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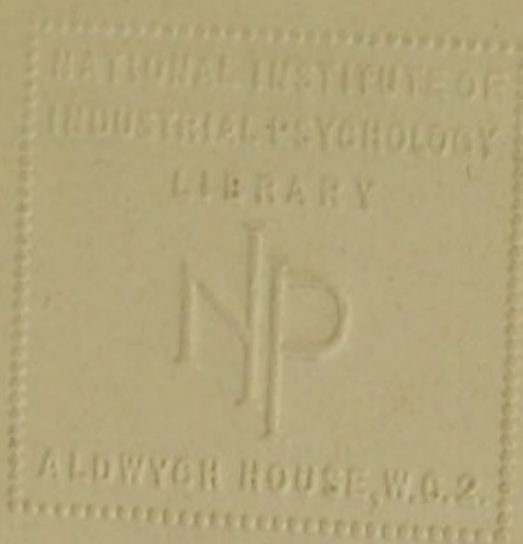
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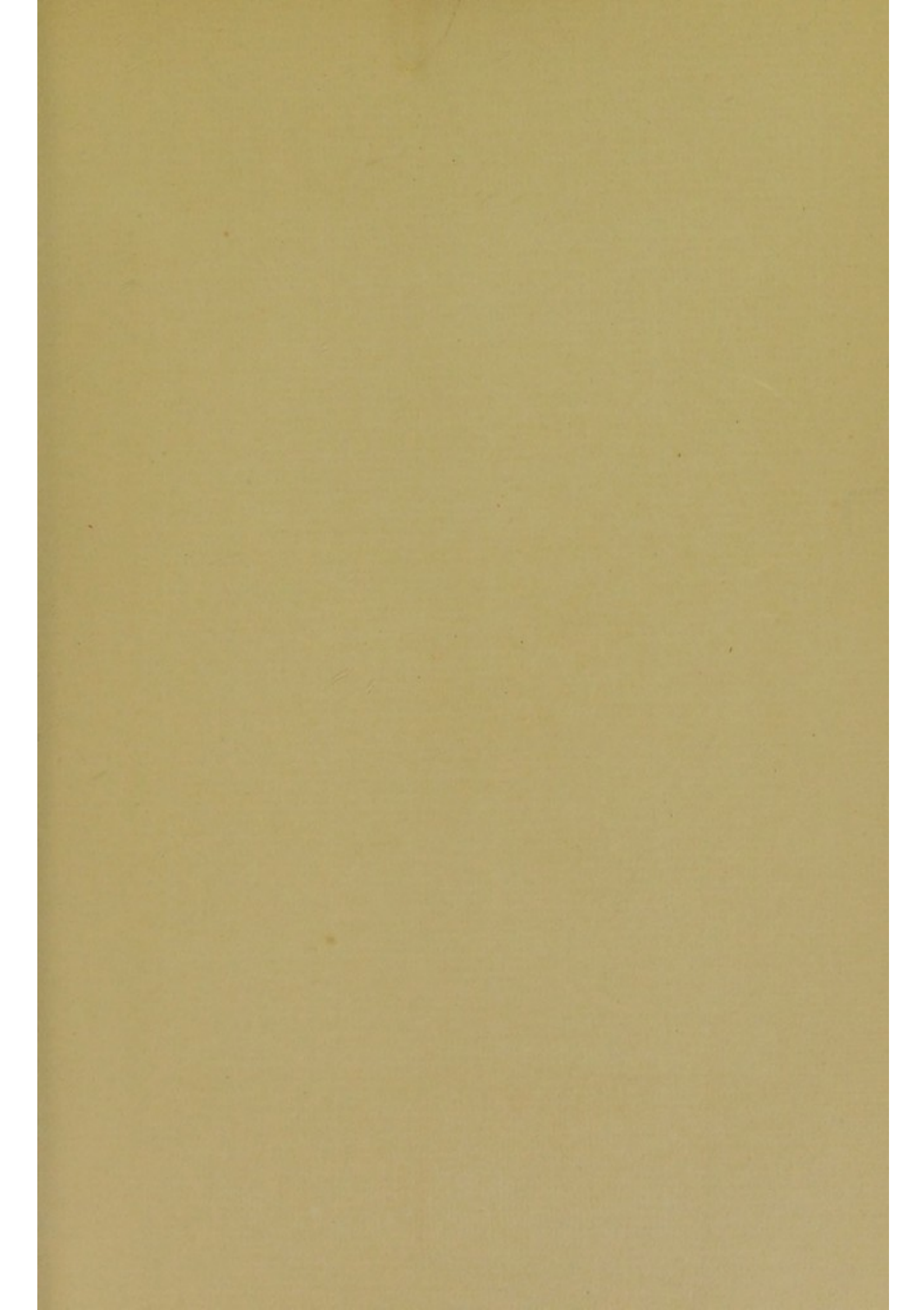
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INTEREST AND EDUCATION

Interest is the greatest word in Education.

JACOB GOULD SCHURMAN.

•The  Co. •

INTEREST AND EDUCATION

THE DOCTRINE OF INTEREST AND
ITS CONCRETE APPLICATION

BY

CHARLES DeGarmo

PROFESSOR OF THE SCIENCE AND ART OF EDUCATION
CORNELL UNIVERSITY

New York

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1906

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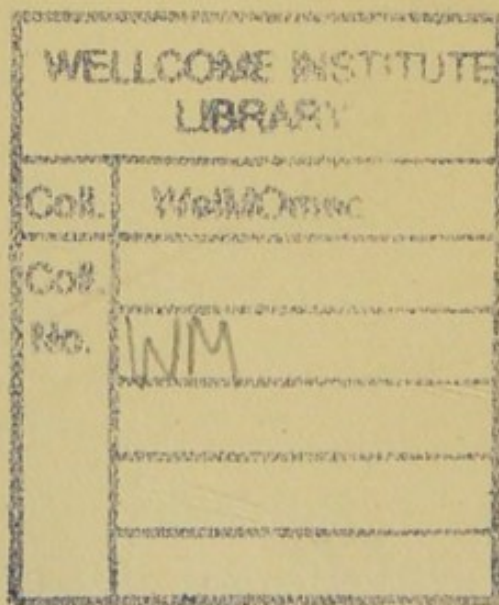
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PREFACE

THE purpose of this volume is to make a concrete application of the doctrine of interest to the matter and methods of education.

So long as mere training of the intelligence through drill upon the school arts, such as reading, spelling, grammar, and arithmetic, is regarded as the chief function of the elementary school, there is small need for any specific doctrine of interest. One naturally refrains from being tedious in instruction when one might just as well be interesting, precisely for the same reason that one does not willingly appear unkempt or ill dressed in society. But to sharpen the intellect, all we have to do is to keep it alert by drilling it and by occupying it with the solution of problems of steadily increasing difficulty. Such work does not necessitate any glowing enthusiasm; it needs only steady application. It is not strange, therefore,

that to those who conceive the sole end and aim of instruction to be the development of the intellect, the term 'interest' is not a word to conjure with.

Is it certain, however, that instruction should confine itself to one aspect of the mind? Besides intelligence the child has feelings and volition. His feelings involve the group of mental states that we call instinct, impulse, emotion, desire, interest, pleasure, pain, etc. Moreover, his volitions are intimately connected with his feelings. May it not be that to establish desirable permanent mental attitudes toward men and their institutions and toward Nature and her living creatures is one of the choicest opportunities, not to say most imperative duties, of the school? Yet one's view of the world, one's hospitality or hostility respecting the order of things, is far more a matter of feeling than of intelligence. Why does a church desire to have the spiritual nurture of children committed to its care? Surely not to drill their intellects, but rather to influence their feelings, to fix in desirable and permanent form their attitude toward God and man and

the church. Why do schools in the slums of New York have the children salute the flag and sing patriotic songs? It is to secure that love of country which marks the good citizen. Is it not as important in every other field of training that the feelings of children should be tenderly nourished and properly directed, that abiding enthusiasms should be awakened in them, that their attitude toward men and things should not only be lighted by intelligence, but warmed by the glow of feeling?

When feeling as well as intellect is to be included in education, it is necessary that instruction should involve more than mental drill; it must include also such bodies of ideas as the feelings can cling to; it must impart knowledge capable of arousing enthusiasm; it must reveal nature and social institutions in such manner that desirable and permanent disposition toward them may be developed. If we wait for life itself to form the disposition, too much is left to accident. Misfortune or mistake may easily embitter and harden the heart; whereas, had proper mental attitudes been formed during the school period, the individual would have

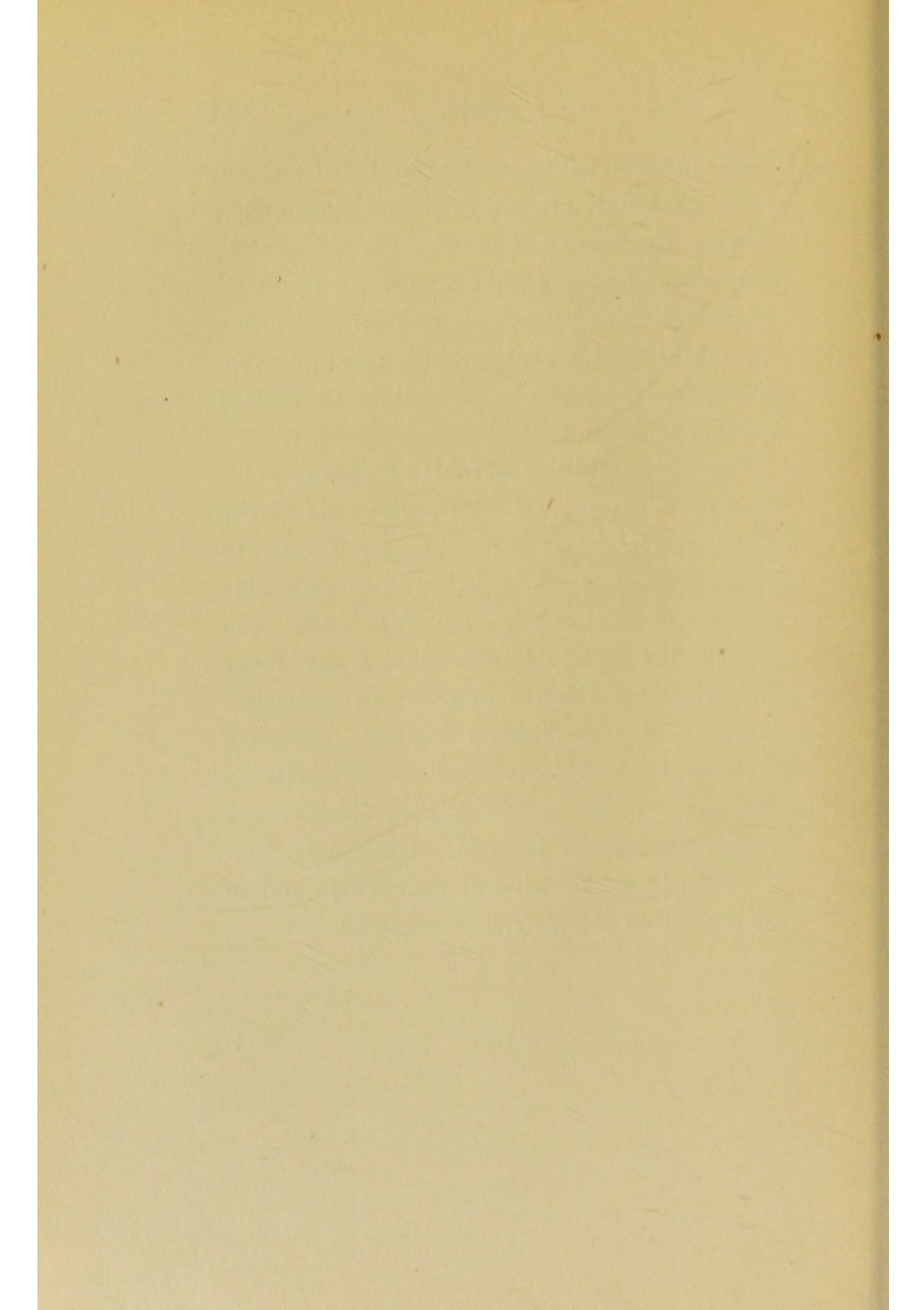
had a saner outlook. We must not make sweetness and light in life depend upon shrewdness or good fortune; it should emanate from the inmost depths of the soul.

Again, mental attitude toward the world has its outcome in volition, since conduct is the legitimate conclusion of desire and interest. This brings instruction into line with the development of the whole mind, and greatly extends the influence of the school in the formation of character. The old-time reliance upon inhibition of undesirable tendencies in the training of the will has a certain warrant that will endure, since negation and prohibition are necessary elements in the proper training of the young. But the affirmative, or positive, side of character-forming is still more important; for, as we cultivate disposition through intelligence, so we shape character through disposition.

All this means that we need a body of instruction in which interest and volition may take root, and a doctrine of interest capable of being applied to the subject matter of instruction.

But interest, enthusiasm, mental attitude, and volitional habits are not the creation of a day; they are the growth of years. For this reason, methods of teaching have a powerful influence in generating and developing them. The doctrine of interest, therefore, finds its application in the field of methods as well as in that of knowledge.

The second, third, and fourth sections of this book are little more than restatements of the doctrine of interest advanced by Dr. Dewey, to whom the volume is inscribed. Considerable portions of Sections VI and VII have been printed, the former in *The School and Home Journal* and the latter in *Gunton's Magazine*. Several of the sections on Method owe much of their content and order to Baumeister's *Handbuch*. The author has received many helpful suggestions from Mr. Thomas D. Bolger, both in the revision of manuscript and in the correction of proofs.



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INTEREST AND EDUCATION

I

HOW INTEREST ARISES AMONG PRIMITIVE MEN

THE term *interest* is a word in common use, and, like other words of its kind, may be variously interpreted. Primarily, the word would seem to indicate a state of feeling, yet it is often extended to the objects toward which the feeling extends; thus a man may have interest in his business, and its objects may easily become his business interests. It often happens, however, that one is not interested in what are his true interests.

What does the word signify in education? If the teacher declares that the student must be interested, the inquiry at once arises, Interested in what? There are good interests and bad interests. Play is a subject of unquestioned interest to children, so that perhaps to gain their interest in their studies we

should turn the studies into play. Children are interested, too, in attaining pleasure and avoiding pain. Shall the teacher, therefore, attempt to convert all labor into pleasure? Many teachers, having this conception of interest, contrast with it the doctrine of effort. They say that play spoils the mind for the serious business of life, leaving it interested only in selfish enjoyments, not at all in duties. Others, seeing the deadening effects that come through effort without interest, likewise condemn the doctrine of effort as a guiding principle of school activities. The word *interest*, therefore, appears undetermined when examined from the standpoint of its use in everyday life.

It may perhaps assist us to free the meaning of the term from confusion, if we make a brief study of the feelings of a race still in a primitive condition. Let us suppose we have gone with Peary on one of his polar expeditions, and that we are trying to understand the actions, motives, and feelings of the Eskimo. We find them engaged upon the most elementary kinds of labor. Their prob-

lems pertain to food, clothing, and shelter in their simplest forms. These people are little concerned with affairs of government, religion, or education. They have no police, no courts, no armies, no professional classes. Municipal problems do not puzzle their minds or vex their patience. Fire departments are not needed, for there is nothing to burn. Taxes are not levied, for there is no public service. Laws are unknown, since real property does not exist. There is, moreover, little personal property that could be stolen and there is no place of refuge for thieves. Transportation is hardly a problem except for the tribe; merchants are unnecessary, since there is nothing to sell. We have here, in brief, a people for whom art, science, government, industrial society, religion, and education are either nonexistent or in their most rudimentary forms. Eliminating thus at a stroke the complexities incident to a highly developed civilization, we are able to examine directly the primal sources of interest among men.

Of the three objects of Eskimo activity, that of shelter is the least in importance, for,

lacking loose stones, the igloo, or one-roomed hut in which the family dwells, is made of blocks of snow for walls and dome, with perhaps a block of ice for a window. The Eskimo lover need not hesitate to wed because he knows not where to house the bride. He can construct his igloo as easily as a bird can build her nest. What little fire the people use is made from animal fat, a by-product of the hunt. The two prime requisites for existence are, therefore, food, which is almost exclusively animal, and clothing, which is quite as exclusively furs. The two forms of activity about which everything turns in an Eskimo community are, therefore, hunting or fishing by the men, and the making of fur clothing by the women. The objects of life are concrete, immediate, pressing. Existence itself is the stake for which each individual in such a community works, and every act becomes charged with this intense interest. Food brings satisfaction and stores up energy for the getting of more food. Life is a circle about whose boundary is written hunger, cold (or the fear of them), energy, effort, food, clothing, satisfac-

tion, more energy, and so on as long as the tribe exists.

It should not be assumed that because every person in the group works with his life in his hand, so to speak, pain is the predominating note. So long as he has energy left, the hunter will enjoy his hunt, will glory in its risks and its triumphs. The exercise of his stored-up energy alone suffices to make him enjoy his work; and when to this source of pleasure we add prospective enjoyment of its fruits, and perhaps the somewhat æsthetic enjoyment arising from a contemplation of goodly stores for the future, we can see that pleasure is not denied to man, even in the desolate and barren Northland. It is only when energy or hope fails that labor becomes a pain to the Eskimo.¹

Like their sisters of more favored climes, the Eskimo women have the less strenuous duties of the household. Since their housekeeping is exceedingly simple, most of their time can be spent in the tanning of skins, and their manufacture into clothing. The skins are rendered

¹ Compare Patten, "The Theory of Prosperity," Introduction, The Macmillan Co.

flexible and durable by chewing. One can fancy a social group of women, each with a fold of a skin in her mouth, busily engaged, not in friendly communication, but in vigorous chewing, a useful even if not an exhilarating utilization of muscular power. But here again, divesting one's self of any prejudice against such labor caused by absence of need and opportunity, one may conceive that even this labor is not a pain to the sturdy belles of the North, who are able to enjoy raw blubber as our maids enjoy sweetmeats. Then, again, as in the case of the man, there is the reward of warm sleeping-bag or sealskin jacket, to say nothing of the æsthetic enjoyment arising from supple skins and handsome fit.

All the minor activities of the hut contribute to the main purpose of getting food and clothing. The men and boys work at their kayaks, their spears, their nets, their arrows, their sleds and thongs. The very play of the children with the puppies contributes to their future power of survival. The women cut their thread from the skins and prepare their bone needles. Now and then a trifle of art appears in the

way of adornment of dress or weapon. Not long since a hunter on Cayuga Lake shot a wild goose on its flight to the South. Imbedded in its breast there stood a bone arrow-head, ornamented at one end by a few simple lines — mute witness to an art impulse in some untutored son of the distant North.

It is like this with all primitive peoples. Their interests cluster about a few requisites for survival. These requisites vary with the environment, as with that of the American Indians, or of the denizens of tropical forests; but whatever they are, they form the goal of all endeavor, the centre of all interests. Moreover, the physical and mental satisfactions growing out of them lend to labors that to us would be repulsive, a joy that makes even such life worth living. Much as we may deplore a primitive existence for men, because of its many deprivations, it would be an error to think of primitive life as one of drudgery, of hateful, hopeless toil. Weariness, pain, indeed, comes when energy is exhausted, but the idea of drudgery with adults belongs to a later social epoch.

When society becomes divided into castes, such as nobles, warriors, priests, and laborers, and the upper classes exploit the lower, compelling the workers to support those who sit in idleness, or labor in non-productive ways, the primitive ends of labor such as exist with the Eskimo become remote. And when the laborer gets back directly only a moiety of the bread he produces, and when, moreover, his social status sinks because of his servile labor, then the direct connection between effort and survival is broken. The laborer becomes a serf, doing the will of another, and he is constrained to accept contempt as a sauce to compulsion. He then works directly to ward off evils, and only indirectly to produce benefits. As will be more fully explained in a subsequent section, drudgery arises when interest in ends desired is not reflected in the labor that is being performed. At times drudgery is endured by all persons, young or old; yet it is hardly a prevailing state, except with those who endure some form of slavery. A prisoner of war chained to a seat as a galley-slave, or a criminal breaking stone upon a turnpike, would be en-

gaged in what would seem pure drudgery, even though such activity might be preferred to idleness in solitary confinement. Serfdom of any sort produces drudgery; an eagle caged longs for freedom, even though a king be his jailer. The serf's life is spent in what has been termed a pain economy,¹ which may be defined as a state of society in which the chief motive to action is the avoidance of pain or of enemies, and in which men work only indirectly for the requisites for survival. The feudal system is an example on a large scale of a pain economy. The laborer became the serf of the feudal lord, ready to till his land, defend his castle, or be his man. He did all this that he might have food, however scanty and poor, and shelter and clothing, however mean, from the man who owned the land and controlled the agencies of production. Under such circumstances, the idea of drudgery, or pain from labor whose product the laborer could not hope to enjoy, would naturally arise. Besides the meagreness of the return from the work, the laborer had his food seasoned with the salt

¹ See Patten, "Development of English Thought," p. 8.

of social degradation. In such cases interest is necessarily negative in character. The old joy in production, found where men work for themselves, gives way to the passive endurance of the man who works for another upon compulsion.

From the foregoing analysis, we may conclude that interest arises primarily from the activities put forth by men to secure the requisites for their physical survival. Consumption of goods produces satisfaction and renews energy for further production. Pain arises only when energy fails, or when that which should conduce to the survival of one individual is forcibly diverted to another. Drudgery as a permanent status of a people is the offspring of serfdom.

II

A MORE FUNDAMENTAL CONCEPTION OF INTEREST

It might be thought that the presence of objects is enough to arouse interest in them. Yet if this were true, it is difficult to see why the same objects should arouse interest in some and aversion in others, while still others may remain indifferent. Evidently the objects, at least among primitive men, would have to have some perceived relation to survival. It did not take the American Indian long to become interested in firearms, so intimately were these seen to be related to his survival, whether game or enemies were considered. But even to this day the uncivilized Indian remains indifferent to agricultural machinery.

On the other hand, it might be thought that the mind through its own activity creates ideals of objects and then becomes interested in them.

But this ignores the function of instinctive action to secure survival, as in the case of fear or hunger, the mating instinct, and the like. Each of these suppositions is one-sided. A more adequate conception of the group of psychical states known as impulse, desire, interest, volition, is that the self is seeking through its own activity to express or realize itself. At first this effort at self-expression is, as we have seen, merely a doing of the things that lead to physical survival. But as life broadens, and something more than food and clothing becomes necessary for those forms of survival that we prize, the field for self-active expression constantly widens, so that, with the growth of new ideals, new motives to action appear, new interests absorb the mind. In other words, the interest that was once instinctive becomes conscious, and is directed by intelligence.

The idea of self-expression is of far-reaching significance, both for the development of the individual mind, and for the development of civilization itself. Our instincts and impulses are products of heredity. Long ages of struggle

for existence have implanted in us the resultants, so to speak, of the qualities of mind that have in the past been necessary for survival. One set of impulses pertains to food, another to the avoidance of dangers, another to the perpetuation of the race. To these primitive impulses leading to survival, we add many others from the higher aspects of human life, like curiosity to know, response to beauty, reverence for what is good and noble. Many of the impulses that were formerly useful in securing survival are now unimportant, and may properly be ignored. This is especially true of our fears. Dr. G. Stanley Hall has discovered that children are subject to some 298 fears, most of which relate to bodily preservation. It is needless to say that under the conditions of modern civilization most of these fears are groundless, and should be overcome. "What casts out fear?" asks Dr. Hall; "love, which is the opposite. Children fear night, trees, thunder and lightning, bugs and snakes, and many other objects of nature. Teach them to love these things, that is, to feel an interest in them. When we have love

distributed over all things in the world that are worthy of being loved, then we have education."

Professor Davidson¹ conceives education to be the process of transforming the original nature of man into his ideal nature. According to this view, the history of mankind is no more than the record of different races in this process of development. In his original nature, a man would, perhaps, not differ from a lion in the general purpose of his self-expression; he would be fierce in his aggression when seeking food; he would be playful when comfortable, angry when crossed in his natural desires; in short, he would be merely one of many in a struggle for existence in which the welfare of the one might mean the detriment of the others. But in realizing his ideal nature, a man transforms this original selfish struggle for his individual welfare into coöperative activities in which he best conserves his own welfare by taking thought for that of others. In short, he transfers his activities from an

¹ See Introduction to "The Education of the Greek People," D. Appleton & Co.

animal to a social economy. Even primitive men, like the Eskimo, work together for common ends. This social economy in its highest expression involves all that we know by the name of industrial coöperation, education, ethics, altruism, and religion. Whatever the individual does, therefore, he does to realize or express some aspect of himself. This mental activity, taking root first in the instincts and impulses of the physical nature, and developing into conscious desire for the realization of certain ends, is at bottom nothing but the effort to express self in accordance with the varying ideals implanted by physical nature or developed by growing insight into the ideal nature of the man.

The complexity of this idea of self-expression is seen when we consider the multiplicity of the ends with which a man may identify himself. Every man has many selves: he is a hierarchy of me's, as Professor James¹ calls him. "In its widest possible sense," he says, "a man's Me is the sum total of all that he can call his, not only his body and his psychic powers, but

¹ See "Psychology, Briefer Course," pp. 176-216.

his clothes and his house, his wife and children, his ancestors and friends, his reputation and works, his lands and horses, his yacht and bank account. All these things give him the same emotions. If they wax and prosper, he feels triumphant; if they dwindle and die, he feels cast down, not necessarily in the same degree for each thing, but in much the same way for all."

Each man is at once a material me, a social me, and a spiritual me, and when he is working for any phase of any one of these, we may say that he is expressing himself. When these selves come into competition, as, for instance, when a man must decide which he will satisfy first, his own appetite or that of his children, we may still say that he is expressing himself, no matter which aspect of himself may prevail, and notwithstanding the fact that we discriminate between his higher and his lower self. Professor James says again, with respect to the rivalry and conflict of the different me's: "With most objects of desire, physical nature restricts our choice to but one of the many represented goods, and even so it is here. I am often confronted by the necessity of stand-

ing by one of my empirical selves and relinquishing the rest. Not that I would not, if I could, be both handsome and fat, and well dressed, and a great athlete, and make a million a year; be a wit, a *bon vivant*, and a lady-killer, as well as a philosopher; a philanthropist, statesman, warrior, and African explorer, as well as a 'tone-poet' and saint. But the thing is simply impossible. The millionaire's work would run counter to the saint's; the *bon vivant* and the philanthropist would trip each other up; the philosopher and the lady-killer could not well keep house in the same tenement of clay. Such different characters may conceivably at the outset of life be alike possible to man. But to make any one of them actual, the rest must more or less be suppressed. So the seeker of his truest, strongest, deepest self must review the list carefully, and pick out the one on which to stake his salvation. All other selves thereupon become unreal, but the fortunes of this self are real. Its failures are real failures, its triumphs real triumphs, carrying shame and gladness with them."

It will be seen from the foregoing that the idea of self-expression is as broad as the conception of self. The essential point is that the activity in which we are interested proceeds from within. Its source is internal; its expression is outgoing. With the Eskimo the cycle—energy, goods, consumption, more energy—pertains to the things that preserve his physical existence; with an artist the cycle—energy, artistic production, æsthetic satisfaction, renewed energy—pertains to a higher aspect of the self, which may emerge when the lower is provided for. Let the artist become hungry and cold, or shabby in dress, however, and he will revert to the cycle of the Eskimo, even though he hunts a customer rather than a seal.

We may say in general that interest is a feeling that accompanies the idea of self-expression. It has its origin in the exhilaration, the sense of power, of mastery, that goes with every internally impelled effort to realize a condition for the survival of the self, whether such survival touch one aspect of the man or another. Interest is therefore dynamic in char-

acter. It has its primary root in inherited impulse. We have impulses to eat, to run, to hunt, to work, to talk, to play, to avoid dangers, to seek pleasures. But these impulses with modern men, as with primitive peoples, are always directed toward some object, in the approach of which we find the realization of some aspect of our mental or physical being. There is, as Dr. Dewey says, no break between the impulse and the self; for the impulse is nothing more than an involuntary, and perhaps almost unconscious, effort at self-expression.

III

THE OBJECT OF INTEREST

IN primitive life the object of interest stands in close relation to the conditions for survival, and so standing is unmistakable. But it is just as plain that in our own daily life interest must have an object toward which the self strives. The artist is interested indeed in his own artistic result, the picture; but he is likewise interested in everything that contributes to the result,—his brushes, his paints and their mixing, his canvas, the light in his study, the pose of his model. He is, in short, interested in every object or act that pertains to his self-realization as an artist in the particular picture upon which he happens to be working. It is not art in general, the mere idea of art as an abstraction, that chains his attention, but the actual ends which he sets before himself, and the means which he conceives as necessary to the accomplishment of

these ends. These are all definite objects to which his interest attaches. The business man is not interested in abstractions, but in the quantity and quality of goods, in the markets, the supply, the demand, how his goods compare in quality and price with those of his neighbors, how he can attract trade by giving or seeming to give the most possible for a certain price. The clergyman is interested in his congregation, in the individual souls whose eternal welfare he would promote, in his church, his pulpit, his salary, his sermon. This is necessarily true, for it is the object alone that gives meaning to the activity. The self does not run like an empty mill, producing nothing, seeking no product; but it is the object which shows to consciousness the quality of the impulse. It gives meaning to the activity. Impulse itself is said to be blind; it is the object that helps to make it intelligent. We must not make the error of supposing that the object comes first, thus calling the activity into being. The artist's materials would not interest the physician. He would regard them as so much rubbish, obstacles, perhaps, to self-

expression. Nor would a case of surgical instruments, as such, interest the artist. As contemplated, they probably would be regarded with indifference. If by mistake they were substituted for his own implements, they would be regarded as obstacles to self-expression, hence with aversion. His only interest in them would be to remove them. But the thought of self-expression comes first; then the artist's materials are objects of interest to him because aids to self-expression. The thought of relieving suffering by surgical operations is the conception the surgeon has of his own self-realization, and his instruments as aids to such realization become at once objects of interest. A toy to a child is a matter of indifference except as it aids him to realize some form of self-expression in his play. It then becomes a means to enable him to realize himself in play, and as such, is an object of interest.

Thus far the situations that have been instanced have all been direct, or immediate, in character. In the case of the Eskimo spearing a walrus, or the artist moulding a statue, the object pursued has been one of intimate, con-

crete self-expression in the struggle for existence, — in the one case physical, in the other artistic. But in the school the object sought often seems wofully remote from any analogous self-expression on the part of the pupil. The learning of a grammar lesson or the translation of a Latin sentence may seem as remote from real life as self-denial now is from heaven hereafter. It may not seem to the pupil that he is doing this work for himself. He may feel no inner need, no impulse to self-expression, that urges him on to accomplishment. The fact that the school period has not been regarded as a part of life, but rather as a preparation for subsequent life, has led to the view that study performs a purely instrumental function, that it simply prepares the pupil to do something in the future.

This gap between the impulse to self-expression and the realization of it in any way the pupil can understand, has, in conjunction with some of our inherited notions about the effort essential to work, led to two antithetic theories of the means to be adopted to get the work done. One theory, that of

effort, maintains that the sheer dead lift of will is the only sure means of getting the child to the goal, and the only way whereby his mind can be trained to do the hard things that are sure to confront him in later life. The other theory, that of pleasurable excitation, holds that it is only by making the object interesting that the mind will work freely and without constraint. The advocate of effort would drive his pupil to the object to be accomplished; that of pleasure would allure him to it. The one would compel, the other coax. Dr. Dewey has portrayed at length the arguments pro and con for these two theories under the guise of an educational lawsuit, in his monograph on "Interest as related to Will."¹

There is a common error underlying the two antithetic doctrines that effort on the one hand and mere pleasure on the other should be the motives to action. The error lies in ignoring the conception that all effort for the realization of an end is an effort at self-expression, and in assuming that it is an effort to attain some object quite external to

¹ University of Chicago Press.

the self. It is evident that, if the object is thus external to the self, it must be made interesting if pleasure is to be an exciting cause of activity, or effort must be expended if the object is to be attained without such pleasurable excitation. As Dr. Dewey points out, when either effort alone or pleasure alone is made the motive to action, there is necessarily a divided attention in the pupil. In the case of effort, there is mechanical attention to the matter in hand sufficient to satisfy the teacher, or perhaps to attain the end; but there is accompanying this mechanical attention a mind-wandering in accordance with the subjective interests that may be present at the time. The boy may be apparently attending to his lesson either in recitation or in study, and at the same time have a running consciousness of ball games, hunting or fishing, or gathering nuts or making windmills or water-wheels, or whatever form of amusement may happen to be present to his thoughts. His mind thus alternates between his pleasures and the mechanical activity aroused by the teacher's demands. On the other hand, if an object

is external to the self-expression of the child, another teacher may seek to secure his attention to it by making the object pleasurable. The object has to be made interesting, but the attention aroused is not due to true interest. It is due rather to a transient pleasurable excitement. Baldwin says that, whereas interests are stimuli to voluntary attention, 'affects' are stimuli to involuntary attention. When objects have to be made interesting, it is evident that the involuntary attention is appealed to. The activity is not truly one of self-expression, though it may be very intense for the time being. As soon as the excitation ceases, attention and interest flag, so that there is a sort of oscillation between excitement and apathy. In the case of effort, the divided attention is simultaneous; in the other, it is successive, being an alternation of alert attention and indifference. The conception of working to attain ends as a manifestation of self-expression completely solves these difficulties, whether they are of a merely practical or of a psychological nature. If the object is external to the self, then the mind may, like a top, be

whipped into activity by pleasurable excitement or by painful anticipation. In either case, we have a serious split in the activity of the mind itself. But if the attainment of an end is truly an expression of self, even of the self temporarily or unworthily conceived, then we can find in interest a complete reconciliation of the antithesis between effort and allurements. For a genuine interest is nothing but the feeling that accompanies this identification of the self through action with some object or idea. In this case, effort becomes the result of interest, and interest becomes the consciousness of the value of the end and of the means necessary to reach it.

IV

THE PERSONAL OR SUBJECTIVE SIDE OF INTEREST¹

1. *Interest a Feeling of Worth.* — Interest, it has already been said, is a feeling. This, like all feelings, is not to be defined. It is only to be felt. More precisely, it is a feeling of the worth, to the self, of an end to be attained. The subjective side of the artist's interest is the constant feeling that self-expression in the form of art is of value to him. Perhaps it is regarded as the greatest thing in the world. All professional interest on its subjective side involves this same feeling of worth. To mend the broken law is the greatest thing in the world to the lawyer; to mend the broken body is the most worthy form of self-expression to the physician; to heal the broken and contrite heart, to mend the broken moral law,

¹ This section and, in a measure, the two preceding sections are a restatement of Dr. Dewey's theory of interest. (See his "Interest as related to Will.")

to save the souls of the perishing, is the most worthy thing of all to the minister. To the politician, interest in politics is a sense of worth to the self arising from party service. To the statesman, to serve one's country is the noblest form of self-expression. To the soldier, self-expression in the form of courageous deeds may go to the extent of self-extinction. The sense of worth in this form of self-expression may exceed the worth even of life itself.

2. *Immediate vs. mediate interest.* — We need at this point to make a further subdivision of the subject according as the ends and means of expression coincide in time or not. In all cases of immediate interest, there is no break between the end of self-expression and the act of self-expression, for the act is the end and the end is the act. The best illustration of this is perhaps play. Every child has a natural impulse to realize itself in this form of activity. So universal is the instinct of play, that it is common to the young of almost all animals, as well as to children. There is no thought here of effort, and no thought of

pleasure, for the activity is the end in itself. When a game is over, the end is accomplished, the self has been expressed, the pleasure has been experienced. Although children put forth great effort in their play and experience great pleasure in it, yet we can easily see that the end and the means coincide in time; that they fuse the one into the other, so that it is only by a logical analysis that we can distinguish the end from the means. There are forms, moreover, of æsthetic enjoyment in which the same thing is true. To an observer, the end of the music is the hearing of the music. The purpose of a picture is the enjoyment of its contemplation. It is conceivable, of course, that one might listen to music for the sake of imitating it, that one might study a picture in order to copy it; but in all cases of contemplative enjoyment of art, the end and the means likewise fuse. They coincide in time and are only to be distinguished in thought.

In most cases, especially in educational activities, the end and the means do not coincide in time. The realizing of self in a given

end, as in the possession of material objects or the acquisition of knowledge, is usually an extended process. In the case of the sculptor, the self must be mediated with the end to be attained by a series of exercises, before the perfect statue can be produced. There must be a long series of activities intervening between the idea of the end and its realization. The figure must be modelled in clay and then chiselled out from the marble. So, in the school, the task set before the pupil can be accomplished only by a series of intervening activities. It is at this point that the one-sided theories about interest and effort appear. One party, thinking only of the emotional side, identifies pleasure with interest; the other, thinking only of the intellectual phase, identifies volition with effort. It is evident, moreover, that education is chiefly concerned with the doctrine of mediate interests. Whenever the object to be attained is a reality only as an idea, the end and the means necessarily fall apart. It is at this point that we come to the distinction between drudgery and work.

3. *Drudgery and Work*.—The mind must have some sort of interest in the thought of realizing itself, or expressing itself by attaining a certain end, whether that end pertain to physical well-being or æsthetic satisfaction or intellectual attainment. But the object to be attained being only an idea, it is evident that self-expression requires a series of intervening activities. If the interest in the end alone remains and no interest attaches to the means, then we have drudgery. If, however, the interest attaching to the end is present also in the means for reaching the end, then we have work. It is conceivable that the workman may have great interest in the dollar he is to receive for his day's wages, and yet be indifferent to, or detest, the labor itself, which is the means for reaching the dollar. In this case we would have drudgery. Many forms of routine work conform to this idea. The housewife may grow sick of the drudgery of washing dishes, of sweeping floors, of mending garments; for, though the end to be attained is seen to be a necessary and desirable one, the interest naturally attaching to the end

to be attained is often not attached to the means for attaining it. A workman in a modern factory may spend eight hours a day, year in, year out, in turning a piece of iron into a certain shape. Though he may have an interest in the perfect bicycle which is to be produced or in winning his daily bread, it is conceivable that he should have no interest in this dull routine of labor, which would then partake of the nature of pure drudgery. In the same way, a pupil may have a direct or an indirect interest in learning a grammar lesson, or solving a problem in arithmetic, or performing any other one of the school duties, yet have no interest at all in the means for accomplishing this phase of self-expression. School work to such a one is drudgery.

If, however, the interest naturally attaching to the end of self-expression can be carried over into the means for reaching this end, we have work, not drudgery. In play, as we saw, the end and the means coincide; but in work, they do not. Work may be as enjoyable as play, but the quality of the enjoyment in the work is different from that in play,

because of this separation of means and end. A workman in a modern factory, though he labors faithfully and well to earn his money and yet has no interest in his daily activity, for whom, in short, drudgery takes the place of true work, may, perhaps, be called an artisan, though the word does not necessarily mean one who substitutes drudgery for work. Another, to whom the interest in the end attaches equally to the means for reaching the end, may be called an artist. He speaks of the joy of work rather than of its pain. In the case of the sculptor, for example, how keen an interest attaches to every stroke of the mallet; with what passion does he develop his idea, forgetting even food and friends in the intensity of his interest in his work! It is said of Edison, the electrician, that he becomes so interested in his problems that he will spend hours and even days in total isolation from others, denying himself food and companionship, so intense is the interest with which he pursues his ideals. No drudge can do that. The teacher, too, should be an artist rather than a drudge; so

that every new day, every new situation, will be a new stimulus to renewed effort. To be a true artist, however, is not for every teacher, not for any teacher at all times. To enable the pupil to approximate the artistic attitude toward his school work, even for brief intermittent periods, is an accomplishment of the few; yet it is an end for which we must all strive.

The idea that drudgery is an inevitable concomitant of school work receives encouragement from two sources already mentioned; namely, that of servile labor, and that of regarding the school solely as a place of preparation for post-academic activity. The labor of the serf contributes not directly, but only indirectly and partially, to his survival. It expresses, not himself, but another. To this separation of self from activity there comes an added indignity, in that his social status is degraded just because he serves another from compulsion. The idea of slavish drudgery once introduced, it is not unnatural that the mass of society should look upon it as a necessary consequence of living in a vale of

tears, and that many should think their children uneducated unless they are made to wear this badge of servitude. Again, since the school is not engaged in productive labor having an immediate relation to the pressing conditions of survival, it is easy to fall into the habit of thinking that all school activity must of necessity be merely preparatory to real activity at a subsequent period. This being the case, one may take the position most native to his type of mind, either that the pupil must drudge for his results, or that he may be allowed to reach them through external attractions. As a matter of fact, however, neither of these positions is tenable.

4. *Desire and Effort*.—Desire and effort are correlatives in properly mediated interest. That is, an analysis of interest proper will disclose both of these elements. In play, where the activity is the end, there can be no question of desire or effort. For, though one may desire to play, one does not think of this desire when actually playing. Play as a distant end is to be distinguished from play as an activity now proceeding. Further-

more, although play often calls forth the greatest physical exertion, the player does not put forth conscious effort. Whenever so-called play becomes an object of effort, it loses its proper character, since it becomes a task.

Effort is really the process of trying to realize an end through work. Desire is the tendency of the energies to push on to accomplish the object of effort. Effort, therefore, is really an evidence of desire. These two things, effort and desire, are consequently only two aspects of one thing, two phases of self-expression, when the end to be attained and the means for reaching it are separate. These two ideas are so important in the doctrine of interest that we shall need to examine them more in detail.

5. *Nature of Desire.*—We often speak of blind appetite, or passion. By this we mean a form of desire not controlled by an intelligent aim. Whenever this form of activity gains control of the mind, there is wasted energy. In the life economy of the animal kingdom, the long process of evolution has directed these blind appetites or passions

toward the well-being of the animal. If a deer or a rabbit is timid, then timidity has become a condition of existence. One is often amazed at the fierce anger shown by a tiger or a lion in overcoming its prey. Yet, unquestionably, this anger is one of the factors which determines the existence of the animal. Without the anger it might be that courage would be lacking to attack formidable beasts of prey; that, should the easier means of procuring subsistence become exhausted, the animal would perish from hunger. Evolution in the animal world has brought about, therefore, a somewhat permanent harmony between the appetites and passions of the beasts and the survival of these creatures in the struggle for existence. With children, however, we can hardly claim that there is such a harmony due to the process of evolution, for man has so long been a social being that the primitive evolutionary forces have practically ceased to act. Anger and rage, or timidity and fear, therefore, to a child, usually mean, not the conditions of existence, but the waste of energy. It is so long since

the race in its normal life has had to fear external dangers, that the function of fear has ceased to be a condition for existence. There is all the more reason, therefore, why the desires of the human being should be rationalized by being directed to proper ends and mediated by interest.

The nature of emotion, of which desire is a phase, may be defined as the tension arising from the difficulty of effecting an adjustment between means and end. Its function is to stir up the efforts of the individual. If the struggle for wealth or place or honor arouses no emotion in a man, it is probable that his desire will remain mere wish. With repetition the emotional tension is likely to be transformed into habitual action. The constant repetition of those activities which mediate between the self and the end it desires to accomplish may cause the desires to lose their emotional tone. In this case, habit takes the place of conscious effort.

The normal outcome is a proper balance between excitation and ideal. Where this balance is lacking, we have either weakness or

excess in action. The man who has become *blasé* is one who has ceased to pursue the ends of life with emotional vigor. The world has become a squeezed orange to him, nothing is worth while. His emotions are washed out, his interests feeble and fleeting, his actions mechanical and lifeless. On the other hand, where the excitation is powerful, where the end appears to the mind with tumultuous vigor, where there is no proper mediation, no calming influence of persistent interests, there we are likely to have what Professor James calls "the explosive will."¹

What has been said of the nature of emotion holds likewise of desire, which is only a phase of the emotional tension, since, in addition to the emotion, it includes a clear consciousness of the end to be attained.

7. 6. *Selfish Indulgence*. — In selfish indulgence, desire is made an end in itself. It loses its function as a stage in the mediation between the self as it is and the self as it would be in some future stage of expression. The chronic novel reader is one in whom the normal desire

¹ "Psychology, Briefer Course," p. 437.

for information or the rational desire for self-development has degenerated into making pleasurable excitement the sole end of reading. Hence he devours novel after novel with nothing in view but the joys and woes of imaginary heroines. The glutton is one in whom the normal desire for food as a means for the preservation of strength has degenerated into a love of eating for eating's sake. The drunkard is one in whom pure self-indulgence has taken the place of whatever rational ends men have ever sought to serve by drinking.

7. *Pleasure and Desire.* — The pleasure naturally associated with desire is due to a contemplation of the end to be attained. This pleasure in turn contributes to the efficiency of the mind in reaching the end. It is only in self-indulgence that pleasure is ever made the end of action. Not a little confusion has arisen in the course of the development of human thought from confounding pleasure as an end and pleasure as a means of self-expression. It is only the latter that can properly be said to be the end of desire. One class of thinkers, conceiving of pleasure as the end of

self-activity, have naturally made it a rule of conduct. Even the Declaration of Independence suggests this doctrine, where it says "that all men are endowed by their Creator with certain inalienable rights: that among these rights are life, liberty, and the pursuit of happiness." Another class, holding the same view with regard to pleasure as the end of action, have thought it necessary in the interests of morality to eliminate this motive entirely from the moral law. This is the position taken by Kant in his "Critique of Practical Reason." Each of these theories is defective from a common error, since each regards desire and the pleasure accompanying it as prior to, or outside of, volition. The relation of desire to will is seen only when desire is conceived as a stage in volition. In the words of Dr. Dewey, "The development of desire into interest marks the happy solution of the whole question."

8. *Desire and Interest.* — Normal desire is properly mediated interest, for interest shows that the aroused emotional force is doing its work, performing its proper function. The great problem in all human activity is to get the

right balance between impulse and end. Interest marks this balance. As Dr. Dewey says, "Interest is impulse functioning with reference to an idea of self-expression."

It is one of the offices of interest to calm and steady the over tumultuous desires. With all frontiersmen it is a well-known fact that the young hunter, when he first comes face to face with a stag, is likely to have what is called "buck fever." His mind is so intent upon the end, the bringing down of the game, that he loses proper control of his muscles; his whole body trembles, his aim is unsteady, the result being that the deer usually escapes. But with training it is possible for the hunter to mediate this desire by giving proper attention to the means for accomplishing the end desired. In the Leatherstocking Tales, the great hero, Natty Bumppo, is pictured as a man having absolute control of his actions, even in the most exciting and perilous moments. His wits are always about him. When there is need of haste, there is with this hero instantaneous activity, with proper attention to the means for accomplishing the desired end.

V

INTEREST AND ELECTIVE STUDIES

IN utilizing the doctrine of interest as a regulative principle in the selection of studies, hence in determining the curriculum for individuals, there is an illuminating distinction that should always be kept in mind; it is the distinction between *clear* ideas and *vivid* ideas.

A clear idea is one that produces inner illumination without the tendency to release energy. It shows us the likenesses and differences of the things about us, but does not stimulate us to do things. Patients recovering from the effects of nitrous oxide are said to have wondrous visions of what seems to them absolute truth, the soul being illuminated by a flood of all-revealing light. This is the clear idea at its highest estate.

A vivid idea is one that tends to pass into action. It stirs up and releases energy; it is charged with emotion; it pulsates with the

feelings that attach themselves to vital interests. Though vivid ideas may also be clear, their predominating quality is their tendency toward motor expression. If the function of clear ideas is to produce inner illumination, that of vivid ideas is to effect results in the world of events.

NOTE. — Though this use of the words *clear* and *vivid* may seem unusual to some, yet the etymology of the terms appears to justify the distinction. That is *clear* which is pellucid, transparent, unobscured, free from confusion, comprehensible. In none of these attributes is there a suggestion of emotion, or a reference to subjective valuation. Clearness appears to signify mere inner illumination. The word *vivid*, on the other hand, shows by its derivation from *vivere*, *vita*, that it relates to what is alive, spirited, active, vital. It suggests feeling, personality, interest. To *vivify* is to endue with life, to enliven, to inspire. *Vividness* is therefore not merely an added degree of *clearness*; it is a distinct quality that an idea acquires by its perceived relation to life.

Men at work in the real situations of life always have vivid ideas, for they are meeting, or striving to meet, the conditions that determine their business or professional survival. One man strives to succeed as a teacher, a preacher, a doctor, or a lawyer; another as a

merchant, an exporter, or an industrial producer. About every calling there clusters a group of vivid ideas having the power to awaken all the potential energies of those to whom they are vivid. Such ideas are the source of genuine interest. Not all ideas, however, are vivid to all men. Unless a man has need of a surgeon, ideas about surgery can at best be clear. They may have a curious, speculative interest for him, but they awaken no emotion, stimulate no energies, lead to no actions; for they touch upon no condition underlying his success in life.

Turning now to the school for the application of these distinctions, we find that all primitive people educate their children by means of vivid ideas alone. The educational activities of the Eskimo child all have direct relation to his future life-work in getting food and producing clothing. Before the days of the book in Greece, it was participation in life that prepared for life. In the early days of Rome, the education of the son of a freeman consisted of two things,—physical training as a preparation for war,

and the learning of the twelve tables of the laws as a preparation for civil life at home and the inculcation of civil life among barbarian peoples. Even when the higher intellectual life was restricted to a few callings, as in education for the church or for knighthood, or for discovering and propagating ancient learning, ideas which to most are now at best only clear, were then vivid.

But now that education has become universal, and occupations vastly diversified, the schools are attempting to supply an education that shall prepare for everything in general and nothing in particular. In doing this they have more and more displaced vivid ideas by those that are merely clear, because of supposed universal validity. But such a plan postpones vivid ideas to the concluding stages of education, where they are least needed, and eliminates them largely from the earlier stages, where they are most needed. It is evident, therefore, that *vividness* should not be ignored when studies are to be selected.

The answer to the question, What shall our students study? depends upon the func-

tion the school, and especially the high school, is supposed to perform. As men differ regarding the nature of education, so they differ as to the purpose of the school. I venture to quote with approval the statement made by the venerated scientist, Lord Kelvin, in an address to the students of Cornell University. "The higher education," he said, "has two purposes, — first, to enable the student to earn a livelihood, and, second, to make life worth living." In an industrial democracy, neither of these purposes must be neglected, even though the studies lying closest to livelihood are the most vivid. With a dominant land and slave-owning oligarchy, as in Greece, or with a limited religious body as in the Middle Ages, it was not necessary for education to concern itself with industrial thrift. Even in the times of Erasmus, educated men were hardly expected to earn their own living, but were led to depend upon the class of men who then endowed scholars as they now endow schools. Being freed from all obligation to teach the masses how to earn their daily bread, the school could have a cur-

riculum whose single aim was to raise the individual into the realms of culture deemed most desirable by the age.

The Greek ideal of art, philosophy, and social intercourse, to which we not seldom confine the word *culture*, remains for many, even to the present day, the chief end of education. So the unified mediæval curriculum, consisting of the seven liberal arts, together with philosophy and theology, reaching as it did from the lowly earth to the vaulted skies, is still for many the prototype of all that a curriculum should be,—fixed, unified, universal; perfect in limb and feature, as incapable of improvement as the sphere is of being more spherical. We admire the culture of the Greek and the curriculum of the schoolman, but we forget that the foundation of the one was slavery, and the presupposition of the other was the academic seclusion of a small body of men.

The modern world, though cherishing the good things in ancient culture, and admiring the architectural unity of the mediæval curriculum of study, has refused to be guided

by the ideals of the one, or to be forced into the moulds of the other. The reason is not far to seek, for it is evident to all observers that modern conditions are wholly different from those of the ancient or the mediæval world.

There are three things that make this departure from old ideals imperative. They are:—

1. The extension of knowledge;
2. The differentiation of industries; and,
3. The universalizing of education.

The eighteenth century gave us physics and mathematics, and the nineteenth gave us biology, yet up to fifty years ago the higher schools taught little besides Latin and Greek and elementary mathematics. Since that time both the exact and the evolutionary sciences, which were developed outside the school, have become an essential part of the curriculum, not only in their pure, but also in their applied, forms. The humanities themselves, once the main reliance of the schoolman, have been greatly enlarged. In the times of Erasmus, the vernacular in each of the countries of Europe was a tongue for

peasants. Scholars spoke Latin. Erasmus himself dwelt successively in Holland, Germany, France, Italy, Austria, and England; yet he could speak neither German nor French, Italian nor English, and he apologized to a friend in Holland for writing to him in Latin, since he wrote his mother tongue so ill. To-day, however, all these vernaculars have become culture languages, which are taught in our schools for their linguistic and literary value. History, which was almost rudimentary fifty years ago, has become a modern science of large and constantly increasing dimensions, while psychology, ethics, sociology, and indeed all aspects of the human sciences, have been transformed by the new methods of evolution.

Not only have industries been differentiated, but behind each of them lies a body of scientific knowledge, which its leaders must master. In witness of this fact, one may point to the sciences taught in the modern university as a preparation for a knowledge of agriculture, a subject which the race has always thought it understood.

Once academic and higher education was a professional preparation for a few restricted callings, but now it is a preparation for the higher stages of all callings. It is the proud boast of engineers that they will soon be the best educated professional body in existence.

Not only has higher education expanded to meet the needs of mechanical, electrical, chemical, and civil engineers, but it also provides instruction for those who follow agriculture, horticulture, forestry, architecture, as well as for any department of pure or applied natural or social science. "I would found," said Ezra Cornell, "an institution where any person may find instruction in any subject." This is the spirit of modern education. The humanities are not forgotten or restricted; on the contrary, they are vastly extended. The languages are increased from two to five or six; the meagre amount of literature that could once be read in foreign tongues is reënforced by a world literature in English; the fine arts are taught as never before, and are applied to every phase of industrial and social life; history has expanded into a science so far-reaching that no

one man now pretends to be master of more than a fraction of it. The modern university, in short, now furnishes knowledge and technical skill in practically all the human sciences, the natural sciences, and the economic sciences.

The bodies of knowledge that have caused such unexampled university expansion are in general now available in the high school. This fact makes it possible, and the demands of life make it desirable, for the high school to offer many more studies than any one student can possibly pursue. Thus at least five languages may be offered instead of two, the work in history and literature may be indefinitely extended, while all the sciences, each with laboratory practice, may be added, to say nothing of training in manual and business technique. Election on some basis seems inevitable. Were we not a democracy, we might ignore the claims of all classes, except the few that in the past have enjoyed the advantages of training and culture. But such a policy is now as impossible as it is undesirable. We might employ the European expedient, and establish schools for the social castes, building

classical schools for the sons of patricians, and trade and technical schools for the toilers. German, French, and English children have to elect schools, but, outside our great cities, American children cannot do this even if they would, for we have but one type of high school. Our pupils must elect studies if they elect anything. Under such circumstances, the attempt to have a uniform fixed curriculum has manifold and obvious disadvantages.

Just as a Franklin press is easier to operate than a modern Hoe press, but is far less efficient, so an old-fashioned fixed curriculum for secondary schools is simpler to administer, but has serious defects. Some of the more obvious defects may be mentioned.

In the first place, such a curriculum denies a place to many subjects that have proved themselves as valuable as those chosen both for the generation of power and for usefulness in future callings. To omit such subjects is to fail to prepare students in the best way for new lines of university work, and for new forms of industrial occupation. A fixed curriculum fails, moreover, to give the student

all the types of mental training to which he is entitled. The methods of linguistics and of mathematics by no means exhaust the distinctive forms of training to be had in education. To mention a single instance, they fail to give any adequate training to the intellectual motor powers which are essential to the effective education of youth. The experimental sciences, manual training, and certain parts of commercial courses supply this element in abundance.

In the next place, a fixed curriculum leaves a large part of the latent ability of the students still inert, for no student has his powers appealed to on all sides; moreover, some are much more gifted in the things not included in the curriculum than they are in those that are chosen. Some excel most in languages, some in history, some in mathematics, some in quantitative others in qualitative or evolutionary sciences, while still others may be strongest in æsthetic studies or in constructive exercises. It may almost be said that capacity to receive polish through so-called culture studies is a gift confined to the few. There

is plenty of soft wood in the world, which, though useful, does not admit of high polish. Moreover, when mathematics is associated with languages or other discrete subjects, it may become a burden even to the able, while to the less gifted it is likely to prove a veritable desert of abstractions. But the same minds that wilt and droop under an infliction of isolated mathematics will grow and thrive through the association of the study with quantitative science or with exercises in the construction of things.

Again, a fixed curriculum lacks, for many students, those associations of ideas that are capable of rousing the mind to its best efforts. We do not sufficiently regard the principle of induction in education. When a study can be found that appeals powerfully to the student's interest, which arouses his dormant powers like a trumpet call, it is nearly always possible to secure an induced interest in allied subjects that can be shown to be contributory to the ends most desired. When students are animated by powerful interests, as, for example, in professional courses, they submit cheerfully

to large amounts of study; but when they are dealing with systems of ideas to which no vital interests are attached, they clamor for variety and light work.

It has long been the dream of the schoolman that somehow, sometime, an ideal fixed curriculum will be devised which may be properly imposed upon all youth, and which will be equally beneficial and essential in the education of all. Like most dreams, this, too, is an illusion. The three things that are leading us away from, rather than toward, such an ideal, are, as we have seen, the expansion of knowledge, the differentiation of industries, and the universalizing of higher education. It cannot be regarded as reasonable to select a few from a large number of equally good studies, and say that these alone shall be taught. When dozens of diverse industries are clamoring for trained leaders, it cannot be regarded as reasonable to say that we will bring our educational system into close relations with a few only. Finally, when every form of talent offers itself for the higher training, it cannot be regarded as reasonable to say

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that we will educate a few types only. All studies, all industries, all talents, must be taken into consideration. It cannot be said that the problems now confronting the schoolman are simpler than they once were; they are vastly more complicated. At the same time, they are more interesting and more important.

At this point I wish to call attention to the self-evident proposition that merely naming the studies to be taught or showing into what groups they naturally fall, is inadequate as an answer to the query concerning what branches high school students shall study. We must, for instance, distinguish between physics and chemistry as sciences and these subjects as nature work, making clear to ourselves that nature work simply explains instances of natural laws, whereas science seeks the laws underlying instances, or verifies laws by means of examples. But even where we confine ourselves to the scientific aspects of physics, chemistry, and biology, there may yet be a wide range for the kind, amount, and spirit of the instruction. These subjects can

be so taught as to stimulate an unbounded curiosity in them, or they may be so presented as to dry up the natural springs of interest. I have seen the science classes in a college double in size and quadruple in interest, through the influence of a scientific society meeting once a month, and in which professors and students read reports on the latest and most striking scientific discoveries and events. Our high school pupils come to us eager to understand such things as the motor, the telephone, wireless telegraphy, X-rays, and liquid air. They have a natural interest in striking phenomena of every kind. No form of literary work in a high school could excel, in value and attractiveness, weekly reports upon scientific discoveries and inventions. Yet some people ridicule these stimuli to scientific interest. When, for example, English schoolmasters were testifying before the Royal Commission upon the difficulties met in scientific instruction, one master asserted that he had no difficulty in arousing interest in chemistry. When asked what chemistry he taught, he replied, "The chemistry of explosive sub-

stances." All academic England laughed in derisive glee. It may be that this man's teaching of chemistry both began and ended in a flash and a bang, in which case it could not have amounted to much. But if the flash and the bang made his boys think chemistry a great study, and thereby introduced them to systematic work, who shall say that the seemingly foolish counsel implied in the reply was not the greater wisdom? What is true of science is true of the other subjects. It is possible to teach ancient languages for purposes now archaic. Once Latin and Greek were the means both for getting and for expressing ideas. Nobody now either writes or speaks in Latin. Yet in John Sturm's school the pupils in the first six years of their course committed to memory twenty thousand Latin words, which they used as a means of expressing thought. We must teach Latin for modern purposes, the greatest of which is, as Professor Bennett tells us, its influence upon the English language. To those who believe this, one may venture to ask, with Professor Bennett, whether the relation of Latin pronunciation to English

etymology is not vastly more important than its relation to the pronunciation of other foreign European languages, and if this is true, whether we should not incontinently get back to the English pronunciation?

Holding in mind now the difference between education that promotes survival by its vividness and that which conduces merely to subjective illumination; and remembering that every field of knowledge is vastly extended and enriched by new methods of approach; that the diversified industries have in their higher stages passed from the field of traditional procedure to that of scientific direction; and, finally, that higher education has become the privilege, not alone of a few favored castes, but of the leaders of all callings, — let us examine the principles that should govern in the selection of studies for the individual.

It may be assumed, first of all, that a normal, well-educated man should at least be intelligent concerning the conquests of his race in all the distinct fields of its endeavor. He need not, indeed, be master of Greek, Spanish, calculus, ontology, physical chemistry,

geology, civil engineering, law, medicine, theology; but he should at least know that these studies exist, comprehend something of their respective functions, and be familiar with some of their elements. In other words, the normally constituted mind should dwell, for a time at least, upon each distinctive department of important human knowledge. What are these departments? They are easily classified into groups sufficiently exact for educational purposes.

We have first of all the human sciences,—those that pertain to man as man, to his life as embodied in institutions. Excluding the professional aspects of such studies, this group embraces languages, ancient and modern, literature, art, and history.

Next we have the natural sciences,—those that pertain to nature as such,—they are physics, chemistry, and astronomy, together with their basis of pure mathematics; the biological sciences; and the earth sciences, like physical geography and geology.

Finally we have the economic sciences,—those that show the mind of man in intimate

interaction with the forces of nature. These sciences embrace economics proper, technology, and commercial knowledge and technique.

We have here from nine to twelve distinct departments of knowledge, according to the minuteness of our classification. The social reason why every student should have something of each, is that each represents a distinct and important department of human achievement. The psychological reason why each mind should come in contact with every one of these departments, is that each one embodies a distinct method, a definite mental movement, not found adequately represented in any other branch. The method of linguistics, for instance, is quite distinct from that of mathematics or art or history. The evolutionary sciences are wholly different in method from the exact sciences. In the same way commercial technique differs from that of mechanics.

Arguing now from these self-evident facts, the first principle I propose for the selection of a normal boy's course of study is that he should take at least something from each chief department representing a peculiar method and

a specific body of important knowledge. The second principle is that the boy, aided by his parents and advised by his teacher, should be allowed to elect what studies he will take within each department. The first principle fixes the *types* the student shall have represented in his education; the second allows the individual to put the emphasis where he will, to determine what department of the university he will enter, to select his studies in view of his future career. In this way the ideas growing out of his school work become, not only clear, but vivid. The student ceases to mark time, or to try to escape from school; on the contrary, he works with accelerating earnestness and enthusiasm.

If provided with equally efficient teachers and supplied with equally good equipments, the student in the scientific, the technological, or the commercial course is not inferior to his brother in the arts course in the range of his education, in the quality of his discipline, in the dignity of his work, or in the worthiness of his destination. Difference is not inferiority.

In determining what studies a student may

be permitted to elect, one must not fail to distinguish between interests that are transient because of the novelty of the subject or the manner of the presentation, and those that are vital and relatively permanent because rooted in bodies of vivid ideas. Interest often follows the teacher. A pleasing personality, a happy method of presentation, will frequently secure an interest on the part of the student which is active as long as it lasts. It is not uncommon to find teachers who make any subject that they teach interesting. Such teachers are highly prized, for they bring student and study into the happiest contact, thus presenting each body of ideas in such a way that it has the best possible chance of becoming vivid. In many cases, however, the interest awakened is due, not to the study itself, but to the one who teaches it. In another grade, under another teacher, it may become tedious, so that, unless it is contributory to some other body of ideas that is vivid, the study is likely to prove unprofitable. But if the student is bent upon following some branch of engineering, for example, and finds geometry hard, he will

not think of flinching from the work of overcoming the obstacles that geometry presents; for, as Dr. Dewey would say, the interest in the end, the engineering, is transferred to the means, the geometry. In other words, the geometry borrows its vividness from another body of ideas.

Again, mere novelty of subject often lends a fictitious interest. The ardent desire that pupils often show for making collections, for trying experiments, for dabbling with chemicals, and for trying new things generally, is an evidence of this kind of interest. Such excursions into new fields are by no means to be deplored, for they may be the chief agency in revealing the student to himself, of enabling him to discover his aptitudes and permanent motives. But the flashes should not be mistaken for enduring fires.

On the other hand, for reasons already given, the student should at some point of his late grammar, or his secondary period, come into contact with each great department of knowledge, else he is in danger of missing the subjects that would otherwise prove of the greatest

value and interest to him. In the words of the Committee of Ten: "The youth who has never studied any but his native language cannot know his own capacity for linguistic acquisition; and the youth who has never made a chemical or physical experiment cannot know whether or not he has taste for exact science. The wisest teacher or the most observant parent can hardly predict with confidence a boy's gift for a subject which he has never touched." There should, therefore, be a fair trial of each subject under favorable circumstances, before it is dismissed from further consideration. It is at this point that the teacher, with his wider knowledge of the interrelations of subjects, must show the student what instrumental value even a distasteful study has in the realization of purposes already formed. The study of mathematics is essential to exact science. The study of linguistics is necessary for literary efficiency.

To put the foregoing doctrine into its briefest form, departments of work are prescribed in so far as they embody knowledge necessary either for earning a livelihood or for making

life worth living ; but the studies within departments, so far as they represent anything like equality of value, are to be made elective. In other words, students elect, not departments, but more or less equivalent studies within departments. The result is that all leading types both of knowledge and of training will be represented in each student's education, while the elasticity allowed gives each the best possible chance of discovering his greatest powers, and of finding those bodies of ideas which to him are most clear and vivid.

It matters little whether this freedom take the form of elective courses as recommended by the Committee of Ten, or whether it take the form of apparently free election, as at Boston, at Ithaca, or at Galesburg. Nor need we fear that tradition will not have its due influence. It takes a courageous mind to forego classics for modern languages if such a course is thought to be an evidence of lack of ability or of diligence. There is more danger that a student will elect the old studies to his injury than that he will suffer harm from choosing the new. Witness the fact that the propor-

tion of high school students taking Latin has doubled during the last ten years.

Thus far, unless by implication, I have not urged the worth of any one department of high school work to the disadvantage of any other. I may perhaps be allowed, in closing, to state my opinion as to the kind of work that would do the most in our high schools to stimulate vivid ideas, especially in the boys. Our greatest lack, particularly in courses in which the humanities prevail, is the meagreness of opportunity for vigorous outgoing motor expression. This can be found most effectively in laboratory practice and in manual training. To show where we stand in the amount of the latter kind of work as compared with Germany, I quote the opinion of Professor Thurston of Cornell. To educate our people as well in these respects as Germany does, he says we should have in this country:—

1. "Twenty technical universities, having in their schools of engineering and higher technics 50 instructors and 500 pupils each.

2. "Fifty trade schools and colleges, of 20 instructors and 300 students each.

3. "Two thousand technical high schools, or manual-training schools, of 10 instructors and 200 pupils each.

"That is to say, there should be in the United States to-day 1000 university professors and instructors and 10,000 students under their tuition studying the highest branches of technical work; there should be 1000 college professors and 15,000 pupils in technical schools studying for superior positions in the arts; and 20,000 teachers engaged in trade and manual-training schools, instructing pupils 400,000 in number, proposing to become skilled workmen. We have in this country 10,000,000 families, among which are at least 1,000,000 boys who should be in the latter class of schools."

Our need of such training from an economic point of view does not compare with that of the Germans, for while we have unlimited resources in field and mine, and abundant room for internal expansion, they are increasing rapidly in population within an area small in extent and but scantily furnished with agricultural and mineral resources. Germans must expand their foreign market for manufactured goods,

or starve. Our need is more a subjective one. We desire to make the most of every life, to develop it to the limit of its powers, to enrich its production, and to sweeten its existence. It is both necessary and desirable that we should cherish the noble educational ideals of the past, and use to a large extent the means of training that numerous generations have found good; but it is equally imperative that our students should participate freely in the knowledge and activities of the present. Understanding is promoted through that clear apprehension of the past achievements of the race which contemplation provides, but efficiency comes through vivid participation in the activities that promote survival; for, though insight comes through revelation, power comes through action.

VI

EDUCATION, INTEREST, AND SURVIVAL

AMONG primitive peoples it is life that educates; among modern cultured races it is the book. Primitive education is effective, but limited. It transmits but little from the past, and promotes but little progress. Modern school education stores the mind with much inherited lore, but its isolation from the realities of life tends to make it ineffective; it promotes survival only indirectly, in that it trains the mind and furnishes the tools of learning.

One can count with certainty upon interest when life educates, but not so surely when the school performs this function. It may be that the school will seem so far removed from the recognizable agencies of survival that the pupil will remain in it no longer than circumstances compel him to. The problem of the teacher in the modern school is not an easy one, for not

only must he make his instruction really serviceable to the pupil for his future life, but he must bring distant ends so near that they will furnish real motives for present endeavor. Unless the teacher can do this, the pupil fails to experience any abiding enthusiasm for his work. To be truly educative, the instruction of the school must be able to contribute powerfully to the pupil's future welfare; and it must be so imparted that immediate ends shall contribute to make the distant ones seem real.

As a matter of fact, most of our education is at present so conducted that children take it as an enforced prescription, while the life outside of the schoolroom furnishes them all their incentives to action. In general we find the mass of children early shaking off the effects of our subjective training, rapidly forgetting all we taught them, except the multiplication table and a few other useful tools of knowledge, and, inspired by the activity about them, taking their place among the classes that survive. It is indeed some comfort to the teacher to know that, however little he may promote the power of survival in a pupil, he cannot wholly spoil a

thoroughly active mind, or entirely counteract the influence of the outside world of achievement. Yet our school education should be of a character actively to promote the qualities that lead to survival. Our pupils should survive somewhat because of our teaching, not entirely in spite of it.

One unfortunate result of insisting that the student shall spend years upon a body of knowledge that to him is devoid of vital motives, is that such a policy not only fails to give an adequate development to the mind, but also leads at times to results that Lombroso would call forms of degeneration. Among the degenerates that such culture helps to produce, four classes come readily to mind.

First, there is the class that may be called the intellectual aristocrats. They are the men who cherish archaic ideals, especially in education; who try to measure the present by the standards of an outgrown past. They cherish what Professor Baldwin calls *autotelic* ideals of culture, where every study is an end in itself. It is art for art's sake. In their view the *diagogic* culture of the Greek should rule in the edu-

cation of the leaders of an industrial civilization. They deny the badge of scholarship to all who do not accept their standards. They deplore a commercial education as basely utilitarian. An intellectual aristocrat is, as one recently said in New York, lost in uncertainty, until the stranger speaks, as to whether the alleged university man to whom he is introduced is "a scholar or merely a sublimated type of tinker." Intellectual aristocrats resent giving honorary degrees to eminent men whose qualifications for such a distinction are only oratory and statesmanship, or eminent achievement in public service. Such men, in so far as their characters are consistent, do not truly survive in a modern world; for, when tested by the standards of survival, we see that they merely exist, since they either live upon the accumulations of worthier men, or they subsist on the bounty of those who find their gibes amusing.

A second class of degenerates produced by too much culture of a wrong kind are those we call dudes. They are creatures whose inheritance of culture has eclipsed their intellects.

A third class, more respectable, but scarcely

less unfortunate than the first two, are those who may be called academic paralytics. They are men who make a profession of their own education, and who thus gradually bring about a paralysis of their executive powers, while cramming their heads with ideas more or less clear. All too frequently men of this class become teachers, thus tending to increase their kind by propagating subjective ideals of education.

A fourth class of culture-degenerates, found oftenest in the older parts of our country, and produced in part at least by scarcity of vivid ideas, are what may be called the digestive paralytics. They are men whose systems must be nourished by milk and regulated by tablets. Not unfrequently this class have abnormally developed brains. They are like large engines with small boilers. Their feelings are intense, but often abnormal; their formal intellectual powers are great, but usually directed to reactionary, visionary, or subjective ends. They neither exert permanent influence, nor beget healthy children.

Yet after all, our country has but few degen-

erates, even if we count in the men of genius, all of whom Lombroso regards as degenerates. The chief fault to be found with a curriculum of the old type, where most of the ideas presented are at best but *clear* to most students, is not so much the great harm as the little good it does. It usually fails to awaken that form of mental enthusiasm which stirs up the active energies of the soul, which makes the youth laugh at obstacles and rejoice in difficulties to be overcome.

It has been said that the race is not always to the swift, nor the battle to the strong, but to the active, the vigilant, and the brave. This is true also in the struggle for survival. The active, the vigilant, and the brave survive; the inactive, the careless, and the cowardly do not. Our education, therefore, should be that which tends to activity rather than to inactivity. It should promote vigilance in observation of the things that conduce to survival. It should promote, not so much the courage of the battlefield, as the courage that gives self-control in the use of the wealth an industrial society produces.

But here we must distinguish between the mental activity that promotes survival and that which does not. The education of outer inactivity is that which ignores the present requisites for survival and confines itself to inner commotion. A tempest in a teapot may be terrific, but the world neither knows nor cares about it. One may then be actively inactive in education ; as, for example, when one teaches ancient languages as if they were still the means for acquiring and expressing ideas, as they once were, but as they no longer are. Such teaching furnishes modern men with archaic instruments, but these no longer assist them to survive. Ideals persist in education long after they are obsolete in practice, so that forms of education once useful to the race now cease to promote activity, and hence have lost their power to promote survival.

Not only may education promote passivity by its emphasis upon obsolete ideals, but, as explained in the preceding section, by failing to distinguish between ideas that are merely clear and those that are both clear and vivid. Ideas are clear when they reveal mere differences or

identities in the things considered; they are vivid only when they attach themselves to perceivable requisites for survival. For example, the idea of temperance to a workman as a moral conception may be clear, but the idea of temperance as a requisite to employment as a skilled laborer may also be vivid. Vivid ideas glow with vital interest, because upon them turns the happiness or destiny of the individual. History, mathematics, languages, science, may be so taught as to promote mere clearness of conception without conducing materially and directly to survival, thus shedding light without generating heat. They may, on the other hand, be so taught as to reënforce the other influences of the environment by making ideas both clear and vivid. The teacher may in vain give the urchin clear ideas about the harmfulness of the cigarette; but the single vivid idea that to smoke is manly, that smoking enhances his importance in the minds of other boys, is enough to make him search the gutter for opportunity. We must seek to counteract bad vivid ideas with those that are good. Children often yield to injurious vivid ideas because

of their nearness. The urchin wants to seem manly now, so he puffs and struts. If the teacher can make him feel that he is sacrificing the genuine manliness for the seeming, his affinity for the stump in the gutter will not be so strong. Boys often want to leave school early to earn the bright and shining dollar. But if they can be led to compare the men of forty who went to work without any education with those who acquired an education before going to work, the delusive vividness of immediate earnings may prove less effective.

All this would hold with the school as it is; but if the school could be so conducted that the pupil could feel that he was doing things that count mightily for his present and future welfare, active life would not, as now, furnish a monopoly of the vivid ideas, and hence of the abiding interests. It is not enough, therefore, to promote clear ideas in our pupils; we must attach ideas to the pupils' inherited motor mechanism. This is done through the exercise of outgoing self-activity. Mere clearness of intellectual vision does not make men efficient. Each group of ideas must find its adequate motor expression,

not only with the tongue, but with the whole motor mechanism. There must be writing and drawing, painting and moulding; there must be construction in material, both for useful and artistic purposes; the active or industrial arts should precede the fine arts. The latter should cease to be ends in themselves, and should be embodied in the useful. So long as art is a thing apart, the artists living in seclusion and their works hanging in museums, so long will it fail to promote the activities that lead to survival. When art everywhere promotes activity, it will promote life by sweetening and adorning it, by conducing to its comfort and peace.

It may be pertinent to ask what share the community is taking in furthering the education that conduces to survival. Mr. Ward tells us that our education is now intrusted to young girls and feeble men.¹ To this we may properly demur, for, alas, not all the girls are young, neither, we trust, are all the men feeble. Yet the fact is undeniable that the more passive part of the community does the teaching. Sub-

¹ See "Dynamic Sociology," vol. ii, p. 557.

jective ideals thrive when education is left to quiet-loving men and non-economic women. The modern woman teacher frequently knows no work but that of the school, and for lack of training and opportunity cannot induce even those expressive activities in which her sex most excel.

The education that would promote survival must not forget to inculcate the courage that leads to self-control. In a primitive economy, it is the underfed that fail to survive. In a highly developed industrial organization like our own, it is the overfed who perish most rapidly. When there is not food enough, in such countries as India or China, war, famine, and disease quickly eliminate the underfed. But in a country like our own, where a single state, like Illinois, could produce food enough for the whole nation, where pestilence can get no foothold and where war does not reduce the population, it is over-indulgence in food and drink that causes decrease in offspring, and forces men into lower stations of life, or cuts short the number of their days. The best preparation the school can furnish is to give

the young clear and vivid ideas concerning the forces that promote or hinder survival, to give them permanent and strong interests in the realities of life, and to provide them with a trained efficiency that scorns debasing temptations and rejoices at difficulties to be surmounted.

From being primitive and agricultural this nation has become urban and industrial. Our population, once sparse, is now becoming dense. This country, formerly capable of supporting perhaps half a million savages, has now become able to support a hundred millions of civilized men. Another hundred years will increase its supporting power by another hundred millions. Our youth are no longer trained to efficiency by farm and forest, but must look to the school for the development of their powers. If our education remains in its subjective and introspective state; if it scorns the present requisites for survival, while cherishing those of bygone ages; if it attains mere clearness of conception, but cares nothing for the vividness that comes from living interests; if the community

will not pay for virility in its men teachers or give proper training to its women teachers ; if it will not encourage the modern spirit by furnishing modern equipments, — then education will pursue its ancient course, causing degeneration in some and failing to make positive contributions to the survival of many. But if community and teaching force alike insist that the modern requisites for survival shall be recognized in the equipment and the teaching of the school, then there is hope that education will become a more potent factor than it ever has been in enabling this nation to become worthy of its unrivalled opportunities. Nothing but ourselves can prevent our country from becoming the world's centre of freedom, well-being, peace, and power ; none but teachers themselves can prevent the school from performing increasingly useful work in furthering these ends.

VII

INTEREST, MOTOR TRAINING, AND THE MODERN CITY CHILD

A DISTINCTION was made in Section V between clear ideas and vivid ideas. Another aspect of the same distinction is that between sensory ideas and their motor reactions. The underlying physiological fact is that we have two systems of nerves, one carrying sensory impressions from the outside world to the surface, or cortex, of the brain, the other carrying motor impulses from the cortex to the muscles. It is through the sensations effected by the sensory system that ideas, knowledge, and thought are made possible; it is through the motor system that men can do things, can so adjust themselves to their surroundings as to survive. Without the extensive development of the sensory-intellectual side of the mind, men would still be savage or primitive, for they would not have

scientific knowledge enough to enable them to understand the nature of the forces around them. They would still turn everything that could harm or help into demons or gods, they would dwell in poverty and ignorance, with little more than animal satisfactions and animal fate. Without the development of the intellectual-motor phases of mind, men would have been unable to use their knowledge effectively in protecting themselves against the destructive forces of nature. The thinker would perhaps be wearing skin clothing, and living in a wigwam or a bamboo hut. But when both sides of the mind are highly developed, we find science and motor capacity happily united, so that the thinker may dwell in marble halls and be clad in garments of beauty and comfort. He may converse with his absent friends, for though sundered far by land or sea, he may yet speak with them as if face to face.

The great and abiding interests of life cluster about those activities that conduce to survival, that have most immediate reference to vital adjustment to the environment.

The mass of mankind are not interested in knowledge that is unrelated to their chief life purposes, however intrinsically beautiful or valuable it may be. If knowledge can be turned to account, it is worth considering; but if it is remote from the life at hand, it will not excite vivid interest, though it may arouse curiosity. As it is with adults, so it is with children. The things that excite abiding mental enthusiasm relate to the things that seem to them important. They, it is true, are not yet concerned with the serious struggle for economic existence, but their natures are ever seeking expression in various forms of activity.

It is an almost irresistible tendency of the school to lay the chief stress of its efforts upon the sensory-intellectual side of the mind, using outgoing expression only so far as the acquisition of knowledge or the drilling of the mind necessitates. A few motor reactions are used, such as the use of the organs of speech in reciting (except when the teacher does all the talking), and that of the hand in writing. But ordinarily there is no free creative

use of the larger fundamental muscles, or any adequate variety in the use of the smaller accessory muscles. It is evident, therefore, that the greatest sources of interest in the young remain almost untouched by the school, since the intellectual-motor aspects of the mind are practically ignored. This remark is made, not as a reproach to teachers, but as the statement of a fact that needs serious attention in the future. The schools are to-day largely the result of forces over which the teacher has had little control. With the perception of new needs, and changing, or at least changeable, circumstances, we may hope for a different order of things.

It is announced that there is no longer a frontier of civilization in America. For four hundred years there has been one. Not only has there been a frontier all this time, but nearly the whole of our vast country has remained under frontier or pioneer conditions up to within the recollection of men now living. Everybody lived in the country or under country conditions, and participated therefore, more or less intimately, in those primary activities

that relate closely to immediate or prospective livelihood. There was a rough but effective division of labor between the home and the school. The home trained the intellectual-motor, and the school the sensory-intellectual, powers. But now the city has come, and with its coming the old motor training has departed, leaving little or nothing of educative value in its place for the city child.

Can education restore to him the intellectual-motor training once so effectively furnished by the country? The answer to this question must be considered at some length.

It were long to tell what advantages are gained by an urban life. The growth of the city is a necessary consequence of the transition from an agricultural to an industrial civilization. England first began the process, and her example has been rapidly followed by France, Germany, Austria, Italy, and by our own United States. A hundred years ago but three per cent of our population lived in cities, now at least half of the people east of the Alleghanies live under urban conditions. The boundaries of the great state of New York

have not been shortened, yet the time will soon be when seventy-five per cent of her population will cease to be rural. A world process of such magnitude would have been impossible had the advantages of industrial development not greatly outweighed those of the old system. Almost everything that contributes most to our personal and national advancement is due to this change. Education, social intercourse, wealth, high standards of life, joined to indefinite expansion in population, industrial supremacy, national unity of purpose,—all these belong in greatest measure to the industrial urban state. Yet with all these unquestioned gains there are large and often permanent losses involved in the change from rural to urban life. Some of these losses are inevitable, some are remediable. The city must forego the free uncontaminated air of the country; it must do without the country's quiet, its open stretches of field and meadow, its tree-lined streams, the low of kine, and the song of bird. It is only in our brief vacations that we are enabled to enjoy what was once our permanent heritage. But there

are also serious educative losses that have arisen in the modern city. These we must now consider.

The programme of elementary education in America before the rise of large cities consisted of two parts: first, training in muscular power and practical efficiency through diversified labor; and second, discipline of the mind through drill in mastering the elements of knowledge as represented in reading, writing, arithmetic, and grammar. To these we may add healthful and almost unrestricted opportunities for such play as a strenuous life permitted.

An urban community is likely to overlook the educational value of richly diversified labor. Not a little of the versatility, the individual initiative, the aggressiveness and general efficiency of the urban business or professional man has been due to the early discipline of farm life.

What can a country boy of fifteen do? Here is what Mr. Elbert Hubbard in his *Philistine* says he himself could do at that age:—

“When I was fifteen years of age I could break wild horses to saddle or harness, and

teach kicking cows to stand while they were being milked. I could fell trees, and drop the tree in any direction desired; I knew the relative value of all native woods, appreciated the differences in soil, grains, fruits, and simple minerals. I could use the draw-shave, adze, axe, broadaxe, cross-cut saw, sickle, and cradle. I could make a figure-four trap, an axe helve, a neck-yoke, ox-yoke, whiffletree, clevis, and could braid an eight-strand cattle whip. We used to mend our harness on rainy days, and I could make a wax-end and thread it with a bristle, and use a brad-awl. I knew how to construct an ash-leach and to make soft soap, apple butter, and pumpkin pies. I knew the process of weaving flax and wool, of making and burning brick. I knew on sight, and had names for a score or more of birds, and had a good idea of the habits of squirrels, skunks, wolves, and the fishes that swam in the creeks. I knew how to cure hams, shoulders, and sidemeat; to pickle beef, and cover apples with straw and earth so that they would keep in safety through the most severe winter, and open up in the spring fresh and valuable. Of course my knowledge was not of

a scientific order, and I could not have explained it to another, because I never knew I had it."

When to all this we add the training that comes from managing farm animals and tools, from overcoming extraordinary difficulties in field and forest, from dogged persistence in work, beginning before the rise and ending only after the setting of the sun, we may appreciate to some extent the perfect coördination of muscle and mind effected by such labor, and understand the fertility of resource and the untiring persistence in the accomplishment of ends that such labor produces. Furthermore, among thrifty farmers, where pleasures were simple but hearty, where food was good and abundant, the nerves of the young were steady, the brain was clear, even if not especially active, and the digestion was perfect. All life, in short, though uneventful, was at least wholesome, and in a large measure educative in the highest sense. It was only when this training was continued too long that it led to arrested development. The country boys who make great successes in the city leave the farm before physical labor sinks into benumbing routine.

What educative influences do our children lose when we become denizens of a large city? At least three important ones: viz., first, early opportunity to work under healthful and varying conditions; second, variety in work after the period of elementary education; and third, opportunity for free, health-giving play.

The children of the poor are not allowed to work steadily until they have passed through the elementary school, usually not before the age of fourteen, while the children of the well-to-do never work at all until they have finished the high school, and in many cases even the college itself. Such children are mostly lacking in the deftness of hand and the readiness of invention that characterized their fathers. Their nerves are often unsteady, the coördination of muscle and mind is imperfect, and digestion is defective. Often their minds are overstimulated by exciting books or theatres or other forms of intensive life. The girls early and easily tend toward nervous delicacy or disease; while the boys, especially if they fall into vice, become *blasé* at an early

age, and in general fail to manifest the virility of their progenitors.

Even when the period of steady labor arrives, the city boy lacks the variety that gives vitality to the country lad. Routine drives out spontaneity and opportunity for individual initiative. Industries are now highly differentiated, so that one workman is usually called upon to do but a single kind of work for long stretches of time. Compare the man who once made a whole watch with the man who now tends the machines that turn the pivots, or the youth who does a dozen kinds of work with a spirited team with the one who picks slate on a coal breaker. The mental life, once stimulated by labor, must in the main now find its stimulus outside of labor. Certain qualities of endurance and persistence will always be cultivated by continuous work, but under modern urban conditions labor lacks much of the old educative value.

A modern high school lad, when told that he lacked the discipline that comes from diversified work, replied, "What's the odds,

so you are strong?" To a certain extent he was right in his reply; for, being a prominent member of a football eleven, and an all-round athlete in a boyish way, he had gained a certain efficiency not unlike that of the country boy of the same age. But city children have for the most part lost opportunity to play. In the older cities in Germany the children have forgotten how, that is, have racially forgotten. Their idea of a recess is a promenade over the cobblestones of a schoolyard, while munching black bread and *Wurst*. Our city children are fast approaching a like condition. The most pitiful sight in the city to one accustomed to the open country is the pathetic effort of children to play in a narrow, crowded street. To play a vigorous game is to risk life, to obstruct the walks or break the windows, while to wrestle on the pavement is to break the bones. The thumb in a game of marbles is about the only organ that is afforded unrestrained exercise. Were it not for the annual summer excursions to country, mountain, and seashore, made by wealthy families, the city boy would be in danger of find-

ing many of his important organs almost as useless as the vermiform appendix.

Can education in whole or in part make up to the child for that loss of wholesome educational influences that ensued when his grandparents or his parents became residents of a city? First of all, we need to examine the adequacy of city schools as at present constituted to this end.

The modern city child has much more time for school than his predecessor in rural life had. Formerly a boy attended school three or four months of the year, and was employed mostly in out-of-door labor the remainder of the time. The city boy is in school from nine to ten months each year. The country lad had many chores to do night and morning, even when he went to school; but the city boy, having no physical work to do, is sent home with a lot of school tasks, which abridge his daylight recreation and infringe on his hours for indoor amusement or sleep.

Again, when life was furnishing the major part of education in healthful, mind-stimulating labor, the school perhaps did well to confine

its brief labors to routine work in mastering the elementary tools of knowledge. Then children learned to read, but they seldom read anything; they learned to write and spell and parse; but they made little or no use of these accomplishments, except in the rare cases when the lad went to college. It might be supposed that now, when the school commands, not a bare fraction, but practically the whole of the time of the children for years, it would do much more than enable them to acquire the tools of knowledge. To a certain extent it does, for children now read during a portion of the time they formerly used to work or play. They get a smattering, too, of history and geography, and sometimes they learn to love nature. But, on the whole, if we ask what the school is doing for the urban child under modern conditions, we must answer that, for the most part, it is merely doing more of what it used to do when life itself was the larger part of education.

A few facts will help to explain why the school has remained practically unchanged, though outside influences have been totally

altered. In the first place, we have thought ourselves unable to pay the salaries necessary to secure even a reasonable number of strong men, and have in consequence employed almost exclusively women, whose services may be had for little money. Outside the larger cities, no men teach in elementary schools, while even in high schools the number of men teachers is constantly decreasing. In New York State only about one-third of the high school teachers are men. The money prizes are too small to induce men to abandon those callings and professions that fascinate the strong man, giving him a field for the exercise of his limitless energy and ambition. Not until the opportunity for men of enterprise in other fields becomes much less than it is, shall we find American men devoting themselves to education at the pittance paid to German men teachers, or now paid to our women teachers.

But the modern woman teacher is far less efficient than she might be, for she has rarely been taught to work. All her time from childhood onward has been spent in the absorption of knowledge. There has been no time for

the acquisition of efficiency and skill in labor. How many teachers in city schools have been trained to be expert in any domestic or fine art, such as cooking, millinery, embroidery, dressmaking, painting, designing and decorating, wood carving, modelling, or even music? Some have indeed acquired more or less skill in one or more of these arts, but they do not owe it to their school education. This criticism is not a reproach to the teacher, but only to the system that consumes all her energy in absorbing facts to pour out in examinations. Living under a system that insists on knowing everything, but in doing nothing, our women teachers have small chance to contribute to that phase of mental training that secures adequate motor expression for ideas, and thus appeals to the most fundamental and abiding sources of interest.

Again, not only do we employ women alone as elementary teachers, but we hire so few of them that only those forms of education that can be made successful by mass teaching have any considerable chance of being made really effective. But it is precisely the old drill

in reading, spelling, writing, arithmetic, and grammar that yields the best results in mass work. The subjects call for much memorizing, but demand little individual thinking. One teacher can keep many pupils busy in spelling and writing words, in solving problems and diagramming sentences; but where classes number from thirty-five to sixty, as they do, a study that demands individual thought and guidance in the case of each pupil has small chance of being successfully taught.

Not only are teachers so few that teaching must be restricted mostly to mass drill, but each teacher is assigned to a limited drill area, called a grade. This custom, though having its advantages, tends still further to mechanize the instruction, to narrow the teacher's view, to dry up her larger sympathies, to starve out the enthusiasms with which she started. Superintendent Greenwood gives the grade teacher only from three to five years, before the mind begins to settle and harden into grooves, and the activities to fall into routine. The minds of such cease to grow. They

become like cisterns which have periodically to be refilled at summer schools or by a term of graduate work. Minds of this type, to change the figure, come to the university as to an educational repair shop.

From the foregoing considerations it is very evident that education as now conducted does not restore what urban life has lost in educational influence. The city boy or girl is probably as well educated as present conditions will allow, but city conditions should change as much in the educational field as they have changed in that of business. Any city that is rich enough to build palaces for dwelling and business purposes, to afford pavements and streets that neither frost nor heat, rain nor traffic, can destroy, to make midnight seem as midday, is able to raise its expenditures for education to a point where it is possible to give the children a training that will enable body and brain to withstand the abnormal strains of city life, and to keep alive those traits of character that have made our nation in the past strong to endure and to achieve.

The most urgent need of the city child is physical educative work and spontaneous play. It would be difficult to say which is the more important. The English know how to turn out an efficient man by combining fifteenth century instruction with modern play. The instruction of the boys of the upper classes in that country has long been of that curious type. Their minds are drilled in the classics by methods and for reasons which were indeed valid when these languages were the means for getting and for expressing ideas; but now that Latin is no longer studied for such purposes, the old reasons for its study and the old methods for teaching it are obsolete. Nothing is more antique than the instruction of English boys in the so-called public schools. Their play, however, makes men of them, Mr. Kipling to the contrary notwithstanding.¹ It gives them efficiency to fight their country's battles, to spread her commerce over the whole earth, to rule inferior people to their own good, to found and develop new nations. Let us read a few pages of "Tom Brown's School

¹ See his poem, "The Islanders."

Days," to show the possibilities of a game with more than a hundred on a side:—

"But now Griffith's baskets are empty, the ball is placed again midway, and the school are going to kick off. Their leaders have sent their lumber into goal, and rated the rest soundly, and one hundred and twenty picked players-up are there, bent on retrieving the game. They are to keep the ball in front of the Schoolhouse goal, and then to drive it in by sheer strength and weight. They mean heavy play and no mistake, and so old Brooke sees; and places Crab Jones in quarters just before the goal, with four or five picked players, who are to keep the ball away to the sides, where a try at goal, if obtained, will be less dangerous than in front. He, himself, and Warner and Hedge, who have saved themselves till now, will lead the charges. 'Are you ready?' 'Yes.' And away comes the ball, kicked high in the air, to give the school time to rush on and catch it as it falls. And here they are amongst us. Meet them like Englishmen, you schoolboys, and charge them home. Now is the time to show what real

metal is in you — and there shall be a warm seat by the hall fire, and honor and lots of bottled beer to-night, for him who does his duty in the next half-hour. And they are well met. Again and again the cloud of their players-up gathers before our goal, and comes threatening on, and Warner and Hedge, with young Brooke and the relics of the Bull-dogs, break through and carry the ball back; and old Brooke ranges the field like Job's war-horse, the thickest scrummage parts asunder before his rush, like the waves before the clipper's bows; his cheery voice rings over the field, and his eye is everywhere. And if these miss the ball, and it rolls dangerously in front of our goal, Crab Jones and his men have seized it and sent it towards the sides with the unerring drop-kick. This is worth living for; the whole sum of schoolboy existence gathered up into one straining, struggling half-hour, a half-hour worth a year of common life.

“The quarter to five has struck, and the play slackens for a minute before goal; but there is Crew the artful dodger, driving the ball in behind our goal, on the island side, where our

quarters are weakest. Is there no one to meet him? Yes! look at little East! the ball is just at equal distance between the two, and they rush together, the young man of seventeen and the boy of twelve, and kick it at the same moment. Crew passes on without a stagger; East is hurled forward by the shock, and plunges on his shoulders, as if he would bury himself in the ground; but the ball rises straight into the air, and falls behind Crew's back, while the "bravos" of the Schoolhouse attest the pluckiest charge of all that hard-fought day. Warner picks East up, lame and half stunned, and he hobbles into goal conscious of having played the man.

"And now the last minutes are come, and the school gather for their last rush, every boy of the hundred and twenty who has a run left in him. Reckless of the defence of their own goal, on they come across the level big-side ground, the ball well down amongst them, straight for our goal, like the column of the Old Guard up the slope of Waterloo. All former charges have been child's play to this. Warner and Hedge have met them, but still on they come. The Bull-dogs rush in for the last

time; they are hurled over or carried back, striving hand, foot, and eyelids. Old Brooke comes sweeping round the skirts of the play, and turning short round, picks out the very heart of the scrummage, and plunges in. It wavers for a moment—he has the ball! No, it has passed him, and his voice rings out clear over the advancing tide, ‘Look out in goal!’ Crab Jones catches it for a moment; but before he can kick, the rush is upon him and passes over him; and he picks himself up behind them with his straw in his mouth, a little dirtier, but as cool as ever.

“The ball rolls slowly in behind the Schoolhouse goal and not three yards in front of a dozen of the biggest School players-up.

“There stands the Schoolhouse præposter, safest of goal keepers, and Tom Brown by his side, who has learned his trade by this time. Now is your time, Tom. The blood of all the Browns is up, and the two rush in together, and throw themselves on the ball, under the very feet of the advancing column; the præposter on his hands and knees, arching his back, and Tom all along on his face. Over them

topple the leaders of the rush, shooting over the back of the præposter, but falling flat on Tom, and knocking all the wind out of his small carcass. 'Our ball,' says the præposter, rising with his prize; 'but get up there, there's a little fellow under you.' They are hauled and roll off him, and Tom is discovered, a motionless body.

"Old Brooke picks him up. 'Stand back, give him air,' he says; and then, feeling his limbs, adds, 'No bones broken. How do you feel, young 'un?' 'Hah-hah,' gasps Tom, as his wind comes back, 'pretty well, thank you — all right.'

"'Who is he?' says Brooke. 'Oh, it's Brown; he's a new boy; I know him,' says East, coming up.

"'Well, he is a plucky youngster, and will make a player,' says Brooke.

"And five o'clock strikes. 'No side,' is called, and the first day of the Schoolhouse match is over."

This is the training that makes Englishmen. They might study Choctaw or Chinese and the mathematics of Ahmes, yet with such play they

would grow up to be men. Our high and grammar school athletics should abandon, or at least subordinate, the college type of play, which admits of but small teams of picked players, and adopt or adapt those English types that give every boy a chance. What has proved so life-giving for character and efficiency among an English class whose luxuries would naturally tend toward their degeneration, teaches a lesson to modern urban communities, where almost every influence tends toward decline in health and motor efficiency.

It is, however, to the element of physical educative work that we must give our chief attention. The ideal city education will maintain a just balance between intellectual and practical, or motor, phases of life. At present it is all intellectual, or sensory, not at all motor, or practical. It was the farm that formerly supplied the motor training; now, when there is tenfold need of such training, it is forgotten. The first requisite for such a new education as will conserve old powers is that there be teachers enough for the individual to be taught in a group small enough to secure his best development of

mind and body. No teacher should have more than twenty pupils. This will, indeed, double the number of teachers, but it will at the same time secure for each child the indispensable requisites for his survival and his highest efficiency in life.

The second essential requisite of such education is that the proper appliances for motor and intellectual training be provided in abundance. This will mean somewhat more room and more apparatus of an inexpensive sort.

The school cannot, it is true, furnish the experience of farm or factory, but it can do better than either, for it can grade its motor exercises to their highest educative value. The milking of cows may be educative for a few months, or until all its phases are mastered; but it can hardly be more educative when continued through life. So of every phase of industrial occupation. It soon passes its limit of usefulness, soon comes to a point where it ceases to be education and becomes drudgery.

The school, happily, has control of experience, which it can press to its highest point of usefulness, but never suffer to lead to

arrested development. It can introduce even at the earliest moment motor exercises that have all the stimulating power of real situations in life, for they, too, are real. In the kindergarten grades of Dr. Dewey's school in Chicago, for instance, children three or four years of age have lessons in cooking, and actually cook food that they and their friends eat as a part of their daily subsistence. Beginning at this tender age, the children, in groups of ten or a dozen, are led year after year through well-graded exercises in cooking and sewing for the girls, shopwork for the boys, and textile and other industries for both, all of which are intimately related in the minds of the children to the past and present of these activities in the community, and all likewise serving as means for the mastery of number and language.

The years from nine or ten to fourteen or fifteen are the most important for motor training. President G. Stanley Hall says¹ of this period:—

“The hand is in a sense never so near the

¹ “The Ideal School as based on Child Study,” Proceedings of the National Educational Association, 1901, p. 481.

brain as now; knowledge never so strongly tends to become practical; muscular development never so conditions mental. Muscle training of every kind, from play up to manual work, must now begin. Instead of having the Swedish or other curriculized and exactly finished objects made, we should have a curriculum of toys at first and of rude scientific apparatus later, where everything will focus more upon the ulterior use of the object than upon the process of making it. All these things will be chosen from the field of the child's interests."

If the training is to be more than a sentiment, it must come every day, and must be closely articulated with the other work. Its spirit must permeate all the work of the school. No study must leave the child in a state of passive receptivity.

Outside of mere memoriter drill, one may fairly say that intellectual absorption is the chief thing now expected of the modern urban child. His attitude is that of a listener; he is a being to receive impressions. He must store his mind with facts deemed important

by his teachers. This practice has its genesis in the formal instruction of primitive times, but it is fixed upon the modern urban school by the conditions above described. Professor James of Harvard very truly tells us that education should not presuppose mere passivity on the part of the child; that there should be no impression without corresponding expression. That is, education must be motor and active as well as sensory and passive. Some interpret this saying as meaning that the child should talk more; in other words, that the tongue should be the chief motor organ exercised. Few will, indeed, depreciate the educative value of language; but when we come to a city child, who is subjected to influences tending to weaken his whole nervous system and to atrophy many of his most important physical powers, we may safely put a broader interpretation upon Professor James's dictum. The whole being, both mental and muscular, should be actively enlisted in the child's education. The school period should be regarded quite as much a part of life as a preparation for life subsequent to that period.

Each new day should set its new problems, which in turn should incite thinking to solve them.

Thinking *in vacuo* is hard work; thinking in the concrete is a delight. In real life there is always a motive, an end to be reached, a problem to be solved. Thought is generated and applied in one act. In ordinary so-called school thinking, however, we cause years to intervene between the genesis of the thought and its application. We have the storage battery idea, whereby the youth stores up in school mental power to use in manhood. Such figures are delusive. The mind of youth refuses to be a storage battery for manhood. It is rather an organism that, like a tree, continues to grow, each year being one of real life as well as one of preparation for future life. The school in the future will not content itself with a formal drill in the tools of knowledge, but will add thereto a real knowledge of nature and of man, while the drill will emerge as a requisite for the mastery of the real. The school of the future urban community will not content itself with pour-

ing knowledge into the pupil as a passive recipient, but it will arouse all his native energy by offering him a complete and blended expression of his active intellectual and motor powers through a long series of occupations. These occupations will embrace extended exercises in all aspects of manual training, cooking, sewing, textile industry, drawing, music, and, later, laboratory practice in the sciences. They will furnish a complete co-ordination of motor and sensory powers, and, coupled with well-blended, concrete, and formal intellectual knowledge, will send the child forth from the school as from one phase of life to another, healthy and vigorous in body, clear in thought, and ready in execution. Then the whole boy will be educated, and not, as now, but half of him. Then the denizen of the city may enjoy all its manifold advantages, with the assurance that neither he nor his descendants will be sacrificing the best half of the heritage that came from a rural ancestry.

VIII

RELATION OF INTEREST TO METHODS OF TEACHING

IT would be a misfortune should teachers become possessed of the notion that vivid ideas pertain alone to the occupations whereby we earn our living. During the elementary period the question of vocation is so remote as to bear but small relation either to the methods or the matter of teaching. To press it unduly to the front at this time would be little short of an impertinence. Even in the high school it is comparatively rare for a student to know definitely just what calling will furnish him a livelihood. It is evident, therefore, that we cannot rely largely on future occupation to furnish us the chief means for arousing interest in study. The vagueness of remote ends, even those that seem closest to requisites for survival, gives them an air of unreality that is far from real vividness. Ideals and distant ends are goals to be kept in

mind by the teacher, who knows to what end the seed germinates and the bud swells. The pupil is absorbed in the present. His impulses cause the spontaneity of his conduct, his surroundings furnish the stimulus to his activity. When Jean Valjean gave the doll to Fantine's child, famished alike for food and affection, and bade her play, he may have seen the future mother lavishing upon her offspring the loving care denied to herself; but the child saw only the ravishing doll, with its miniature glories of form and dress. She gave full play to her long-repressed impulses. Her ideas had such intensity that they completely absorbed her being, yet they had nothing to do with adult vocation. The soul lives as well as the body, and it is about the soul's impulses that the interests of childhood cluster.

When an adult traces out the evolution of his great life-purpose, he finds that his ideal has undergone many transformations in its development. It is only gradually, and in the fulness of time, that original impulses, modified by external circumstances and by acquired insight, assume their permanent form. Final occupation

is perhaps more often the result of favoring or hindering circumstances than it is of conscious, long-cherished design.

It is because of these facts that Herbart and others are justified in regarding the education of the pupil as a gradual self-revelation, by means of a progressive revelation to him of the world of society and the world of nature. Gaining a gradual insight into the world without, he comes to have an insight into the world within — his own mind, its powers and aspirations. But a panorama of the world, whether institutional or natural, passed before and into the mind of the child, is not the whole of education. It is only half of it. Revelation alone may do for the Hindoo seer, but not for the children of the West. They must have action. A German once said, "Mann ist was er isst,"¹ but we might better say, "Man is what he does." A good motto for education would be — Insight through revelation; power through action.

Giving up then, once for all, the notion that in the early stages of education we must appeal to adult life to find motives for action and direct

¹ Man is what he eats.

stimuli to interest, let us turn to the resources plainly at our command for securing clearness and vividness of ideas in the minds of children.

Enumerating some of the functions of instruction that pave the way to those immediate interests which become gradually transformed into permanent ones, we find the following points of importance:—

1. We must raise up and vivify immediate ends, partly through the presentation of near-lying and appropriate ideas, and partly through the utilization of native tendencies of thought and action.

2. We must, by the charm of our manner, the alertness of our minds, and the skill of our presentation, aid the pupil to acquire knowledge and to develop intellectual and muscular dexterity. These points will be elaborated in sections which follow.

3. We must seek to vivify masses of ideas by making a progressive revelation of their significance to the pupil. The student, for example, who has followed the growth of freedom, as shown in the successive histories of races and nations, will have a conception of liberty and

country that will make them seem his most precious possessions — the objects of his undying devotion.

4. We must arouse interest in subjects now uninteresting, not alone through charm and skill, but also by showing how these subjects contribute to ends in which interest is already aroused. This is interest by induction; it is more potent in higher than in lower grades. It should be possible to arouse the interest of a high school student in any subject that is plainly contributory to the purposes he has already formed. Though such an induced interest might be called indirect, yet there is good prospect that it will become direct and independent, provided the subject is well taught.

5. It is one of the chief functions of instruction to arouse the native powers of the mind to their fullest and freest expression. The power of vigorous, rapid, and sustained thought is one of the choice fruits of education. It is only attained by constant and long-continued effort on the part of the child. This end is not to be attained through compulsion, but is attained rather through that joy in work which the pupil

experiences when skill and charm of teaching incite to noble effort.

6. The teacher who would help to build up a permanent group of life interests in the pupils must recognize to the full extent the native curiosity of the mind. The desire to know is as spontaneous in a child as the desire to eat. New powers are always dawning, so that new stimuli to curiosity are always possible. Impulses renew themselves in manifold directions. Now we perceive the impulse to imitate sounds, now to scribble, to draw, to spell, to count, to collect, to mimic the actions of others, and always we may count upon the impulse to do, to make, and even to unmake, or destroy. These impulses we must interpret according to their ultimate meaning. We must see to what they may or can lead; then we shall know whether to encourage or to repress. Every fledgling reaches a period in its development when it wants to fly. Fortunately there is little to hinder its trying when the proper time arrives; but with the child, though every stage in his development witnesses the birth of new powers and new longings, the conditions under which we work in the

schoolroom often lead us to forbid his flying, when that is the next thing he ought to do. They may even cause us to lose sight of the fact that he has wings.

Though its stimulus constantly varies, curiosity, or the desire to understand that which at once attracts and eludes, is a common heritage of the race. Curiosity is so fundamental that even the animals share it with us. Mr. William J. Long tells an entertaining story of an old caribou that greatly wanted to know the meaning of what he saw and heard.¹ The incident was as follows: "I remember a solitary old bull that lived on the mountain side opposite my camp, one summer—a most interesting mixture of fear and boldness, of reserve and intense curiosity. After I had followed him a few times and he found that my purpose was wholly peaceable, he took to hunting me in the same way, just to find out who I was, and what queer thing I was doing. Sometimes I would see him at sunset, on a dizzy cliff across the lake, watching for the curl of smoke or the

¹ "Beasts of the Field," pp. 60-61, Ginn & Co., Boston, New York, Chicago.

coming of a canoe. And when I jumped in for a swim and went splashing dog-paddle away about the island where my tent was, he would walk about in the greatest excitement, and start a dozen times to come down; but always he ran back for another look, as if fascinated. Again he would come down on a burned point near the deep hole where I was fishing, and, hiding his body in the underbrush, would push his horns up into the bare branches of a withered shrub, so as to make them inconspicuous, and stand watching me. As long as he was quiet it was impossible to see him there; but I could always make him start nervously by flashing a looking-glass, or flopping a fish in the water, or whistling a jolly Irish jig. And when I tied a bright tomato can to a string and set it whirling round my head, or set my handkerchief for a flag on the end of my trout rod, then he could not stand it another minute, but came running down to the shore, to stamp and fidget and stare nervously, and scare himself with twenty alarms, while trying to make up his mind to swim out and satisfy his burning desire to know all about it."

An impulse so powerful with both child and animal should be utilized to its fullest extent in the schoolroom. It is not a little pathetic to see how very small an amount of aroused and satisfied curiosity will suffice to make school seem an attractive place to the child and to sweeten a world of tedious toil. It is more pathetic still to find this morsel sometimes denied. If even a portion of the time spent by teachers in looking over numberless "tests" and "compositions" and "examination papers" were used in devising novel methods of presentation, or in discovering curious facts or explanations to bring forward during recitation, the school would be greatly the gainer. Children who would otherwise sink into irretrievable dulness, or be bored to the point of torpidity, would awake to find themselves in a new and wonderful world.¹

7. Not only must we interpret and utilize the native impulses clustering about the desire to explore the curious, but we must gratify the

¹ The story, "Jean Mitchell's School," Public School Publishing Co., Bloomington, Illinois, furnishes many happy illustrations of fertility of device in interesting children.

equally native impulse to comprehend the causal relations of things. Herbart expressed this idea when he said that the speculative or causal interest is a type fundamental to the mind. A mind unbenumbed by exclusive memoriter training always responds to the question, *Why?* Why does the water rise in a pump when we lower the handle? Why does mercury fall in the thermometer as the weather grows colder? Why does the dew gather on the grass at night? Why are railroads and rivers so important in military movements even when the men must march? Why does dividing the denominator of a fraction multiply its value? We could well-nigh secure an adequate interest in any study by arousing and satisfying the scientific curiosity that is possible in connection with it. A study not calling for causal or rational explanations is hardly worthy of a place in the modern school. (Shall we except English spelling?) The important studies give abundant opportunity of gratifying the natural desire to know the cause of things. This topic is treated at more length in Section XV.

8. This enumeration may fitly close with a

reference to the æsthetic impulses found to greater or less extent in every individual. There is no child that does not hold some things to be beautiful. Men are not agreed as to the genesis of the art impulse. Some find it in play, some in religious feeling, some in the economic utilization of articles of utility, and some in still other sources ; but, whatever its origin, the art impulse is always present in some degree with children, and it may be aroused and gratified as one of the primary instincts of the mind. The school may be made a joyous place by the outward adornment of the walls, and by the inner adornment of the recitation through felicity of language, through happy humor, and through the revelation of inherent beauties of thoughts and things.

It will be the purpose of a number of the succeeding sections to show more in detail how charm of manner and skill of presentation may contribute to the formation of the choicest interests that may attach themselves to the studies whereby we educate.

IX

RELATION OF THE TEACHER TO HIS METHODS

METHOD is not an overlord, dominating all the doings of the teacher; it is rather a guiding friend, pointing out the shortest path to a desired goal. Some try to compile books of methods as cooks compile cook-books, or as doctors classify specifics. A New York physician says he would pay ten dollars a dozen for a certain fever tablet, if they could not be obtained for less, since, no matter what the cause of the fever, he finds that this particular tablet will control it. But the healthy mind should not be treated by pathological methods. It demands only a reasonable conformity to the laws of its normal action, and the presentation of matter in a fresh and interesting manner.

There are indeed a few general principles of teaching applicable, with suitable modifications, to all subjects and to all ages, but there

is no universal method for any subject. There are many possible ways to stimulate and guide the mind. Many questions must be asked and answered before one can determine, even approximately, the best procedure in any given case. Thus, for example, one must ask: (1) What knowledge may I assume that my pupils possess concerning this subject? (2) What shall be the starting point? (3) What difficulties of comprehension are likely to be encountered? (4) How can the new matter be most easily understood and grasped? (5) In what order shall I present this lesson? What shall come first, what last? (6) What can I abstract from other subjects that will aid in this? (7) How can I make the subject vivid? (8) How, in short, can I bring the pupils to easy and complete mastery of the subject? (9) How can I lead them to make the best use of what they learn?

Every one of the foregoing questions is susceptible of a variety of answers, yet the answer that is made consciously or implicitly helps to determine the way in which the lesson shall be taught. No theory can give a

complete and ready answer to every question. If it could, teaching would cease to have the possibilities of an art within itself, and would become a sorry routine occupation. Each case must be worked out by itself in the attempt to reach a preconceived aim. All 'best' methods, if invariably employed, become in virtue of this fact the 'worst' methods. This is true, because, just as nature is said to abhor a vacuum, so art abhors a routine.

Young teachers need to cultivate a sense of proportion, to adapt means to given ends. It is unwise to try to drive tacks with sledgehammers, or spikes with tack-hammers. Above all, the young teacher should refrain from exhibiting the whole methodological repertoire in each recitation, even if critical observers should be present. The ends that need to be emphasized in recitation constantly vary. Sometimes the exposition of a difficult point is the only thing that should be attempted; at other times drill upon matter understood, but imperfectly learned, should be the central aim of the lesson; occasionally tests of principles will come to the front. Noth-

ing at times could therefore be more fatal to success than the effort to go through a set of prescribed exercises, however excellent such a plan might be under some circumstances. Furthermore, power does not lie in the raw material, but in its use. A good teacher can make the dryest sort of material glow with life and interest. Most persons dislike technical grammar; yet a good teacher can make it a charming subject to almost any pupil. Once a group of college seniors asked to be excused from history, because they said they hated the subject. They actually thought they disliked history, so great was their loyalty to the teacher, of whom they were personally fond. What was really the case was that the glorious attractions of this most fascinating study were tarnished by unsympathetic and mechanical treatment.

Teaching is a fine art, and, like other arts of its kind, it conforms to Longfellow's line:—

“Art is long, and time is fleeting,”

or, better, from the German:—

“Die Kunst ist lang und kurz ist unser Leben.”

Like painting or music or sculpture, there is much room for learning technique, but more for the exercise of spontaneity.

But, we may ask, when is the teacher free? When does he sway most powerfully the pupil's mind and interest? The answer is: when he best applies the principles of method in accordance with his own individuality. Unless there is this freedom of application, teaching degenerates at once into routine, in which both teacher and pupil are bored. Tediousness, says Herbart, is the most grievous fault into which the teacher can be betrayed.

One of the most serious dangers confronting the teacher, and one arising from the large number of children to be taught, is that the individual will be concealed in the mass. In such cases mechanism in memorizing, in drilling, in writing, in reproducing, is likely to suppress the vital and independent; it tends to crush out or leave undeveloped the spontaneity of the individual. There is all the more need, therefore, of the elevation of teaching to a genuine art.

From the relations of spontaneity to mechanism there arise three classes of teachers:—

1. There are first the 'born' teachers, those who do the right thing by instinct, "who breathe without being aware of their lungs." We may call them the educational geniuses. Somebody says that Agassiz was the only teaching genius Harvard ever had. Much as this may be doubted, it is certain that no university is ever the fortunate possessor of many of this kind. There was once such a teacher in Greece. Alexander the Great had Aristotle for a teacher; yet one must at once acknowledge that Aristotle also had Alexander the Great for a pupil. Could we all have teachers of this type, the world might be vastly richer. But, alas! the educational geniuses are few, even though many fondly fancy they belong to the class. Among such teachers all is spontaneity, personality, genius. There is no room for rule and there is perhaps no need for it.

2. Then we have the numerous class who may be called the educational artisans. These are the teachers who smother personality by

technique. They put themselves and their pupils into the straight-jacket of methodological procedure. They subject everything to the routine of rule. Personality has small influence in what they do. Wrinkles and gray hairs, jangled nerves and channelled brains, are the early portion of such, for they expose themselves to the arid blasts of their calling, without experiencing any of the life-giving joys it furnishes to their more fortunate colleagues.

3. We have, finally, the educational artists. They are the teachers who value method, but do not overvalue it; who recognize the value of personality, but avoid its eccentricity. With them freedom conforms to law, for they blend the personal and the law-accordant into an artistic unity. Personality is governed by method; method is permeated by personality.

With the young, interest in the main follows the teacher, not the subject. It is for this reason that personality and teaching skill are so important in the awakening of the intellect, the enriching of the mind, the arousing of the desires, the direction of the outgoing efforts of the soul.

X

PERSONAL ELEMENTS IN INSTRUCTION

Speech — Tempo — Tone — Tension

IN all these matters the teacher is the pattern, whether he will or not. If the teacher's mind is alert, the pupil's will be also; if the teacher exhales the sunny influence of good humor, the soul of the child will blossom like the rose in June; if the teacher uses correct and forceful language, the pupils will strive to do the same. But, on the other hand, if the teacher bristles with ill-humor, or spitefulness, or sarcasm, or is lax in thought and bearing, or slovenly in language, a troop of similar ills will spring up in the children.

More perhaps than anything else, it is the voice that denotes character, that reveals the good traits, or betrays the weak. By this it is not meant that the native quality of the voice determines character, for who has not

known most worthy people with most execrable voices, or been obliged to associate mellowness of tone with harshness of conduct? It is rather the manner of using the voice nature has given us that serves as an index to character. The ideal teacher's voice, especially if the teacher be a woman, is low, firm, clear, and forceful; never harsh, boisterous, or shrill. There is no more excruciating sound in nature than a thin, shrill, high-pitched, and perhaps also nasal voice, especially if at the same time the tone betrays ill temper or jangled nerves. It is the custom of many undisciplined people to follow the law of the piano wire, and raise the pitch with each increase of tension. Teachers afflicted with this infirmity should practise deep, full, low tones, increasing force without raising pitch. As vocal defects should be combated in the teacher, so the so-called "school tone" should be discouraged in the scholar, for it is a mark of the absence of life and interest. Our tones are not mechanical when we are dealing with real situations, but only when we have fallen into routine, indifference, or dulness.

On the other hand, the teacher should avoid with all diligence the small, indistinct, feeble voice, for its unimpressiveness neither arouses to effort nor deters from mischief. It is an index of shyness or timidity, or a degree of humility incompatible with the forcefulness essential in a teacher; or, worst of all, it arises from feebleness of will. At times the wee small voice seems to be associated with indifference, or stolidity, or general anæmia of thought. The remedy in such cases is that urged by the citizens of Hamelin Town upon their council, when they cried:—

“Rouse up, sirs, give your brains a racking,
To find the remedy we’re lacking,
Or, sure as fate, we’ll send you packing.”

When the student doffs his cap and gown to put on the badge of authority in the school-room, his speech is usually heavily laden with slang and dialect. These must be laid aside with college pranks and general academic irresponsibility. Even such respectable errors as “It is me,” or “Like I do” are no longer in order; while such slang expressions as “stunts,”

"cold feet," or "busted out," are absolutely inadmissible.

Speech should, like the voice, be clear and forceful, not loaded with technicalities or foreign terms, or hampered by academic stiffness; but straightforward, simple, vigorous. To mention the "synthetic unity of transcendental apperception" to students who have not read Kant's "Critique of Pure Reason," is to daze or disgust, as the case may be. Even to students of education who chance not to have read Rosenkranz's "Philosophy of Education," the expression, "The state must not return to the psychological ethical genesis of a negative deed" might prove a poser. No thought important to a young mind is incapable of expression in language comprehensible to that mind.

By *tempo* is meant the rate of mental movement in the recitation; by *tone*, the prevailing state of mind, whether grave or gay, subdued or elated, strenuous or relaxed. It is evident that *tempo* and *tone* must be in accord. To read a selection filled with noble earnestness of sentiment in light and rapid tones is like singing the words of a solemn oratorio to the

jigging measure of a street ditty. Who that has ever heard the noble music to which the words, "He was despised and rejected of men," are sung, would not have his feelings outraged by a rendition in belittling music? Fancy reading the "Reply to Hayne" in high and rapid tones! The very structure of the composition resists such an effort.—"The eulogium pronounced by the honorable gentleman upon the character of the state of South Carolina meets my hearty concurrence." In such composition *tempo* answers naturally to tone.

When, however, it is necessary to drill upon memorized matter, either singly or in concert, as in reciting the multiplication table or in practice upon inflections, speed is desirable. The young like excitement when it brings elation without confusion. The pulse quickens, the blood flows in greater volume to the brain, the attention is sharpened, and, unless the exercise is too violent, heightened mental power and enhanced interest in school work result.

But, on the other hand, where reflection is needed, time must be given. Not that thought should be sluggish, but that it should be clear,

exact, and reliable. The mind that is whipped into hair-trigger explosiveness on matters demanding deliberation is almost sure to become unreliable in its thought processes. It is cocksure; but, as Huxley says, "Of all the dangerous mental habits, that which schoolboys call *cocksureness* is probably the most perilous."

The teacher should also strive for variety in tone, emphasis, and inflection, not as ends in themselves, but as mirrors of a variegated thought content; for nothing is more depressing than dead uniformity of voice.

By class *tension* we mean the alertness, the force, the earnestness, the enthusiasm, with which the work of the class proceeds. Here, as everywhere, the teacher sets the pace, for a lax teacher never had a strenuous class. True teaching is hard work. It requires the expenditure of nervous force. What we would see in our pupils, we must first manifest in ourselves. Are they to have enthusiasms in their studies? The divine glow must first burn in our own bosoms; our feelings are the prototypes of theirs. Is the school to be a part of real life for our pupils? It must first be real to us.

Are the minds of our pupils to be kept up to the growing point? A similar tension must first possess our own.

When the minds of our pupils are alert, eager, enthusiastic, then they are growing, for their education is revealing something of the infinite riches of the stored-up mental treasures of the race; then the roots of permanent waxing interests are striking deep into the soil; then the personality of the teacher is contributing its share toward forming in the minds of the young masses of ideas that shall be both clear and vivid.

XI

CONCRETENESS IN INSTRUCTION

CONCRETENESS contributes perhaps more than any other single phase of instruction both to clearness and to vividness. It lays a foundation, therefore, for interest.

It is an old saying that "the road to hell is paved with abstractions." However this may be in theology, it is certain that in education a path so paved rarely leads to the goal of vivid ideas. Some of the reasons why it does not are as follows:—

1. The teaching of abstractions, mostly empty to the pupil, begets a habit of vain memorizing. Not understanding clearly the meaning of the generalizations placed before him, yet being required to have at least the semblance of comprehension, the pupil resorts to his memory. The teacher who is easily satisfied with words will be content with accurate verbal reproduction.

2. But the memorizing of subject matter imperfectly understood begets a growing foggi-ness of vision. A meaningless abstraction frequently repeated acquires a familiarity that soon passes for knowledge. This is seen with adults when they juggle with, but do not master, the terms in speculative philosophy. It is a new social phenomenon among the masses who have learned to read but not to think, that any exploded theory of ancient philosophy may become a cult claiming its thousands of devotees, provided its high-sounding abstractions be tinged with religious sentiment, or gilded with promise of practical usefulness. But if adults may so easily be induced to dwell among the fogs by feeding on abstractions, what shall we say of the children and youths who are fed with the same indigestible mental food?

3. Another way of saying the same thing is to point out the fact that the memorizing of rules and definitions not yet understood leads to the substitution of words for ideas. Lotze tells us that all strivings of the mental life not only begin with the concrete percep-

tions of the senses, but that they ever return to them to obtain material and starting points for new development of the mind's activity.¹ If this be true, the road paved with abstractions is the road away from interest, away from vivid and life-giving thought.

Concreteness arises from the use of objects or of pictures or of individual and striking illustrations. We can make words alone thrill with the intensity that comes of direct perception, for the imagination can be made to furnish an inner concrete vision comparable to the reality itself. Such words are well chosen, rich in sensuous elements, plastic in tone, full of spirit, always dealing with specific facts or particular events. Indeed, many people have the happy gift of transmuting the commonplace into the interesting, or even the important, solely by means of spirited narration. What seems prosaic enough to the ordinary observer becomes irresistibly comical, or passing strange, or humanly pathetic, when thrown upon the screen of consciousness by the words

¹ "Mikrokosmos," II, p. 176.

of one who sees the significance in the panorama of the day's experiences. The teacher, above all others, needs to have the philosopher's stone, the power of turning into gold what would otherwise be dross.

The inner vision of teacher and pupil should coincide. The world of words should go over into the world of things in the mind of the learner. This coincidence and inner illumination may be brought about in many ways. We may, for instance, compare the strange and distant with the familiar and near. The past exists as an element of the present. There is no victory of human liberty in the bygone ages that does not find its embodiment in some aspect of modern society. Alchemy led to chemistry, and astrology to astronomy. Our present industrial implements and machines have their prototypes for the most part in those of olden times. No touch of human nature portrayed in myth or legend is entirely eliminated from our own characters. It follows, then, that if we seek the strange in the familiar, we shall in most cases find it. A false scientific pride often prevents the graduate

of the university from using the most potent means for securing the greatest clearness and vividness of ideas. The understanding of the young has its roots in the home, the playground, the family, the woods, the meadows or fields, the village or the city. He is the wise teacher who takes note of this fact, and anchors every conception in the experience of the learner.

The natural sciences, properly taught, furnish the most fertile fields for the growth of concrete ideas. They have to do with objects in countless variety, with cause producing its effect before the eyes. In these studies the senses are always active. We are ever called upon to see, to handle, to hear, to touch, to experiment. Thus, in the study of plants and minerals and animals, the eye and the hand are called into constant activity. We distinguish form and color, structure and surface. We perceive the smooth, the clean, the light, the heavy, the firm, and the yielding. Surfaces, points, lines, angles, engage our attention. We count and measure and use instruments. When objects are absent, we may compare them

with those present, or we may use the photograph or the stereopticon. Even the speculations of biological science can be made vivid by the use of fossil objects. All the natural sciences are made more concrete by experiment, but this is especially true of physics and chemistry. The principle of the siphon may be made concrete by the use of a bent rubber tube, or that of the pump with a straight lamp chimney fitted with the necessary rod and valves.

In arithmetic we may render the ideas concrete by the use of blocks, as in the Speer method,¹ and by many other devices for measuring and illustrating. In geometry we may lend concreteness to notions by measuring, folding, paper-cutting, comparing, and superposing. Messrs. Beman and Smith have given us a translation of "Row's Geometric Exercises in Paper Folding,"² which enables the teacher to render a large part of geometry perfectly concrete, and hence of fascinating interest.

In geography, ideas are rendered concrete

¹ Ginn & Co., Boston, New York, Chicago.

² *Ibid.*

by spontaneous observation and by directed experience. Pictures, maps, and globes, as well as oral descriptions, are aids to concreteness. Geography is more difficult than nature study in this respect, however, for the remote must always be pictured to the mind through comparison with the near.

History makes a larger draft upon the imagination than the subjects just mentioned, yet it is possible to fill it so full of concrete vividness that it will become the most fascinating of all studies. As already remarked, the past lives in the present, and it is through the present it must be made to live again. Whittier's boyish schoolmaster understood the art of making his hearers see the old in the new.

"Happy the snow-locked homes wherein
He tuned his merry violin,
Or played the athlete in the barn,
Or held the good dame's winding-yarn,
Or mirth-provoking versions told,
Of classic legends, rare and old,
Wherein the scenes of Greece and Rome
Had all the commonplace of home,
And little seemed at best the odds
'Twixt Yankee pedlers and old gods :

Where Pindus-born Araxes took
The guise of any grist-mill brook,
And dread Olympus at his will
Became a huckleberry hill." ¹

Olympic games become more real when compared with our modern forms of athletics. The past may be read, too, in monuments, buildings, castles, forts, etc. The foreign-born child has the advantage of being able to see many ruins of forts and buildings, many monuments and historic works of art; but pictures, aided by such art and historic remains as we have, are no mean substitutes.

Linguistic instruction suffers somewhat in vivid objectivity, for it is through inner perception that words must gain life and color. In the study of English poetry, we must avoid the too early or too frequent use of abstract terms like *metonymy*, *metaphor*, *synecdoche*, etc., or the reduction of classic dramas to skeleton outlines, thus robbing them of flesh and blood. On the contrary, emphasis should be laid upon the inner life and power of the contents; stress should be placed upon the personalities por-

¹ "Snowbound."

trayed, upon the development of their thoughts and actions. It is ever life that stimulates life.

In the study of foreign languages we gain concreteness by comparing their characteristics of word and structure with the characteristics of the mother tongue. It is a happy circumstance for language teaching that nearly a third of our vocabulary comes to us from Latin through the French, while the body of English is of Anglo-Saxon origin. The teacher of Latin, French, or German, therefore, need rarely be at a loss to find in English a basis for the comprehension of any one of these languages.

Translation, to be effective, must never descend to the level of the puzzle, or become a mechanical process, but it must thrill with life and vigor; the thought to be discovered must seem a precious message to be unearthed like a gem from a mine. It need hardly be said that to make a foreign language concrete, there must be no premature emphasis upon the grammar alone, for grammar is at best a useful instrument, like a spade. If it is made an end in itself, we lose at once concreteness, vividness, and interest.

XII

ORAL PRESENTATION

THE oldest thing in education is the voice of the teacher addressing itself to the ear of the learner. It is the primitive method of teaching. By this means Homer imbibed his knowledge of the Greek heroes. By it he imparted to the world the wonderful creations of his mind. Mr. Denton J. Snyder has pictured to us the poet at his mother's knee, listening with glowing soul to her stories of the ancient heroes and Olympian gods : ¹ —

“She would begin with a glow in her eyes and tell me
their story,
Meanwhile plying the distaff—she never could help
being busy—
All of their tales she knew, by the hundreds and hun-
dreds she knew them,
Tales of the beings divine, once told of their dealings
with mankind,

¹ “Homer in Chios,” Sigma Publishing Co., Chicago.

When they came to our earth and visibly mingled with
mortals.
New was always the word on the tongue of Crethéis
my mother,
Though she dozens of times before had told the same
story,
Still repeating when I would call for it, ever repeating,
For a good tale, like the sun, doth shine one day as the
other.
What a spell on her lips when up from her lap I was
looking,
Watching her mouth in its motion, whence dropped
those wonderful stories !
Oft I thought I could pick up her word in my hand as
it fell there,
Keep it and carry it off, for my play a most beautiful
plaything,
Which I could toss on the air when I chose, like a ball
or an apple,
Catch it again as it fell in its flight, for the word was a
thing then.
Mark ! what I as a child picked up, the old man still
plays with :
Words made of breath, but laden with thought more
solid than granite,
Pictures of heroes in sound that lasts, when spoken,
forever,
Images fair of the world and marvellous legends afore-
time,
All of them living in me as they fell from the lips of
my mother."

It is evident that a method once almost the sole reliance of the race for educating the young must still possess virtue, even in this age of books and pictures. To examine the scope and usefulness of oral presentation as a means of forming clear and vivid ideas in the minds of the young is the purpose of this section.

We need, first of all, to see the difference between the monologue and the dialogue. In the former the speaker not only does all the talking, but usually all the thinking. Whatever we may think of the lecture method in the university, one need not reflect long to see that it is not well adapted to the instruction of the young. Unless the lecture is so fascinating as to rest under the suspicion of not teaching what the children need to learn, the passivity of the hearers is likely to lead to inattention and ultimately to disorder. But even if the children are attentive and orderly, it is almost certain that they will neither learn accurately nor think well, for the lecturer is prone to pour out knowledge too rapidly, while the children have no incentive and no opportunity to do any real thinking. The mind is carried on from point

to point by the stimulus of the lecturer's words. The pupil has nothing to do but to allow the train of ideas to follow the lead of the teacher. He does not in the least direct it himself. The process is not unlike that in revery, in which the mental panorama unrolls itself as it will. There may be much more intensity in the case of a good lecture, and hence a correspondingly greater impression, but even at its best the lecture does little to impart knowledge or to stimulate real thinking.

It is an illusion to suppose that because one talks one thereby necessarily teaches. There is a vast difference between *telling* and *teaching*. In genuine teaching we must see that knowledge is so acquired that it may be a real possession, and we must see that the mind of the learner is active enough to perceive and feel the significance of what is learned. This means that the new lesson must be associated with related knowledge already acquired, and it means also that the principles underlying the new facts must be fully appreciated through actual thinking.

In ancient Greece it was the Sophists who

used the monologue exclusively. They simply lectured to the people, holding that there was no need of debate, since this would but reveal difference of opinion. But, they said, if each man has his own opinion, and has a right to it, then there is no use in discussing at all, for no conclusion can be reached. The result of this theory was that each Sophist went from place to place telling his own opinions and giving no one a chance to combat them. He finally held openly that, since difference of opinion leads to no conclusion, each man must himself be the measure of truth for himself. Under such circumstances it is evident that science could not exist. There would be no room for anything but opinion.

It is well for the progress of the world that a wiser man, in the person of Socrates, appeared to confound the Sophists and to lead men to see that such a thing as science can exist. For knowledge of any kind to be scientific, it must become subject to laws and principles which are seen to be independent of the opinions of individuals. If we still had 'opinions' about the truths of the multiplication table, we should

have no science of mathematics. Socrates used, not the monologue, but the dialogue, in his endeavors to get at the truth of things. Being able to ask questions and to use the answers, he soon sifted out those opinions that were self-contradictory. In this way he was able to reduce experience to rule and principle.

The teacher's problem, however, is not precisely that of Socrates, for, instead of overturning a false system of ideas, the teacher must try to secure an adequate comprehension of systems of thought everywhere recognized to be true. But if he uses the method of the monologue, he is likely to make authority take the place of insight, to substitute passing impression for careful, thoughtful mastery. The fundamental difficulty with the lecture method is that it secures little or no response from the student. As an occasional means of arousing interest in a subject, of giving a point of view, of showing the broader meaning of our daily work, thus giving a telescopic glimpse into the future, the lecture is invaluable. But if we spend all our time gazing at the future through the glass, we shall never arrive at the distant goal.

Interchange of thought, through question and answer, through explanation, description, and exposition, in short, through the dialogue, is therefore the indispensable requisite of useful oral presentation.

The length and character of the oral work will depend upon the age of the pupils and the nature of the subject matter. The manner of the presentation should be open and free, calculated to hold the eye and to keep the attention. The minds of the children must be kept on the alert by thought-inciting questions. Dictation of matter to be copied is out of place, because time-consuming, and depressing to lively interest; but condensed headings should be written upon the blackboard. If brief and pointed, the writing by the teacher and the copying by the pupil will not interrupt the progress of the presentation; it will conduce rather both to mastery of the subject and to interest in it.

Narration of events in the form of stories or vivid description of what has happened is the simplest, and at the same time perhaps the

most effective, kind of oral presentation. A good story-teller claims instant and constant attention. He knocks at all doors,—humor, gladness, sadness, pity, exultation, fear; he rouses to action or subdues rebellious feelings; he softens to kindness where only callousness formerly existed; he can, in short, through proper selection of subject matter, and by sympathetic narration, produce, at least for the time being, any worthy effect upon his pupils that he may deem desirable.

Narration of this kind can be used effectively at times in every subject, but it is of special service in languages, in history, and in the natural sciences. One who is teaching natural history should avail himself of such literary treasures as the works of William J. Long¹ and Ernest Seton-Thompson.² In the earlier grades, where imagination plays a more prominent part, Kipling's "Jungle Books" will be most helpful. With the early grades, it is best for the teacher to adhere closely to what

¹ "Beasts of the Field" and "Fowls of the Air." Ginn & Co., Boston, New York, and Chicago.

² "Some Wild Animals I have Known."

has been put into permanent literary form. This should be narrated as nearly in the words of the original as possible, for much of the charm of such matter depends upon the form.

The pupils should have frequent opportunity to reproduce what has been narrated. In this way they absorb a large body of correct and even elegant language, which frequent reproduction makes their own. This method can even be used in the teaching of modern foreign languages, much to the advantage of the pupil's fluency in using the strange tongue. The teacher should narrate freely, not hampered by the book. Some teachers can read almost as well as they can narrate, but a story read often reminds one of an eagle walking. The eagle is free in his movements only when flying. So the narration of the teacher only reaches its greatest excellence when he is unimpeded by the book. In the case of extended narration, the story should be told and retold section by section.

The art of describing is far more difficult than that of narrating, and for a very good reason, which Lessing long since pointed out in

his book, "Laocoön."¹ Narration describes that which happens in time; description tells of that which exists in space. In following the unfolding of events as they happen one after another, the narration simply follows the natural order of cause and effect, each part of the story coinciding with its own particular phase of the progress of events. In other words, the time elements of the story correspond to the time elements of the original occurrence. In the case of description, however, though there is a time element in the oral presentation as before, there is no corresponding time progress in the thing described. The description moves on, but the object does not. The mind must therefore hold constantly before itself the elements of the thing described, joining the one to the other as the description proceeds. This is why it is hard to describe effectively, and why a description is hard to follow even when it is clear. What could be simpler than a bed of flowers, yet how few can make an adequate mental picture from even a good description? The

¹ Translation, The Macmillan Co., New York.

reader may try his own powers upon the following, which certainly does not leave a vague impression because of any literary fault: —

“There does the noble Gentian raise his head
High o’er the troop of common plants,
Beneath its standard serves a tribe of flowers;
Its own blue brother bows and honors it.
While golden pyramids of brilliant flowers
Cling round the stem and crown its robe of green,
The leaves of brilliant white, with deepest green,
Streaked and inlaid throughout, are seen to glow
With the moist diamond’s many-colored rays,
Most righteous law! uniting strength with grace,
In the fair body dwells the fairer soul.
Here creeps a lowly plant like some gray mist,
Its leaves by nature shaped as cruciform;
Two gilded beaks formed by the lovely flower
Spring from a bird made out of amethyst.
Here a bright finger-fashioned leaf doth cast
Its green reflection in the limpid stream.
The flower of snow, with purple lightly tinged,
Environed by the white rays of a star;
Emeralds and roses deck the trodden heath,
And cliffs are covered with a purple robe.”

For the sake of contrast, the reader may try a somewhat longer selection in which events, unfolding in a time order, keep pace with the march of the narration. There is

no difficulty now in vivid apprehension, either of the story, or of the descriptive elements it contains.

“ A greater omen, and of worse portent,
Did our unwary minds with fear torment,
Concurring to produce the dire event.
Laocoön, Neptune’s priest by lot that year,
With solemn pomp then sacrificed a steer;
When (dreadful to behold) from sea we spied
Two serpents, ranked abreast, the seas divide,
And smoothly sweep along the swelling tide.
Their flaming crests above the waves they show;
Their bellies seem to burn the seas below;
Their speckled tails advance to steer their course,
And on the sounding shore the flying billows force.
And now the strand, and now the plain they held.
Their ardent eyes with bloody streaks were filled;
Their nimble tongues they brandished as they came
And licked their hissing jaws, that sputtered flame.
We fled amazed: their destined way they take,
And to Laocoön and his children make;
And first around the tender boys they wind,
Then with their sharpened fangs their limbs and bodies
grind.
Their wretched father, running to their aid
With pious haste, but vain, they next invade;
Twice round his waist their winding volumes rolled;
And twice about his gasping throat they fold.
The priest thus doubly choked — their crests divide,
And towering o’er his head in triumph ride.

With both his hands he labors at the knots;
His holy fillets the blue venom blots;
His roaring fills the flitting air around.
Thus when an ox receives a glancing wound,
He breaks the bands, the fatal altar flies,
And with loud bellowings breaks the yielding skies."

The entire "Laocoön" is devoted to a discussion of the natural limitations of poetry on the one side, and painting and sculpture on the other. In poetry (and narration) the time element is all important, so that description as such is unnatural to it; whereas in painting the space element is all important, so that the effort to portray events by means of painting or sculpture must necessarily prove ineffective. The book opens with a discussion of why the mouth of "Laocoön" in the famous statue of that name is so nearly closed, when the natural thing for a Greek to do under such circumstances would be to shriek aloud, as Virgil makes "Laocoön" do. Winkelmann and others had explained the half-closed position of the mouth as being due to 'classic repose'; but Lessing points out that to have made the mouth wide open, as it would be in screaming,

would be to reduce to a permanent space condition that which is only a passing time state. This is the reason why we do not like a smile in a photograph. A smile is a transient thing, whose charm is due to its creation and its disappearance. A permanent smile becomes a kind of petrified grin. It follows that description is a sort of word-painting, and is a substitute for what should be a real painting to be an adequate representation of the reality.

The "Laocoön" will well repay a careful reading on the part of the teacher who desires to see the true scope and the limitations both of narration and description. It is of course invaluable in furnishing canons of art criticism.

Difficult though the art of describing may be, it is still indispensable in the teaching of nearly all school subjects. It is particularly needed in geography and nature work, in history and in language. The art can best be studied in the few poets and novelists who, like Scott, excel in descriptive power. In describing an animal or a plant the life history of the object, as from seed to fruit, or

from birth to death, lends concreteness, and helps to supply the time movement so important in narration. In biography a similar device may be used, the history of a man being traced from the cradle to the grave. One can enliven the description of a mineral by giving it a place in human affairs; as, for instance, as an element in a bridge or a building or a locomotive. When an object is present, its description is greatly assisted by this fact alone. The description will naturally proceed by actual or ideal separation of the object into its elements, each of which will be seen in relation to the other elements and to the whole. Here a right order is important, as in the description of leaves and insects. It is an excellent exercise for the pupil to try to make clear to others that which he has himself discovered. If a distant plant or animal is to be described, the genetic order already mentioned is extremely important.

The aspect of oral presentation that we call exposition is so important that a separate section must be devoted to it.

XIII

THE ART OF EXPOSITION

IT is a nice point in teaching to know what things need exposition; it is an equally important one to know to what extent they need it. While it is quite possible to make a philosophic exposition of the implications to be found in a story like that of Simple Simon, yet such labor is lost on the child young enough to enjoy the rhymes. Old King Cole can't be made merrier by explanation, nor Little Jack Horner any better. A Mother Goose story is its own best revelation to the child. On the other hand, almost any phase of any subject of school instruction may at times need exposition.

Everything turns upon the relation of the point to be understood to the stage of mental advancement in the learner. One mind, for instance, grasps the nature of a demonstration with perfect ease, another feels it but dimly

or not at all; one can travel with seven-league boots through the stages of a mathematical process, another must take every step, however short, or falter by the way. The imagination of one pupil is lively and clear, while that of another flies with leaden wings; one student has illuminating knowledge, while another's light is darkness. One boy remembers and thinks in a flash; the mind of another is a sieve which holds only dross. In short, that which needs exposition is as manifold as subject matter and mind. It is evident, therefore, that the teacher must know both his subject and the mind of his pupil.

To descend somewhat to details, it is clear that that which is remote in time or distant in space may be out of immediate relation to the experience of the pupils, hence be in need of more or less exposition. History always makes large drafts upon the imagination, for a prosaic present may furnish but scant basis for constructing a long-vanished scene. It may be difficult to disentangle from the present the elements of political life that had

their genesis in the Orient, or in the Occident of long ago. Yet if ancient history is to have the vividness that comes from a sense of its reality, the chasm of years must be bridged, the past must live again in the present. The meaning of obscure poetry may often be made clear by illustration and paraphrase, while its spirit may often be imparted by sympathetic and appreciative reading. Mr. John Burroughs has only scorn for efforts to find the heart of literature by means of literary dissection.¹ He says: "If the teacher, by his own living voice and an occasional word of comment, can bring out the soul of a work, he may help the student's appreciation of it, he may, in a measure, impart to him his own larger and more intelligent appreciation of it. And that is a true service.

"Young men and women actually go to college to take a course in Shakespeare or Chaucer or Dante or the Arthurian legends. The course becomes a mere knowledge course. My own first acquaintance with Milton was through an

¹ "Literary Values," *Century*, April, 1902.

exercise in grammar. We parsed 'Paradise Lost.' Much of the current college study of Shakespeare is little better than parsing him. The class falls upon the text like hens upon a bone in winter; no meaning of word or phrase escapes them, every line is literally picked to pieces; but of the poet himself, of that which makes him what he is, how much do they get? Very little, I fear. They have had an intellectual exercise and not an emotional experience. They have added to their knowledge, but have not taken a step in culture. To dig into the roots and origins of the great poets is like digging into the roots of an oak or maple, the better to increase your appreciation of the beauty of the tree. There stands the tree in all its summer glory; will you really know it any better after you have laid bare every root and rootlet? There stand Homer, Dante, Chaucer, Shakespeare. Read them, give yourself to them, and master them if you are man enough. The poets are not to be analyzed, they are to be enjoyed; they are not to be studied, but to be loved; they are not for knowledge, but for culture, to enhance our appreciation of life and our

mastery over its elements. All the mere facts about a poet's work are as chaff compared with the appreciation of one fine line or fine sentence. Why study a great poet at all after the manner of the dissecting room? Why not rather seek to make the acquaintance of his living soul and to feel its power?"

There are things to say about the teaching of literature which this article does not consider, but Mr. Burroughs is right about the futility of searching for an emotion with a scalpel.

The exposition of terms by use of definitions, themselves needing to be defined, is usually futile, for it is like an effort to verify equations with unknown quantities. It is better to rely on illustrations. Instead, for example, of defining *envy* as "A feeling of uneasiness, mortification, or discontent excited by the contemplation of another's superiority, prosperity, or success, accompanied with some degree of enmity or malignity, and often or usually with a desire or an effort to discomfit or mortify the person envied,"¹ it is better to ask a few questions, thus: Did you ever hear of an envious man?

¹ Century Dictionary.

By what feelings did he show his envy? By what actions?

A rule has been given us for exposition, which it were well to heed. It is, "As little as possible, as much as necessary."¹ Exposition is not an end, but a means. Some teachers are possessed to demonstrate self-evident propositions; some use a wilderness of words in monologue to accomplish what a few questions would better effect. Who has not seen teachers, not to say professors, spending the whole recitation hour day after day in solving problems for their students? These monologues in crayon are no more effective than monologues in words.

There are two chief types of exposition; namely, (1) the type that pertains to the forms for expressing ideas, and (2) that which pertains to the ideas themselves.

Verbal expositions relate to words, sentences, figures of speech, and the like. Strange words must be explained by means of familiar ones, complicated grammatical structure must be simplified, long periods often need to be broken up into short ones, highly figurative

¹ "So wenig wie möglich, so viel als nötig."

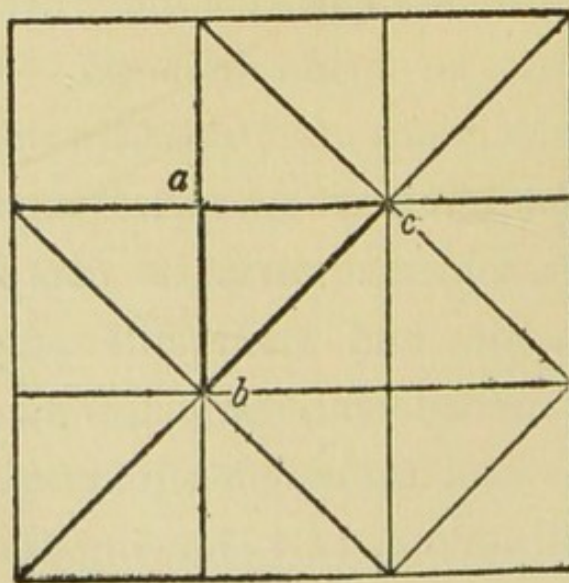
language must be made plain by familiar forms of speech. All the teacher's resources of philology, grammar, and rhetoric are likely, sooner or later, to be needed in rendering language comprehensible to his pupils.

The greatest need for exposition, however, is in the realm of reality, whether of thought or of things. Ideas, conceptions, judgments, laws, principles, relations, often lie beyond the pupil's unaided power of comprehension. A political principle, for example, like that of local self-government can only be truly apprehended when on the one hand we see what its ultimate consequences are for the political well-being of the people, and on the other what evils its absence entails.

In expositions of this kind that which is abstract must be made concrete by appeal to examples, experiences, descriptions, and the like. Complex ideas must be analyzed into simple ones, objects must be compared as to their similarities and their differences, events must be examined both from the standpoint of their causes and their consequences. Ancient history is illuminated by showing its reflection

in recent experience, while recent history gets new meaning when its elements are seen to be embodied in the history of other times, countries, and peoples. Even so abstruse a matter as a geometrical proposition may be made much more vivid, first by appeal to experience and history, and then by lucid presentation of essential points. Taking for illustration the proposition respecting the square on the hypotenuse of a right triangle, we may approach the more vigorous demonstration by illustrative methods, which will lend interest to the problem and throw light upon it.

For the first illustration, construct a mosaic in the form of squares, as follows: It will be

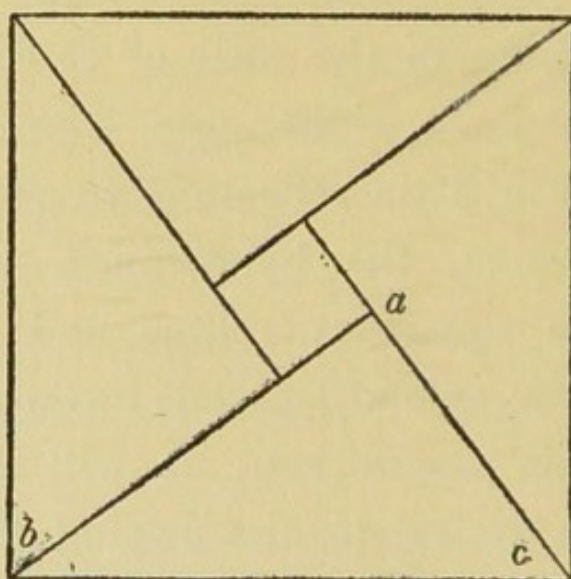


seen that the square on the hypotenuse bc consists of four triangular pieces, and that the squares on the lines ab and ac consist of two such pieces each.

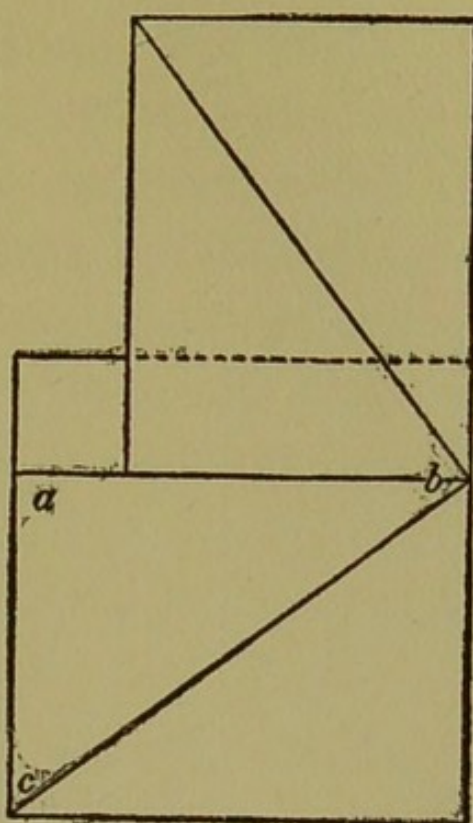
We gather from the history of mathematics that Pythagoras, whose name this proposition bears, probably learned from the Egyptians that three lines in the ratio of three, four, and five will make a right-angle triangle. It requires only a little reflection to see that the square of five, the hypotenuse, equals the sum of the squares of three and four. We have thus a second special instance of the truth of this proposition. It will add to the interest if we relate the legend that, upon making this discovery, Pythagoras sacrificed a hecatomb to celebrate it.

Unless the teacher is in haste to attack the ordinary Euclidian demonstration, it will be worth while to spend a recitation period in examining the ocular demonstration made by the Hindoo, Bhâskara, 1114, A.D. His figure is constructed by allowing the square on the hypotenuse to enclose the triangle, and in making each of the other sides of the enclosing square

the hypotenuse of another inscribed right triangle of the same dimensions as the first. In the middle will remain a small square, each side of which is the difference between the long and the short leg of the triangle. The figure is as follows:—



By rearranging these triangles into two rectangles at right angles to each other, with the small square placed in the corner, we have an ocular demonstration which the pupils can verify by drawing, cutting out, and rearranging. The whole area is the sum of the squares of the two sides; it is also the square on the hypotenuse. Rearranged, the figure is as follows:—



The only explanation that Bhâskara vouchsafes is the single word, *Behold!* It is enough.

Approaching now the regular Euclidian demonstration, construct the triangle abc with the squares lying outside, as follows, p. 176: Drop the line ai perpendicular to cb , thus dividing the square on the hypotenuse into two rectangles. It may be surmised that the rectangle hd is equal to the square bf , and that the rectangle ci is equal to the square cg . This surmise is to be tested to see if it is correct.

A good exposition in such a case as this will not simply tell the pupils the whole process of proof, but will rather make the essential steps stand out one by one as solvable problems. Such a method gives the help that is needed, and withholds that which is not needed. The minds of the students may well be turned to the following points:—

1. Are cf and bg continuous straight lines? Why?

2. Can the rectangle bi and the square bf be compared directly? No. Why not? Can their halves, the triangles bhd and bea be compared directly? Why not? (Not similar.)

3. Is it possible to make a triangle equal to bhd ? Yes, bda . How do you know the two triangles are equal? How can you construct a triangle equal to bea ? Join ec . Reason for equality?

4. What part of the rectangle bi is the triangle bad ? Reason? What part of the square bf is the triangle bec ? Reason?

5. Is the triangle bad equal to the triangle bec ? Yes. (Two sides and included angle of the one equal to two sides and included

angle of the other.) How do you know the included angles are equal?

6. Do we know now that the rectangle bi is equal to the square bf ? Why?

7. In a similar manner, prove that the rectangle ci is equal to the square cg .

8. Are we now sure that the square on the hypotenuse bc is equal to the sum of the squares on the legs ba and ac ? Reason?

In briefer form the real problems in this proposition are:—

1. To see that cf and bg are respectively continuous straight lines.

2. To construct similar triangles equal to half the rectangle bi and half the square bf .

3. To compare the rectangle bi and the square bf by comparing their halves to two similar triangles. Everything else is merely the application of axioms.

XIV

THE ART OF QUESTIONING

To question well is to teach well. In the skilful use of the question more than in anything else lies the fine art of teaching; for in it we have the guide to clear and vivid ideas, the quick spur to imagination, the stimulus to thought, the incentive to action. The question leads us to perceive the implications involved, but hitherto unrecognized, in our knowledge, it helps us to comprehend the principles underlying knowledge and conduct, and it enables us to focus our minds in recalling what we have learned.

To the lawyer the question is a weapon of offence and defence; to the teacher it is a means of securing growth, for it can turn indifference into interest, torpidity into activity, ignorance into knowledge. By means of the question the teacher can keep the mind of the pupil up to the growing point, making

it at once alert and thoughtful. The question is, in short, the universal implement of good teaching, applicable to all ages of pupils and suitable to all stages of instruction.

For convenience, questions may be grouped into four classes, as follows:—

1. Analytical,
2. Development,
3. Review,
4. Examination.

The purpose of the first is to analyze knowledge into its elements, in order to bring its implications to consciousness. From the nature of numerator and denominator of the common fraction, for instance, we may easily derive the methods of adding, subtracting, multiplying, and dividing fractions. The denominator shows the number of parts into which a unit has been divided; hence shows the size of the parts. The numerator shows how many of the parts are taken. The value of the fraction, therefore, depends upon two things; namely, the size of the parts and their number. Then, for example, to multiply the value

of the fraction we may either multiply the number of parts, which is done by multiplying the numerator, or we may multiply the size of the parts, which is done by dividing the denominator. Analytical questions will reveal all these relations to the pupil.

The purpose of the development question is to aid the pupil in arriving at a clear comprehension of classes, rules, principles, and other forms of generalization. It is particularly applicable in the inductive approach to general truths, but it is equally serviceable in making verifications of principles that have been assumed.

The purpose of review and of examination questions is evident from their names.

It is self-evident that all questions should be definite, comprehensible, and thought-provoking. These are general characteristics which are always acknowledged in theory, though not always secured in practice. It is not uncommon for examiners of teachers to ask for and be satisfied with a mere enumeration of such qualities. These enumerations are as useless as they are easy. Their value

as guides to teaching is comparable to the value of the prescription for learning the French language in eleven days, which was to divide the French language into eleven parts and to learn one part each day!

We get no real light on the art of questioning until we consider in detail the special characteristics that make questions good or bad. So numerous are these that we shall not be able to survey the field adequately without a somewhat careful enumeration.

Special Characteristics of Questions

1. Avoid: (a) Obscure expressions; as, What are the logical presuppositions of a peaceful state of mind?

(b) Foreign words; as, What was the *raison d'être* of the *coup d'état* of the third Napoleon?

(c) Technical expressions; as, What valence does the study of vegetal functions produce?

(d) Figurative expressions; as, What dread portent does the roaring of the lion body forth?

2. Avoid questions that are so general as to constitute world conundrums; as,

What political institutions are founded upon the principle of popular sovereignty?

What is the fundamental principle of Christianity?

What are the presuppositions of manhood suffrage?

What is civilization?

3. Avoid complex or obscure questions; as,
Wherein consisted the originality of the genius of Napoleon?

What was the most epoch-making event of the Franco-Prussian War?

Which phenomena of the fratricidal strife in the American Republic were most determinative of the ultimate fate of the nation?

“Who chased whom around the walls of what?”¹

4. Avoid double questions; as,
What form has the valley and what kind of a view does it furnish?

Who are supposed to have blown up the *Maine* and how must a civilized people consider such an act?

¹ Quoted by Professor L. M. Salmon from an examination paper.

Where is Ohio and how is it bounded?

5. Ask questions with correct emphasis and inflection; as,

Will you ride with me?

Will *you* ride with *me*?

Will you *ride* with me?

Will you ride with *me*? etc., etc.

6. Avoid the obscurity caused by auxiliary clauses or confusing parenthetical expressions; as,

Do you think that it is expedient, taking into consideration the character of the population, which as you know has a strong admixture of Spanish blood and might not be well adapted to the degree of self-government implied in statehood, for the territories of New Mexico and Arizona to be admitted to the Union as states, especially as these regions lie largely in the arid section of our country (you have perhaps read how remote and desolate these deserts are except as they are reached by railroads, and watered by artesian wells or by water brought in long irrigating ditches from mountain streams, which soon lose themselves in the sands of the plains; doubtless you have

also heard of artesian wells, which are made by drilling straight down into the earth for many hundreds of feet, only to find in some cases that the water is so strongly impregnated by minerals as to be unfit for use)? John may answer.

Remark. — Some teachers express their ideas in psychological rather than in logical order, running on until out of breath and allowing one idea to suggest the next without regard to its bearing upon the matter in hand. An error akin to this fault is the habit of making superfluous remarks, hoping thereby to add vivacity to the recitation; as, I want to see now who of this fine class, on this bright morning, can tell me what Mr. Lincoln, after much thought and not a little earnest prayer, and at the solicitation of many good citizens, did when the whole country was electrified and then thrown into profound grief by the battle of Antietam. What bright boy or girl is ready with an answer that will show that he or she understands the history of our country?

7. Avoid the obscurity caused by verbs of indefinite meaning, such as, *have, do, is, happens*; as,

What do soldiers *have* when they go to battle? *Ans.* Guns, clothing, food, officers, commands, anxiety, fortitude, etc.

What does glass *do* when it is heated? Bends, softens, expands, melts.

What *is* the rat? A rodent, a mammal, a thief, an animal, a pest.

What *happens* when it rains? Thunders, grows dark, water flows, rivers rise, etc.

Remark.—An indefinite question calls for and deserves an indefinite answer.

8. Words that together make up one conception should not be divided between question and answer; as,

What did he suffer? *Ans.* Death.

What did the man take? *Ans.* His departure.

How did the man lie? *Ans.* Dead.

In what did the eyes of the audience swim?
Ans. Tears.

What did they roar with? *Ans.* Laughter.

What did the child burst into? *Ans.* Tears.

9. Avoid the “pumping” question, which is still worse; as,

Abraham was a ———? *Ans.* Shepherd.
Wrong. He was a patri———? *Ans.* Patriarch.

This word is a sub———? *Ans.* Subject.
No. It is a substan———? *Ans.* Substantive.

10. The question must be in correct logical

form. Several cases may be distinguished, as follows:—

(1) If a particular is sought the immediate universal should appear in the question; as,

From what metal (immediate universal) are ten-dollar pieces minted? *Ans.* From *gold* (a particular).

From what *material* are bricks made? *Ans.* From clay.

(2) Avoid too great universality; as,

Where is Buffalo? *Ans.* In New York, on Lake Erie, at the western terminus of the Erie Canal, in the United States, etc. The correct form would be, In what state is Buffalo? On what lake? In what country? At the western terminus of what canal? etc.

(3) Avoid vague questions; as,

What kind of a man was Napoleon Bonaparte?
How was the battle of the Wilderness fought?

How does the dandelion grow?

Remark. — The matter is not mended by putting such questions in the form of a command; as, Tell all you can about Napoleon, the battle of the Wilderness, the dandelion.

(4) Avoid questions calling for modality in general when each case is conditioned by the point of view; as (in the Sunday School),

How shall we view the forgiveness of sins?
Ans. As possible, probable, doubtful, needful, predestined, certain, as dependent upon contrition, upon better life, etc.

Remark. — The correct form will turn the mind toward the answer desired; as, The forgiveness of sins is possible — Why? Why does the forgiveness of sins depend upon contrition?

(5) A question should not be so framed as to call for both *cause* and *effect* (ground and consequence); as,

Why are criminals punished? *Ans.* Because of unlawful deeds, to reform them, to protect society.

The better way is to call for ground and consequence in separate question; as,

On what grounds are criminals punished?
Ans. Because of unlawful deeds.

For what purpose are criminals punished?
Ans. Reformation in themselves; warning to others.

(6) When particular characteristics are called for, the question must contain both *genus* and *kind*; as,

What sort of a dwelling (*g*) is injurious to health (*k*)? *Ans.* A damp (*c*) dwelling.

What kind of an apple (*g*) sets the teeth on edge (*k*)? *Ans.* A sour (*c*) apple.

(7) When the compass of a notion is asked for, the ground of the classification must be stated in the question; as,

What classes of heavenly bodies are there,

(*a*) with respect to light?

(*b*) with respect to motion?

(*c*) with respect to magnitude?

(8) One should be sparing of questions asking for definitions (except perhaps in examinations). If definitions are desired, it is better with the younger pupils to state class and differentia in the question; as,

What is the name of the science that explains the laws of thought? *Ans.* Logic.

Remark.—Correct definitions are hard to formulate, and for children they have small didactic use, except so far as they are inductively developed and deductively applied.

11. Avoid a careless or weak use of verbs in questions. It is by means of the verb that we ask a question, for the verb is the bearer of the thought, the controller of the construction. Nothing can be asked by means of the other parts of speech. Several cautions may be given:—

(1) As before indicated, avoid the use of such colorless verbs as *be*, *have*, *become*, *happen*, and especially *do*; as,

What was he? What did he have? What did the boy become? What happened then? What did he do? Such questions can only relate to memorized matter; they have no developing power. For example, What does a man *do* when he is sick? *Ans.* Goes to bed, sends for a physician, stops work, suffers, complains, makes his will, repents of his evil deeds, fears death, ceases to earn money, etc.

(2) A question otherwise indefinite may be made definite by reference to some attendant circumstance; as,

What happened on the third of July, 1863? on the fourth of July of the same year? What occurs to the mercury of a thermometer in falling temperature?

(3) Colorless verbs may be strengthened by the addition of auxiliary clauses containing strong verbs; as,

What does the nightingale do that is pleasing to us? *Ans.* She sings. Better, By what means does the nightingale give us pleasure?

Ans. By her song.

What did Judas do because of his greed? *Ans.* He betrayed his Lord. Better, To what did greed impel Judas?

Remark.—It is usually better to avoid both colorless verb and subordinate clause by using the strong verb in a simple clause; as, What is the earth, if we have regard to its form? *Ans.* A sphere. Better, What is the form of the earth?

In general we may say that every question should tend to strengthen the pupil's mental power by inciting him to think; it should fix or extend his knowledge or increase his power of expression. Consequently the teacher should study to frame his question so as to stimulate clear, vigorous thinking; he should avoid all forms of question that tend to confusion by indefiniteness, or to mental laxity by their too

great universality. All questions, likewise, should be avoided that fail to stimulate thought in that they reveal the answer expected.

The analytical and the development questions are the most important and the most difficult. By the aid of the latter we endeavor to secure in the pupil a comprehension of generalizations in the form of conceptions, rules, and principles, which are involved in the subject matter taught; by means of analytical questions we resolve these totals into their elements, in order to find characteristics and individual facts. It is important that questions should stand in orderly and logical relations, leaving no impassable logical gaps. Questions should follow the causal order when it exists, so that one will follow naturally after, or out of, the other. It is well for the beginner occasionally to work out beforehand a set of development or analytical questions, or to write out brief catechisms, taking care not to let diverting topics and episodes lead him off the main path.

It is often important to make evident that which is contained only by implication to the pupil's knowledge, to bring to consciousness

that of which he is now unconscious, to correct misconceptions, to illuminate the obscure. Analytical questions which effect these results will often accompany or follow those designed to develop the generalizations of knowledge. Both kinds of questions will be used in discussions of lessons in literature, in foreign languages, in sciences, and in mathematics.

No teacher can question successfully by rule. Facility comes only with intelligent practice, preceded by forethought and followed by reflection. The first helps us to avoid errors; the latter helps us to correct them. In the course of time one who has a natural aptitude for teaching and who tests and corrects his own work by study and thought, will find that the art of questioning effectively has become well-nigh instinctive. Before this facility has been acquired, there is some danger of becoming pedantic. It is too much to demand a complete sentence for every answer, for what is good form in social intercourse is not bad form in the school room. If Socrates, the prince of questioners, may abbreviate question and answer, surely we, his humble successors,

may do likewise. Such questions as, Why? How? For what purpose? To what end? In what way? are often in place, saving time and promoting mental activity.

It is pedantry, also, to banish all questions that can be answered by *yes* or *no*. We need only to be sure that sufficient reason follows or sufficient experience or knowledge precedes the answer. In other words, the *yes* or *no* should not be a fortunate or an unfortunate guess.

A few general rules may be helpful to the young teacher. They may be formulated as follows:—

1. Questions should in general be directed to the class, then to an individual; or if in the development of a topic the question is directed to a given pupil, all should feel that they may have an opportunity to tell what they know or at least a responsibility to do so. Inattention begets listlessness and loss of interest.

2. Pupils should be called by name, and not merely indicated by pointing, or by such expressions as “you” or “you there.”

3. Stereotyped order in calling upon the pupils should be avoided, for obvious reasons.

The weak and the lazy, moreover, need to be called upon most, but the able need and deserve to have frequent opportunity to recite. The abler pupils may be called upon to correct and to help.

4. Questions should be asked in clear, audible tones, but shrillness and undue loudness are to be avoided, since they are the index of artificiality, even if they do not indicate a lack of culture.

5. Where the answer demands reflection, an adequate time should be granted. Unless the question is a mere call for information, it may be recast, if it does not meet with ready response.

6. When questions are put for the sake of drill, or of recitation upon memorized matter, they should be asked with force and rapidity. Children are fond of stirring exercises, especially in reciting the multiplication table or in making rapid computations or in drill upon inflections.

The answer is the natural counterpart to the question. Each would be incomplete with-

out the other. A good question deserves a good answer, although the art of securing good answers is not always practised.

So far as vocal characteristics are concerned, the answer should be made in good, clear, audible tones, corresponding in tension to the state of the teacher's mind, never in a whisper or a flutter of vocalized breath. The 'school tone' is as bad in the pupil as in the teacher, for it ruins the voice, deadens the thought, and impairs the development of character. Americans, especially of the North and East, are reputed to have the worst voices in the world; it is certain that they are often harsh, high, shrill, rasping, or nasal. Doubtless a capricious and trying climate has much to do in effecting these results; but not a little of the fault lies with the public school, where children are taught at high tension, often in chalk-laden and vitiated air. To make themselves heard in large and often noisy rooms, the pupils are admonished to "speak up," until after a time a voice, naturally musical and low, is permanently pitched to produce loud, high, and monotonous tones. The North

has public schools, bad climate, and wretched voices; the South has low, musical voices, mild climate, and public schools only one generation old. It would involve rather a nice calculation to apportion causes adequately in the two cases, but one needs only to remember one's own school days and to visit schools to convince one's self that bad use of the voice both by teacher and pupil is largely responsible for our defective voices.

If teachers would learn how to use their own voices, making them low, strong, musical, and non-nasal, and then give systematic voice culture to their pupils, our musical ability as a nation would be enhanced, and the joy of living be sensibly increased. We teach our pupils Latin and Greek in order to give them culture. To some extent our efforts are successful; but culture of the voice, which manifests itself with every utterance, is more universal in its effects and more to be admired than the culture of the intellect. In daily intercourse, who would not prefer sweet, mellow tones of voice to all the learning that could be crammed into the mind? Such a voice is

nature's best gift, especially to women, and it is art's choicest achievement. Teachers should develop both the voice consciousness and the voice conscience, a keen sensibility to the ugly in tone, and a determination that is second nature to prevent it or to eradicate it whenever it appears.

If, in asking questions which are designed to analyze or to develop a subject of thought, it is found that the pupils cannot answer readily, the teacher should scrutinize his question to find the cause of the failure. Of course, in calling for memorized matter, it may be assumed that the children do not know if they cannot answer; but a variety of causes may prevent ready response when the teacher seeks merely to unfold ideas. It may be that the class is timid, either because the surroundings are new and strange, or because the teacher himself paralyzes their efforts. Again, the pupils may be inattentive because the teacher is prolix or uninteresting, or because the air is bad or their brains are fatigued; or it is possible that they do not know the end the teacher is trying to reach, in which

case their minds are like sailboats without rudders.

Sometimes haste to answer causes errors. The young love to answer instantly, and this is no crime. In such cases the teacher may repeat the question, and await a better answer. If a pupil appears incorrigible in his rattle-brained answers, let him write them for a time upon the board or upon paper. This device secures the needed time for reflection. Should the answer be so bad as to be laughable, it is best for the teacher not to join in the laugh unless there is something really funny about it, but to try to teach him a better way to reply. Impatience should not vent itself in ridicule or scorn. Only impertinence deserves such treatment.

A topic equal in importance to the use and misuse of the voice is the development of, or the failure to develop, good English through the answers given by the pupils. With small children it is well to encourage in every way the habit of answering in full sentences, not of a stereotyped form, but such as will teach completeness and continuity of thought. With

older students the forms of good society are the most natural and effective.

Sometimes the teacher becomes reconciled to receive mere fragmentary answers to questions; as,

Where do we find the arid regions of our country? *Ans.* West.

By what means do the people supply water to the land? *Ans.* Irrigation and artesian wells.

What caused the suffering at Valley Forge? *Ans.* Lack of food and clothing.

How old was Christ when for the first time he discoursed with the doctors in the temple? *Ans.* Twelve.

The ejection of detached words does not conduce to a mastery of the English tongue. It is common for teachers to make minor or occasional corrections, without bringing about a regular connection between matter and form. It thus becomes possible for children to pass through our public schools without ever acquiring the power of connected and correct speech upon any subject. This incapacity is enhanced if the teacher never calls upon the child for

connected discourse, but relies upon questions that may be answered by very brief sentences or even by their detached fragments. Every child should have frequent incentives to answer in a group of well-articulated sentences. His training in the use of oral English should not depend upon training in subjects specifically denominated "English," but should extend to all subjects, mathematics, and science, not less than to language and literature.

However important the method of question and answer may be, it should not blind us to the need of alternating catechism with other forms of instruction. Description, narration, and exposition are not to become insignificant because the value of the question is magnified. An interchange of these methods contributes to freshness and interest. When all the music is made on one string it is sure to become monotonous.

When exposition has made a definite point, or has advanced a distinct step in the development of a subject, the question helps to reënforce what has been accomplished. It tends to

clarify the pupil's knowledge, helping him to assimilate and to remember what he has partially learned, and it lays a firmer basis for further elucidation of the subject. It is not an uncommon error to present too great masses of new knowledge, without making sure that the pupil has comprehended what has been put before him. This is particularly true in mathematics and physics, where far-reaching principles are involved, and where the mastery of each step in turn is the condition of secure advance. Nothing equals the catechetical method for helping the student to grasp each principle, and to make sure that he is not dropping out elements essential for his future progress.

There is much room for choice of method when there is partial knowledge present respecting any principle of grammar, mathematics, or science that is to be established. It should be understood that exposition takes less time than catechism, but at some sacrifice of the student's self-activity. If the teacher habitually does much and the student little, torpidity will soon become the ruling state of mind

for the pupil. On the other hand, catechism promotes self-activity, but it may easily sacrifice time. We need therefore to strike a just balance, promoting self-activity, keeping interest alive, and yet making rapid and substantial progress.

If catechism were our sole reliance, it would fail to cultivate the habit of continuous speech. For this reason we must not forget narration, while applying the mental whetstone by means of questions. In the interests of connected speech one should refrain from tripping the pupil with disconcerting questions. A race over obstacles may be diverting, but it does not conduce to steady advance. It is even better to permit the pupil to blunder through to the end of his recitation, than to interrupt him perpetually with questions calculated to obstruct the current of his thought. Sometimes teachers are so impatient to obtain immediate results that they find it impossible to wait.

A school considered by many as one of the best in the United States is that which was conducted by the late Charles L. Howard of St. Louis. Not a little of its excellence consists in

the fact that the teachers have developed the power to wait for the pupil to do his thinking. A visitor one day, having passed through this school, expressed himself as well pleased with all he had seen excepting one room, where he said everything was "dead." It chanced that during his brief stay in that room nothing was said. The teacher stood silent looking at the pupil, and the pupil stood silent looking at the floor. To outward appearances nobody was doing anything. The principal invited the visitor to go with him again to the room in question. The same class was still reciting. After listening a few moments, the visitor discovered that the pupils were engaged in numerical computations so complex and so rapid that he had difficulty in keeping up with the pace set by the children. He came to the conclusion that, though death always means silence, silence does not always mean death.

XV

INTEREST AND THINKING

IN all cases of mediate interest, as we saw in Section IV, the end and the means for reaching it do not coincide in time. A series of intervening activities separates the self and the goal toward which the self strives. We have the precise counterpart of this condition when we seek to have our pupils think.

To most readers of educational literature the admonition to make the pupil "think" brings to mind such words as *analysis* and *synthesis*, *induction* and *deduction*, or it suggests painful thoughts about the syllogism and the rules of logic. The matter, however, is not so serious, provided we divest our minds of the prevalent impression that thinking is the performance of some abstract process, presumably of great virtue, but of whose precise nature we are somewhat uncertain. All school thinking, at least of elementary grade, is

nothing more than the solution of concrete problems, in which the problem is the end to be reached, and the process of the solution is nothing more than the series of activities intervening between the self and the end desired.

As soon as school work assumes the form of problems to be solved by the self-activity of the pupils, we have at once a concrete application of the doctrine of interest, provided, of course, that we can make the end seem to the pupil worth striving for, and can render it natural for the interest to cling to the steps of the solution as well as to the attainment of the end. But it is to this form of work that children most readily respond. If supplied with suitable books of reference, what could be more delightful for members of the history class than to study out answers to such questions as the following: How did the colonists construct their first dwellings? Had they nails? locks? door-knobs? hinges? window glass? bricks? shingles? How may the beds have been constructed? the tables? the chairs? Of what were the spoons made? the plates? Were the colonists supplied with

stoves? matches? canned vegetables or fruits? How did they manage to get on without these useful articles? What kind of ploughs and other farm implements had the colonists? How did they cut and thresh their wheat and rye? What facilities had they for travel, such as roads and vehicles? Compare the guns of the colonial period with those of the present. What pleasures had these people that we perhaps lack? What hardships did they suffer that we do not have to endure? Compare the purposes of the English explorers with those of the French; the Spanish. Contrast the French settlements with those of the English. Why should the Indians often look with more favor upon the French settler than upon the English?

Teachers need not be dismayed at the thought of setting such problems before their pupils because of lack of books. In the first place, it is not so hard to get books as it once was. In many places state or city libraries are placed at the disposition of the schools. In New York and other states books are sent upon request from the state library,

and may be kept for considerable periods of time. Home libraries often contain useful books which the children may consult, or the school library may possess unexpected facilities for investigation ; or, provided none of these sources are available, the few books the teacher has, supplemented by her knowledge and resourcefulness, will enable any history class to take advantage of the method of the problem. Even if there is but one text-book to be had, and that a mere skeleton of history, the teacher may set problems daily which may be solved by mother wit, supplemented by home experience. Most men of the age of fifty know from personal experience much concerning life under primitive conditions.

Every time a pupil works out a problem, no matter how simple and concrete, he performs a genuine exercise in thinking, and, what is still more important, he conforms to the conditions of normal, healthy interest. It is the bane of much of our school work that it is prepared for unthinking mass absorption. It is adjusted to uniform consumption with just so much each day, each term. The pupil can

only memorize and recite. He has no opportunity, not to say incentive, to work things out in accordance with his own initiative, and by his own ingenuity. Thinking is, however, a vital element in genuine interest, since it contains the idea of an end to be reached by a series of activities.

It is unfortunate for the school that current misconception attaches the idea of thinking almost entirely to the enforced activity of the will. 'Voluntary' attention is thought to be the result of unpleasant effort, the dead strain of determination. Even Professor Ribot appears, from the following, to hold this erroneous opinion:¹—

"Voluntary or artificial attention is a product of art, of education, of direction, and of training. It is grafted, as it were, upon spontaneous or natural attention, and finds in the latter its condition of existence, as the graft does in the stalk into which it has been inserted. In spontaneous attention the object acts by its intrinsic power; in voluntary attention the subject acts through extrinsic, that is, through

¹ "The Psychology of Attention," p. 35.

superadded powers. In voluntary attention the aim is no longer set by hazard or circumstances; it is willed, chosen, accepted, or, at least, submitted to; it is mainly a question of adapting ourselves to it, and of finding the proper means for maintaining the state; and hence, voluntary attention is always accompanied by a certain feeling of effort. *The maximum of spontaneous attention and the maximum of voluntary attention are totally antithetic: the one running in the direction of the strongest attraction, and the other in the direction of the greatest resistance.* They constitute the two polar limits between which all possible degrees are found, with a definite point at which, in theory at least, the two forms meet."

The lines in italics express the common idea; namely, that interest has alone to do with the mental state arising from the constantly renewed stimulus that sustains involuntary or spontaneous attention; and that thought, which comes from voluntary attention, is something foreign to interest. A careful reading of Dr. Dewey's theory of interest should convince one that the com-

mon view is an erroneous one, and that interest is never so potent as when it is associated with will-impelled thought. Interest, voluntary attention, and thinking are synonymous terms, to the extent that they belong together, presupposing and supplementing one another in the solution of concrete thought problems. It is only the pressure of mass instruction that has concealed from us this intimate and important identity between interest and voluntarily directed attention to the solution of self-selected, or at all events self-welcomed, problems. It is the memorizing of ready-made answers, required or anticipated, that dulls the thought powers of the child. The story is told of a little girl who was memorizing the answers to a set of geography questions, among which was the following question accompanied by its answer: Do the stars shine by day as well as by night? *Ans.* They do. She sat with her head in her hands, swaying to and fro and repeating the answer: They do, they do, they do—they do, they do, they do. Though doubtless an exaggeration,

this incident shows how memorizing may inhibit thinking.

Nothing could be more useful to teachers desiring to utilize and develop the thought powers of the children under their charge than the study of the processes whereby scientists have found adequate explanations of facts and events that had long puzzled their predecessors. The explanation of so familiar a thing as fire baffled many a generation of thinkers. For a long time many philosophers had to content themselves with an explanation that did not explain. They fancied that a subtle, intangible, and unknown principle named *phlogiston* exists in combustible materials and is the cause of fire. So evident, however, is the fact that the attempt to explain the known by means of the unknown is a mere self-deception, that earnest thinkers never pause until they find the true cause, as they did in the case of fire. Again, it is well known that for fifteen hundred years alchemists and chemists sought a means whereby the base metals might be transmuted into gold. The persistence of

this effort was due to a defective atomic theory left us by Democritus and other ancient philosophers. They conceived that all atoms are qualitatively alike, and that bodies differ, therefore, only in the arrangement of their atoms. Were this true, there would be no absurdity in seeking so to rearrange the atoms of iron that they would form gold.

The point to be observed in these and all other efforts to find true explanations is that there is a distinct problem to be solved, a distant goal to be reached, and that the interest in the end is always carried back into the experiments and researches deemed necessary to reach the solution. The great outside macrocosm of science becomes the prototype and guiding ideal for the microcosm of the individual mind. By this it must not be inferred that the school is to become a mere after-image of the world of science, where mere shadow or imitation discoveries are to be made, and in which the discovery is only a pale repetition of what has already been accomplished. The school may, however,

borrow something of the method of science, may enjoy the same kind of motives, in that the pupil, like the scientist, has a problem, requiring the adaptation of means to end, and capable of arousing the most earnest effort, not to say enthusiasm.

Among the many problems that attracted the early attention of thinkers, and whose solution is suggestive to teachers, was the phenomenon of dew. It was a matter of universal experience, yet nobody seemed able to give a satisfactory explanation of it. The most remarkable thing about it is that there are men still living who were born before it was thoroughly understood. The Romans fancied, that since dew falls only on clear nights, it must be some sort of emanation from the distant heavens, possibly of the stars; and the Roman ladies, sharing this belief, used to bathe their faces in dew to improve their complexions. They seemed to imagine that something of the celestial radiance belonging to those remote spheres from which they thought the dew emanated would be imparted to their own countenances.

The true theory of the cause of dew was first set forth in complete form by William Charles Wells of London, in 1814. Since that time, at least three important writers, namely, Sir John Herschel, John Stuart Mill, and Alexander Bain, have used the history of the discovery of the cause of dew to illustrate the processes of thought.

The stages in the scientific aspects of this investigation are substantially as follows:—

1. It must first be clearly understood just what the problem is, namely, the explanation of the cause of the moisture that gathers upon objects at night, and which is not due to rain, fog, mist, or snow. This moisture is deposited when there is none visible in the sky, that is, on clear nights. An effect is given, therefore, whose cause it is our problem to discover.

2. The first thing that is done in nearly all efforts at discovery is to examine the attendant circumstances to see if thereby some reasonable explanation is not suggested. Two such circumstances at once occur to us: dew falls at night, and it also falls in that part of

the twenty-four hours when it is coldest. Two possible causes are therefore suggested, *darkness* and *cold*. The first of these we may at once eliminate, because on the darkest nights, when the sky is covered by clouds, dew does not usually fall; furthermore, there is no apparent likeness between moisture and the absence of light. Let us therefore examine the other attendant circumstance to see if a cause is not thereby suggested.

3. Several analogies at once occur to us. Moisture gathers when we breathe on cold glass or metal, or when we pour cold water into a glass or pitcher on a hot day, or in a hot room. It also gathers upon the window-panes of crowded rooms when the outside temperature is cold, and upon walls of outer passages when a moist thaw succeeds frost.

4. Let us therefore try cooling down various surfaces under varying conditions. Lay a thermometer on dewy grass at night, and hang another in the air at some distance above the ground. This experiment we may repeat on many successive nights. We find that it is always cooler on the grass than it is

above it. It naturally occurs to us to try the same experiment on nights when there is no dew. Here we encounter a difficulty, for the grass may still be cooler than the air above it, and yet there be no dew. Evidently there is something more than the mere difference in temperature to be taken into consideration.

5. It is a matter of common observation that dew gathers on some objects but does not upon others. Can it be that the materials themselves have anything to do with the phenomenon? Let us try various objects, such as metals, glass, stone, wood, cloth, wool, cotton, etc., with this question before us: Does the temperature of objects vary with the amount of dew they gather?

6. At this point the inquirer is aided by the researches of Sir John Leslie upon the law of the radiation of heat, which is as follows: The rate of becoming dewed varies with the *conducting power* of the substance. That is, objects that are good conductors of heat do not readily become dewed, while objects that are poor conductors gather dew in proportion to their badness as conductors.

7. Let us further inquire to what extent the character of the surface operates, the substance remaining the same. Leslie found that rough surfaces gather dew more rapidly than smooth ones, because they *radiate* internal heat more readily. In the meantime another set of experiments may be made upon texture, as seen in metals, stone, wood, velvet, eiderdown, cotton, etc. We find that compact bodies are but little dewed, whereas loose textures have much dew. Now, as regards *heat*, we find that loose bodies are bad conductors. They resist the passage of heat, and hence are suitable as clothing.

8. Gathering up the results of these experiments, we find that surfaces are cooled by a cool contact, but that, if the surface is supplied with heat from within, there can be no permanent cooling of the outside until the internal heat is exhausted. Furthermore, good radiation brings about surface cooling, but bad radiation, as in the case of polished metals, means the retention of surface heat. We come therefore to the conclusion that the thermometer would show, namely, that sur-

faces gather dew as they fall in temperature. We seem, therefore, at this stage to have found an invariable connection between dew and temperature.

9. Yet we meet a serious obstacle in the fact that the same fall of temperature does not always bring dew, since there are cool nights when none falls. It would be difficult, therefore, to establish the cause of dew by temperature experiments alone. As a matter of historic fact, the explanation was finally cleared up through the aid furnished in another department of science.

10. In 1799 Dalton published his theory of aqueous vapor, or atmosphere of steam, which was the missing link in the dew problem. He found that the vapor in the atmosphere varies according to circumstances, and that the amount the atmosphere is capable of holding depends upon temperature, to each degree of which a certain amount corresponds. An amount equal to one inch of mercury is sustained at 80° , half an inch at 59° . When the air has as much moisture as it is capable of containing it is said to be *saturated*. Then,

supposing the air to be saturated at any moment, a fall in temperature will lead to precipitation as visible moisture, but since the air is not always saturated, not every fall in temperature will bring dew or mist. The point of saturation is therefore called the dew-point.

11. These experiments upon temperature, when combined with this application of the law of aqueous humor in the atmosphere, completely explained the cause of dew, one of the puzzles of the centuries. It became possible to explain many attendant influences, like those of clouds, trees, intervening surfaces, and the like.

It is now possible for any teacher to make any child intelligent upon this subject, of which the greatest scientists were once unable to give a satisfactory account; but the educational value of this revelation to the pupil depends upon the manner in which it is made.

The first and worst method might be to present the subject after the manner of the dictionary; that is, by definition. For example:—

1. *Webster*: "Moisture from the atmosphere

condensed by cool bodies upon their surfaces, particularly at night."

2. *The Standard*: "Moisture condensed from the atmosphere and gathered in small drops upon the upper surfaces of plants and other bodies which radiate heat well, but conduct it badly; once supposed to fall like rain and still so spoken of; as, a heavy dew fell."

3. *The Century*: "The aqueous vapor which is deposited from the atmosphere by condensation, especially during the night, in the form of small drops on the surface of bodies. The formation of dew is explained by the loss of heat by bodies on the earth's surface through radiation at night, by which means they and the air immediately about them are cooled below the dew-point (which see). Dew is thus deposited on bodies which are good radiators and poor conductors of heat, like grass; hence also, it appears chiefly on calm and clear nights — that is, when the conditions are most favorable for radiation."

The obvious defect of such a method of presentation is that, even if there is intellectual comprehension of the cause of the dew, there

is, however, no thinking of the kind spoken of in this section ; since the mind formulates no problem for solution, makes no experiments, and takes no steps to demonstrate or to verify the truth of the proposition. On the contrary, the usual result is that the pupil tries to hold both fact and exposition by force of memory. At best, nothing more than clear ideas are obtained by such a method. The zest that comes from thought in solving self-set or self-accepted problems in the determination of the principles underlying cooling by radiation and the varying capacity of the atmosphere to hold water-vapor with change in temperatures is wholly lost. In other words, if we would have vividness, interest, and the verve that accompanies them, we must let the pupil live into the subject by that species of thought which involves problem and solution.

A distinction must be made between problem-setting in the grades, and problem-setting in the high school, because the leading purposes of the two stages differ. In elementary science work in general, our chief aim is not so much to master the principles underlying a wide

range of phenomena, as it is to utilize the scientific knowledge possessed by the teacher in the explanation of particular facts and events. This problem of the dew is a section of a much wider body of knowledge concerning water and its forms. In the high school we should want the student to understand this fact, and to use the study of dew as one illustration of the laws that govern evaporation and condensation of water, and conduction and radiation of heat. In other words, the high school student has the mastery of principle, law as such, for his problem, whereas the elementary pupil has for his objective point the explanation of given individual facts. In the latter case, the teacher will suggest the problem, How shall we find out the cause of dew? He will have the children try easy and striking experiments in evaporation and condensation, and will make such observations as are practicable concerning the conduction and radiation of heat. Cloth, cotton, wool, and other objects may be put out at night, and the relative amount of dew noticed in the morning. The efforts of the children to find elementary facts concerning

water and heat will serve as a basis for their lively apprehension of the more difficult points that the teacher must explain. So far as they are able, and so far as the circumstances permit, the children will thus make their contribution to the thought necessary to good understanding of the matter in hand.

With the high school student, therefore, law is the end to be reached, while the specific facts and events are the instruments whereby he is able to solve his problems by his own thought; with the elementary school student, on the other hand, the explanation of the specific fact or event is the end for which he works, while the principles of nature are the means whereby the teacher helps him to solve his problem, mostly by his own thinking. This difference between the purpose of nature work in the grades and science in the high school is a constant. It holds with almost equal validity, not only in all nature study, but also in the study of all other subjects.

Problem-setting for and by the pupils, and self-incited thought in reaching the solution, should permeate every department of school

work. It is fairly common already in number work, for this naturally assumes the form of problem and solution. Even mechanical and perfunctory solution is better than none. But where the pupil can feel that the problem is genuine and vital, not merely conventional, he works at it with the zest that belongs to all things that are thoroughly alive.

There are two problems that constantly recur in oral reading. They are: 1. What is the thought? 2. How can it be so expressed as to convey the real meaning to others? A grammar school reading class can be trained to lightning-like rapidity in the perception of meaning involved in a given rendering. If the meaning suggested by the reading of one pupil differs from their own conception, the other pupils are eager to show, by reading, just what their notion of the text is. When opportunity is given for such expression of thought, each member of the class is kept keenly alert to detect both misconceptions and new insights by the other members. The whole class might agree as to the calling of the words of a paragraph, and yet no two

agree that the true meaning has been expressed by any particular reader. The writer listened, not long since, to an actor as he recited the lines of the banished king in "As You Like It." The man had maturity, good form and face, and a voice full of deep, mellow music; but alas! he was unable to convey accurately the simple ideas of that part. A well-drilled child of twelve could have corrected him upon almost every line. The most obvious meanings were obscured or entirely perverted by this actor, who had never learned how to distinguish shades of meaning by shades of emphasis and inflection.

Problem-setting and problem-solving of the kinds here described are fascinating alike to teacher and pupil, for each feels that he is dealing with a real not a simulated situation, and the mental powers are all healthfully excited. When children's minds are thus active, one may almost see and feel them grow.

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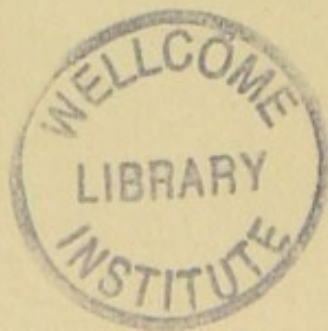
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