succession of subjects; for all subjects should in essence be begun with the dawn of mentality. The truly important order is the order of quality which the educational procedure should assume.

My second caution is to ask you not to exaggerate into sharpness the distinction between the three stages of a cycle. I strongly
many of you, when you heard me detail the three stages in each cycle, said to yourselves—How like a mathematician to make such formal divisions! I assure you that it is not mathematics but literary incompetence that may have led me into the error against which I am warning you. Of course, I mean throughout a distinction of emphasis, of pervasive quality—romance, precision, generalisation, are all present throughout. But there is an alternation of dominance, and it is this alternation which constitutes the cycles.

CHAPTER III

The Rhythmic Claims of Freedom and Discipline

From Wisdom To Subjects

The fading of ideals is sad evidence of the defeat of human endeavour. If the schools of antiquity philosophers aspired to impart wisdom, in modern colleges our humbler aim is to teach subjects. The drop from the divine wisdom, which was the goal of the ancients, to textbook knowledge of subjects, which is achieved by the moderns, marks an educational failure sustained through the ages. I am not maintaining that in the practice of education the ancient were more successful than ourselves. You have only to read Lucian, and to note his satiric dramatizations of the pretentious claims of philosophers, to see that in this respect the ancients can boast over us no superiority. My point is that, at the dawn of our European civilization, men started with the full ideals which should inspire education, and that gradually our ideals have sunk to square with our practice.

But when ideals have sunk to the level of practice, the result is stagnation. In particular, so long as we conceive intellectual education as merely consisting in the acquirement of mechanical mental aptitudes, and of formulated statements of useful truths, there can be no progress; though there will be much activity, amid aimless re-arrangement of syllabuses, in the fruitless endeavour to dodge the inevitable lack of time. We must take it as an unavoidable fact, that God has so made the world that there are more topics desirable for knowledge than any one person can possibly acquire. It is