



Intellectual Education Herbert Spencer

There cannot fail to be a relationship between the successive systems of education, and the successive social states with which they have co-existed. Having a common origin in the national mind, the institutions of each epoch, whatever be their special functions, must have a family likeness. When men received their creed and its interpretations from an infallible authority deigning no explanations, it was natural that the teaching of children should be purely dogmatic. While “believe and ask no questions” was the maxim of the Church, it was fitly the maxim of the school. Conversely, now that Protestantism has gained for adults a right of private judgment and established the practice of appealing to reason, there is harmony in the change that has made juvenile instruction a process of exposition addressed to the understanding. Along with political despotism, stern in its commands, ruling by force of terror, visiting trifling crimes with death, and implacable in its vengeance on the disloyal, there necessarily grew up an academic discipline similarly harsh—a discipline of multiplied injunctions and blows for every breach of them—a discipline of unlimited autocracy upheld by rods, and ferules, and the black-hole. On the other hand, the increase of political liberty, the abolition of laws restricting individual action, and the amelioration of the criminal code, have been accompanied by a kindred progress towards non-coercive education: the pupil is hampered by fewer restraints, and other means than punishments are used to govern him. In those ascetic days when men, acting on the greatest-misery principle, held that the more gratifications they denied themselves the more virtuous they were, they, as a matter of course, considered that the best education which most thwarted the wishes of their children, and cut short all spontaneous activity with—“You mustn’t do so.” While, on the contrary, now that happiness is coming to be regarded as a legitimate aim—now that hours of labour are being shortened and popular recreations provided—parents and teachers are beginning to see that most childish desires may rightly be gratified, that childish sports should be encouraged, and that the tendencies of the growing mind are not altogether so diabolical as was supposed. The age in which all believed that trades must be established by bounties and prohibitions; that manufacturers needed their materials and qualities and prices to be prescribed; and that the value of money could be determined by law; was an age which unavoidably cherished the notions that a child’s mind could be made to order; that its powers were to be imparted by the schoolmaster; that it was a receptacle into which knowledge was to be put, and there built up after the teacher’s ideal. In this free-trade era, however, when we are learning that there is much more self-regulation in things than was supposed; that labour, and commerce, and agriculture, and navigation, can do better without management than with it; that political governments, to be efficient, must grow up from within and not be imposed from without; we are also being taught that there is a natural process of mental evolution which is not to be disturbed without injury; that we may not force on the unfolding mind our artificial forms; but that psychology, also, discloses to us a law of supply and demand to which, if we would not do harm, we must conform. Thus, alike in its oracular dogmatism, in its harsh discipline, in its multiplied restrictions, in its professed asceticism, and in its faith in the devices of men, the old educational regime was akin to the social systems with which it was contemporaneous; and similarly, in the reverse of these characteristics, our modern modes of culture correspond to our more liberal religious and political institutions.

But there remain further parallelisms to which we have not yet adverted: that, namely, between the processes by which these respective changes have been wrought out; and that

between the several states of heterogeneous opinion to which they have led. Some centuries ago there was uniformity of belief—religious, political, and educational. All men were Romanists, all were Monarchists, all were disciples of Aristotle; and no one thought of calling in question that grammar-school routine under which all were brought up. The same agency has in each case replaced this uniformity by a constantly-increasing diversity. That tendency towards assertion of the individuality, which, after contributing to produce the great Protestant movement, has since gone on to produce an ever-increasing number of sects—that tendency which initiated political parties, and out of the two primary ones has, in these modern days, evolved a multiplicity to which every year adds—that tendency which led to the Baconian rebellion against the schools, and has since originated here and abroad, sundry new systems of thought—is a tendency which, in education also, has caused divisions and the accumulation of methods. As external consequences of the same internal change, these processes have necessarily been more or less simultaneous. The decline of authority, whether papal, philosophic, kingly, or tutorial, is essentially one phenomenon; in each of its aspects a leaning towards free action is seen alike in the working out of the change itself, and in the new forms of theory and practice to which the change has given birth.

While many will regret this multiplication of schemes of juvenile culture, the catholic observer will discern in it a means of ensuring the final establishment of a rational system. Whatever may be thought of theological dissent, it is clear that dissent in education results in facilitating inquiry by the division in labour. Were we in possession of the true method, divergence from it would, of course, be prejudicial; but the true method having to be found, the efforts of numerous independent seekers carrying out their researches in different directions, constitute a better agency for finding it than any that could be devised. Each of them struck by some new thought which probably contains more or less of basis in facts—each of them zealous on behalf of his plan, fertile in expedients to test its correctness, and untiring in his efforts to make known its success—each of them merciless in his criticism on the rest; there cannot fail, by composition of forces, to be a gradual approximation of all towards the right course. Whatever portion of the normal method any one has discovered, must, by the constant exhibition of its results, force itself into adoption; whatever wrong practices he has joined with it must, by repeated experiment and failure, be exploded. And by this aggregation of truths and elimination of errors, there must eventually be developed a correct and complete body of doctrine. Of the three phases through which human opinion passes—the unanimity of the ignorant, the disagreement of the inquiring, and the unanimity of the wise—it is manifest that the second is the parent of the third. They are not sequences in time only, they are sequences in causation. However impatiently, therefore, we may witness the present conflict of educational systems, and however much we may regret its accompanying evils, we must recognise it as a transition stage needful to be passed through, and beneficent in its ultimate effects.

Meanwhile, may we not advantageously take stock of our progress? After fifty years of discussion, experiment, and comparison of results, may we not expect a few steps towards the goal to be already made good? Some old methods must by this time have fallen out of use; some new ones must have become established; and many others must be in process of general abandonment or adoption. Probably we may see in these various changes, when put side by side, similar characteristics—may find in them a common tendency; and so, by inference, may get a clue to the direction in which experience is leading us, and gather hints how we may achieve yet further improvements. Let us then, as a preliminary to a deeper consideration of the matter, glance at the leading contrasts between the education of the past and that of the present.

The suppression of every error is commonly followed by a temporary ascendancy of the

contrary one; and so it happened, that after the ages when physical development alone was aimed at, there came an age when culture of the mind was the sole solicitude—when children had lesson-books put before them at between two and three years old, and the getting of knowledge was thought the one thing needful. As, further, it usually happens that after one of these reactions the next advance is achieved by co-ordinating the antagonist errors, and perceiving that they are opposite sides of one truth; so, we are now coming to the conviction that body and mind must both be cared for, and the whole thing being unfolded. The forcing-system has been, by many, given up; and precocity is discouraged. People are beginning to see that the first requisite to success in life, is to be a good animal. The best brain is found of little service, if there be not enough vital energy to work it; and hence to obtain the one by sacrificing the source of the other, is now considered a folly—a folly which the eventual failure of juvenile prodigies constantly illustrates. Thus we are discovering the wisdom of the saying, that one secret in education is “to know how wisely to lose time.”

The once universal practice of learning by rote, is daily falling more into discredit. All modern authorities condemn the old mechanical way of teaching the alphabet. The multiplication table is now frequently taught experimentally. In the acquirement of languages, the grammar-school plan is being superseded by plans based on the spontaneous process followed by the child in gaining its mother tongue. Describing the methods there used, the “Reports on the Training School at Battersea” say:—“The instruction in the whole preparatory course is chiefly oral, and is illustrated as much as possible by appeals to nature.” And so throughout. The rote-system, like ether systems of its age, made more of the forms and symbols than of the things symbolised. To repeat the words correctly was everything; to understand their meaning nothing; and thus the spirit was sacrificed to the letter. It is at length perceived that, in this case as in others, such a result is not accidental but necessary—that in proportion as there is attention to the signs, there must be inattention to the things signified; or that, as Montaigne long ago said—*Sçavoir par cœur n'est pas sçavoir*.

Along with rote-teaching, is declining also the nearly-allied teaching by rules. The particulars first, and then the generalisation, is the new method—a method, as the Battersea School Reports remarks, which, though “the reverse of the method usually followed, which consists in giving the pupil the rule first,” is yet proved by experience to be the right one. Rule-teaching is now condemned as imparting a merely empirical knowledge—as producing an appearance of understanding without the reality. To give the net product of inquiry, without the inquiry that leads to it, is found to be both enervating and inefficient. General truths to be of due and permanent use, must be earned. “Easy come easy go,” is a saying as applicable to knowledge as to wealth. While rules, lying isolated in the mind—not joined to its other contents as out-growths from them—are continually forgotten; the principles which those rules express piecemeal, become, when once reached by the understanding, enduring possessions. While the rule-taught youth is at sea when beyond his rules, the youth instructed in principles solves a new case as readily as an old one. Between a mind of rules and a mind of principles, there exists a difference such as that between a confused heap of materials, and the same materials organised into a complete whole, with all its parts bound together. Of which types this last has not only the advantage that its constituent parts are better retained, but the much greater advantage that it forms an efficient agent for inquiry, for independent thought, for discovery—ends for which the first is useless. Nor let it be supposed that this is a simile only: it is the literal truth. The union of facts into generalisations *is* the organisation of knowledge, whether considered as an objective phenomenon or a subjective one; and the mental grasp may be measured by the extent to which this organisation is carried.

From the substitution of principles for rules, and the necessarily co-ordinate practice of

leaving abstractions untaught till the mind has been familiarised with the facts from which they are abstracted, has resulted the postponement of some once early studies to a late period. This is exemplified in the abandonment of that intensely stupid custom, the teaching of grammar to children. As M. Marcel says:—"It may without hesitation be affirmed that grammar is not the stepping-stone, but the finishing instrument." As Mr. Wyse argues:—"Grammar and Syntax are a collection of laws and rules. Rules are gathered from practice; they are the results of induction to which we come by long observation and comparison of facts. It is, in fine, the science, the philosophy of language. In following the process of nature, neither individuals nor nations ever arrive at the science *first*. A language is spoken, and poetry written, many years before either a grammar or prosody is even thought of. Men did not wait till Aristotle had constructed his logic, to reason." In short, as grammar was made after language, so ought it to be taught after language: an inference which all who recognise the relationship between the evolution of the race and that of the individual, will see to be unavoidable.

Of new practices that have grown up during the decline of these old ones, the most important is the systematic culture of the powers of observation. After long ages of blindness, men are at last seeing that the spontaneous activity of the observing faculties in children has a meaning and a use. What was once thought mere purposeless action, or play, or mischief, as the case might be, is now recognised as the process of acquiring a knowledge on which all after-knowledge is based. Hence the well-conceived but ill-conducted system of *object-lessons*. The saying of Bacon, that physics is the mother of the sciences, has come to have a meaning in education. Without an accurate acquaintance with the visible and tangible properties of things, our conceptions must be erroneous, our inferences fallacious, and our operations unsuccessful. "The education of the senses neglected, all after education partakes of a drowsiness, a haziness, an insufficiency, which it is impossible to cure." Indeed, if we consider it, we shall find that exhaustive observation is an element in all great success. It is not to artists, naturalists, and men of science only, that it is needful; it is not only that the physician depends on it for the correctness of his diagnosis, and that to the engineer it is so important that some years in the workshop are prescribed for him; but we may see that the philosopher, also, is fundamentally one who *observes* relationships of things which others had overlooked, and that the poet, too, is one who *sees* the fine facts in nature which all recognise when pointed out, but did not before remark. Nothing requires more to be insisted on than that vivid and complete impressions are all-essential. No sound fabric of wisdom can be woven out of a rotten raw-material.

While the old method of presenting truths in the abstract has been falling out of use, there has been a corresponding adoption of the new method of presenting them in the concrete. The rudimentary facts of exact science are now being learnt by direct intuition, as textures, and tastes, and colours are learnt. Employing the ball-frame for first lessons in arithmetic exemplifies this. It is well illustrated, too, in Professor De Morgan's mode of explaining the decimal notation. M. Marcel, rightly repudiating the old system of tables, teaches weights and measures by referring to the actual yard and foot, pound and ounce, gallon and quart; and lets the discovery of their relationships be experimental. The use of geographical models and models of the regular bodies, etc., as introductory to geography and geometry respectively, are facts of the same class. Manifestly, a common trait of these methods is, that they carry each child's mind through a process like that which the mind of humanity at large has gone through. The truths of number, of form, of relationship in position, were all originally drawn from objects; and to present these truths to the child in the concrete is to let him learn them as the race learnt them. By and by, perhaps, it will be seen that he cannot possibly learn them in any other way; for that if he is made to repeat them as abstractions, the abstractions can have no meaning for him, until he finds that they are simply statements of what he intuitively discerns.

But of all the changes taking place, the most significant is the growing desire to make the acquirement of knowledge pleasurable rather than painful—a desire based on the more or less distinct perception, that at each age the intellectual action which a child likes is a healthful one for it; and conversely. There is a spreading opinion that the rise of an appetite for any kind of information implies that the unfolding mind has become fit to assimilate it, and needs it for purposes of growth; and that, on the other hand, the disgust felt towards such information is a sign either that it is prematurely presented, or that it is presented in an indigestible form. Hence the efforts to make early education amusing, and all education interesting. Hence the lectures on the value of play. Hence the defence of nursery rhymes and fairy tales. Daily we more and more conform our plans to juvenile opinion. Does the child like this or that kind of teaching?—does he take to it? we constantly ask. “His natural desire of variety should be indulged,” says M. Marcel; “and the gratification of his curiosity should be combined with his improvement.” “Lessons,” he again remarks, “should cease before the child evinces symptoms of weariness.” And so with later education. Short breaks during school-hours, excursions into the country, amusing lectures, choral songs—in these and many like traits the change may be discerned. Asceticism is disappearing out of education as out of life; and the usual test of political legislation—its tendency to promote happiness—is beginning to be, in a great degree, the test of legislation for the school and the nursery.

What now is the common characteristic of these several changes? Is it not an increasing conformity to the methods of Nature? The relinquishment of early forcing, against which Nature rebels, and the leaving of the first years for exercise of the limbs and senses, show this. The superseding of rote-learned lessons by lessons orally and experimentally given, like those of the field and play-ground, shows this. The disuse of rule-teaching, and the adoption of teaching by principles—that is, the leaving of generalisations until there are particulars to base them on—show this. The system of object-lessons shows this. The teaching of the rudiments of science in the concrete instead of the abstract, shows this. And above all, this tendency is shown in the variously-directed efforts to present knowledge in attractive forms, and so to make the acquirement of it pleasurable. For, as it is the order of Nature in all creatures that the gratification accompanying the fulfilment of needful functions serves as a stimulus to their fulfilment—as, during the self-education of the young child, the delight taken in the biting of corals and the pulling to pieces of toys, becomes the prompter to actions which teach it the properties of matter; it follows that, in choosing the succession of subjects and the modes of instruction which most interest the pupil, we are fulfilling Nature’s behests, and adjusting our proceedings to the laws of life.

Thus, then, we are on the highway towards the doctrine long ago enunciated by Pestalozzi, that alike in its order and its methods, education must conform to the natural process of mental evolution—that there is a certain sequence in which the faculties spontaneously develop, and a certain kind of knowledge which each requires during its development; and that it is for us to ascertain this sequence, and supply this knowledge. All the improvements above alluded to are partial applications of this general principle. A nebulous perception of it now prevails among teachers; and it is daily more insisted on in educational works. “The method of nature is the archetype of all methods,” says M. Marcel. “The vital principle in the pursuit is to enable the pupil rightly to instruct himself,” writes Mr. Wyse. The more science familiarises us with the constitution of things, the more do we see in them an inherent self-sufficingness. A higher knowledge tends continually to limit our interference with the processes of life. As in medicine the old “heroic treatment” has given place to mild treatment, and often no treatment save a normal regimen—as we have found that it is not needful to mould the bodies of babes by bandaging them in papoose-fashion or otherwise—as in gaols it is being discovered that no

cunningly-devised discipline of ours is so efficient in producing reformation as the natural discipline of self-maintenance by productive labour; so in education, we are finding that success is to be achieved only by making our measures subservient to that spontaneous unfolding which all minds go through in their progress to maturity.

Of course, this fundamental principle of tuition, that the arrangement of matter and method must correspond with the order of evolution and mode of activity of the faculties—a principle so obviously true, that once stated it seems almost self-evident—has never been wholly disregarded. Teachers have unavoidably made their school-courses coincide with it in some degree, for the simple reason that education is possible only on that condition. Boys were never taught the rule-of-three until after they had learnt addition. They were not set to write exercises before they had got into their copybooks. Conic sections have always been preceded by Euclid. But the error of the old methods consists in this, that they do not recognise in detail what they are obliged to recognise in general. Yet the principle applies throughout. If from the time when a child is able to conceive two things as related in position, years must elapse before it can form a true concept of the Earth, as a sphere made up of land and sea, covered with mountains, forests, rivers, and cities, revolving on its axis, and sweeping round the Sun—if it gets from the one concept to the other by degrees—if the intermediate concepts which it forms are consecutively larger and more complicated; is it not manifest that there is a general succession through which alone it can pass; that each larger concept is made by the combination of smaller ones, and presupposes them; and that to present any of these compound concepts before the child is in possession of its constituent ones, is only less absurd than to present the final concept of the series before the initial one? In the mastering of every subject some course of increasingly complex ideas has to be gone through. The evolution of the corresponding faculties consists in the assimilation of these; which, in any true sense, is impossible without they are put into the mind in the normal order. And when this order is not followed, the result is, that they are received with apathy or disgust; and that unless the pupil is intelligent enough eventually to fill up the gaps himself, they lie in his memory as dead facts, capable of being turned to little or no use.

“But why trouble ourselves about any *curriculum* at all?” it may be asked. “If it be true that the mind like the body has a predetermined course of evolution—if it unfolds spontaneously—if its successive desires for this or that kind of information arise when these are severally required for its nutrition—if there thus exists in itself a prompter to the right species of activity at the right time; why interfere in any way? Why not leave children *wholly* to the discipline of nature?—why not remain quite passive and let them get knowledge as they best can?—why not be consistent throughout?” This is an awkward-looking question. Plausibly implying as it does, that a system of complete *laissez-faire* is the logical outcome of the doctrines set forth, it seems to furnish a disproof of them by *reductio ad absurdum*. In truth, however, they do not, when rightly understood, commit us to any such untenable position. A glance at the physical analogies will clearly show this. It is a general law of life that the more complex the organism to be produced, the longer the period during which it is dependent on a parent organism for food and protection. The difference between the minute, rapidly-formed, and self-moving spore of a conferva, and the slowly-developed seed of a tree, with its multiplied envelopes and large stock of nutriment laid by to nourish the germ during its first stages of growth, illustrates this law in its application to the vegetal world. Among animals we may trace it in a series of contrasts from the monad whose spontaneously-divided halves are as self-sufficing the moment after their separation as was the original whole; up to man, whose offspring not only passes through a protracted gestation, and subsequently long depends on the breast for sustenance; but after that must have its food artificially administered; must, when it has learned to feed itself, continue

to have bread, clothing, and shelter provided; and does not acquire the power of complete self-support until a time varying from fifteen to twenty years after its birth. Now this law applies to the mind as to the body. For mental pabulum also, every higher creature, and especially man, is at first dependent on adult aid. Lacking the ability to move about, the babe is almost as powerless to get materials on which to exercise its perceptions as it is to get supplies for its stomach. Unable to prepare its own food, it is in like manner unable to reduce many kinds of knowledge to a fit form for assimilation. The language through which all higher truths are to be gained, it wholly derives from those surrounding it. And we see in such an example as the Wild Boy of Aveyron, the arrest of development that results when no help is received from parents and nurses. Thus, in providing from day to day the right kind of facts, prepared in the right manner, and giving them in due abundance at appropriate intervals, there is as much scope for active ministrations to a child's mind as to its body. In either case, it is the chief function of parents to see that the *conditions* requisite to growth are maintained. And as, in supplying aliment, and clothing, and shelter, they may fulfil this function without at all interfering with the spontaneous development of the limbs and viscera, either in their order or mode; so, they may supply sounds for imitation, objects for examination, books for reading, problems for solution, and, if they use neither direct nor indirect coercion, may do this without in any way disturbing the normal process of mental evolution; or rather, may greatly facilitate that process. Hence the admission of the doctrines enunciated does not, as some might argue, involve the abandonment of teaching; but leaves ample room for an active and elaborate course of culture.

Passing from generalities to special considerations, it is to be remarked that in practice the Pestalozzian system seems scarcely to have fulfilled the promise of its theory. We hear of children not at all interested in its lessons,—disgusted with them rather; and, so far as we can gather, the Pestalozzian school have not turned out any unusual proportion of distinguished men: if even they have reached the average. We are not surprised at this. The success of every appliance depends mainly upon the intelligence with which it is used. It is a trite remark that, having the choicest tools, an unskilful artisan will botch his work; and bad teachers will fail even with the best methods. Indeed, the goodness of the method becomes in such case a cause of failure; as, to continue the simile, the perfection of the tool becomes in undisciplined hands a source of imperfection in results. A simple, unchanging, almost mechanical routine of tuition, may be carried out by the commonest intellects, with such small beneficial effect as it is capable of producing; but a complete system—a system as heterogeneous in its appliances as the mind in its faculties—a system proposing a special means for each special end, demands for its right employment powers such as few teachers possess. The mistress of a dame-school can hear spelling-lessons; and any hedge-schoolmaster can drill boys in the multiplication-table. But to teach spelling rightly by using the powers of the letters instead of their names, or to instruct in numerical combinations by experimental synthesis, a modicum of understanding is needful; and to pursue a like rational course throughout the entire range of studies, asks an amount of judgment, of invention, of intellectual sympathy, of analytical faculty, which we shall never see applied to it while the tutorial official is held in such small esteem. True education is practicable only by a true philosopher. Judge, then, what prospect a philosophical method now has of being acted out! Knowing so little as we yet do of psychology, and ignorant as our teachers are of that little, what chance has a system which requires psychology for its basis?

Further hindrance and discouragement has arisen from confounding the Pestalozzian principle with the forms in which it has been embodied. Because particular plans have not answered expectation, discredit has been cast upon the doctrine associated with them: no inquiry being made whether these plans truly conform to the doctrine. Judging as usual by the

concrete rather than the abstract, men have blamed the theory for the bunglings of the practice. It is as though the first futile attempt to construct a steam-engine had been held to prove that steam could not be used as a motive power. Let it be constantly borne in mind that while right in his fundamental ideas, Pestalozzi was not therefore right in all his applications of them. As described even by his admirers, Pestalozzi was a man of partial intuitions—a man who had occasional flashes of insight rather than a man of systematic thought. His first great success at Stantz was achieved when he had no books or appliances of ordinary teaching, and when “the only object of his attention was to find out at each moment what instruction his children stood peculiarly in need of, and what was the best manner of connecting it with the knowledge they already possessed.” Much of his power was due, not to calmly reasoned-out plans of culture, but to his profound sympathy, which gave him a quick perception of childish needs and difficulties. He lacked the ability logically to co-ordinate and develop the truths which he thus from time to time laid hold of; and had in great measure to leave this to his assistants, Kruesi, Tobler, Buss, Niederer, and Schmid. The result is, that in their details his own plans, and those vicariously devised, contain numerous crudities and inconsistencies. His nursery-method, described in *The Mother's Manual*, beginning as it does with a nomenclature of the different parts of the body, and proceeding next to specify their relative positions, and next their connections, may be proved not at all in accordance with the initial stages of mental evolution. His process of teaching the mother-tongue by formal exercises in the meanings of words and in the construction of sentences, is quite needless, and must entail on the pupil loss of time, labour, and happiness. His proposed lessons in geography are utterly unpestalozzian. And often where his plans are essentially sound, they are either incomplete or vitiated by some remnant of the old regime. While, therefore, we would defend in its entire extent the general doctrine which Pestalozzi inaugurated, we think great evil likely to result from an uncritical reception of his specific methods. That tendency, constantly exhibited by mankind, to canonise the forms and practices along with which any great truth has been bequeathed to them—their liability to prostrate their intellects before the prophet, and swear by his every word—their proneness to mistake the clothing of the idea for the idea itself; renders it needful to insist strongly upon the distinction between the fundamental principle of the Pestalozzian system, and the set of expedients devised for its practice; and to suggest that while the one may be considered as established, the other is probably nothing but an adumbration of the normal course. Indeed, on looking at the state of our knowledge, we may be quite sure that is the case. Before educational methods can be made to harmonise in character and arrangement with the faculties in their mode and order of unfolding, it is first needful that we ascertain with some completeness how the faculties *do* unfold. At present we have acquired, on this point, only a few general notions. These general notions must be developed in detail—must be transformed into a multitude of specific propositions, before we can be said to possess that *science* on which the *art* of education must be based. And then, when we have definitely made out in what succession and in what combinations the mental powers become active, it remains to choose out of the many possible ways of exercising each of them, that which best conforms to its natural mode of action. Evidently, therefore, it is not to be supposed that even our most advanced modes of teaching are the right ones, or nearly the right ones.

Bearing in mind then this distinction between the principle and the practice of Pestalozzi, and inferring from the grounds assigned that the last must necessarily be very defective, the reader will rate at its true worth the dissatisfaction with the system which some have expressed; and will see that the realisation of the Pestalozzian idea remains to be achieved. Should he argue, however, from what has just been said, that no such realisation is at present practicable, and that all effort ought to be devoted to the preliminary inquiry; we reply, that though it is not possible

for a scheme of culture to be perfected either in matter or form until a rational psychology has been established, it is possible, with the aid of certain guiding principles, to make empirical approximations towards a perfect scheme. To prepare the way for further research we will now specify these principles. Some of them have been more or less distinctly implied in the foregoing pages; but it will be well here to state them all in logical order.

1. That in education we should proceed from the simple to the complex, is a truth which has always been to some extent acted upon: not professedly, indeed, nor by any means consistently. The mind develops. Like all things that develop it progresses from the homogeneous to the heterogeneous; and a normal training system, being an objective counterpart of this subjective process, must exhibit a like progression. Moreover, thus interpreting it, we may see that this formula has much wider application than at first appears. For its *rationale* involves, not only that we should proceed from the single to the combined in the teaching of each branch of knowledge; but that we should do the like with knowledge as a whole. As the mind, consisting at first of but few active faculties, has its later-completed faculties successively brought into play, and ultimately comes to have all its faculties in simultaneous action; it follows that our teaching should begin with but few subjects at once, and successively adding to these, should finally carry on all subjects abreast. Not only in its details should education proceed from the simple to the complex, but in its *ensemble* also.

2. The development of the mind, as all other development, is an advance from the indefinite to the definite. In common with the rest of the organism, the brain reaches its finished structure only at maturity; and in proportion as its structure is unfinished, its actions are wanting in precision. Hence like the first movements and the first attempts at speech, the first perceptions and thoughts are extremely vague. As from a rudimentary eye, discerning only the difference between light and darkness, the progress is to an eye that distinguishes kinds and gradations of colour, and details of form, with the greatest exactness; so, the intellect as a whole and in each faculty, beginning with the rudest discriminations among objects and actions, advances towards discriminations of increasing nicety and distinctness. To this general law our educational course and methods must conform. It is not practicable, nor would it be desirable if practicable, to put precise ideas into the undeveloped mind. We may indeed at an early age communicate the verbal forms in which such ideas are wrapped up; and teachers, who habitually do this, suppose that when the verbal forms have been correctly learnt, the ideas which should fill them have been acquired. But a brief cross-examination of the pupil proves the contrary. It turns out either that the words have been committed to memory with little or no thought about their meaning, or else that the perception of their meaning which has been gained is a very cloudy one. Only as the multiplication of experiences gives materials for definite conceptions—only as observation year by year discloses the less conspicuous attributes which distinguish things and processes previously confounded together—only as each class of co-existences and sequences becomes familiar through the recurrence of cases coming under it—only as the various classes of relations get accurately marked off from each other by mutual limitation, can the exact definitions of advanced knowledge become truly comprehensible. Thus in education we must be content to set out with crude notions. These we must aim to make gradually clearer by facilitating the acquisition of experiences such as will correct, first their greatest errors, and afterwards their successively less marked errors. And the scientific formulæ must be given only as fast as the conceptions are perfected.

3. To say that our lessons ought to start from the concrete and end in the abstract, may be considered as in part a repetition of the first of the foregoing principles. Nevertheless it is a maxim that must be stated: if with no other view, then with the view of showing in certain cases what are truly the simple and the complex. For unfortunately there has been much

misunderstanding on this point. General formulas which men have devised to express groups of details, and which have severally simplified their conceptions by uniting many facts into one fact, they have supposed must simplify the conceptions of a child also. They have forgotten that a generalisation is simple only in comparison with the whole mass of particular truths it comprehends—that it is more complex than any one of these truths taken singly—that only after many of these single truths have been acquired does the generalisation ease the memory and help the reason—and that to a mind not possessing these single truths it is necessarily a mystery. Thus confounding two kinds of simplification, teachers have constantly erred by setting out with “first principles”: a proceeding essentially, though not apparently, at variance with the primary rule; which implies that the mind should be introduced to principles through the medium of examples, and so should be led from the particular to the general—from the concrete to the abstract.

4. The education of the child must accord both in mode and arrangement with the education of mankind, considered historically. In other words, the genesis of knowledge in the individual must follow the same course as the genesis of knowledge in the race. In strictness, this principle may be considered as already expressed by implication; since both, being processes of evolution, must conform to those same general laws of evolution above insisted on, and must therefore agree with each other. Nevertheless this particular parallelism is of value for the specific guidance it affords. To M. Comte we believe society owes the enunciation of it; and we may accept this item of his philosophy without at all committing ourselves to the rest. This doctrine may be upheld by two reasons, quite independent of any abstract theory; and either of them sufficient to establish it. One is deducible from the law of hereditary transmission as considered in its wider consequences. For if it be true that men exhibit likeness to ancestry, both in aspect and character—if it be true that certain mental manifestations, as insanity, occur in successive members of the same family at the same age—if, passing from individual cases in which the traits of many dead ancestors mixing with those of a few living ones greatly obscure the law, we turn to national types, and remark how the contrasts between them are persistent from age to age—if we remember that these respective types came from a common stock, and that hence the present marked differences between them must have arisen from the action of modifying circumstances upon successive generations who severally transmitted the accumulated effects to their descendants—if we find the differences to be now organic, so that a French child grows into a French man even when brought up among strangers—and if the general fact thus illustrated is true of the whole nature, intellect inclusive; then it follows that if there be an order in which the human race has mastered its various kinds of knowledge, there will arise in every child an aptitude to acquire these kinds of knowledge in the same order. So that even were the order intrinsically indifferent, it would facilitate education to lead the individual mind through the steps traversed by the general mind. But the order is *not* intrinsically indifferent; and hence the fundamental reason why education should be a repetition of civilisation in little. It is provable both that the historical sequence was, in its main outlines, a necessary one; and that the causes which determined it apply to the child as to the race. Not to specify these causes in detail, it will suffice here to point out that as the mind of humanity placed in the midst of phenomena and striving to comprehend them, has, after endless comparisons, speculations, experiments, and theories, reached its present knowledge of each subject by a specific route; it may rationally be inferred that the relationship between mind and phenomena is such as to prevent this knowledge from being reached by any other route; and that as each child’s mind stands in this same relationship to phenomena, they can be accessible to it only through the same route. Hence in deciding upon the right method of education, an inquiry into the method of civilisation will help to guide us.

5. One of the conclusions to which such an inquiry leads, is, that in each branch of instruction we should proceed from the empirical to the rational. During human progress, every science is evolved out of its corresponding art. It results from the necessity we are under, both individually and as a race, of reaching the abstract by way of the concrete, that there must be practice and an accruing experience with its empirical generalisation, before there can be science. Science is organised knowledge; and before knowledge can be organised, some of it must be possessed. Every study, therefore, should have a purely experimental introduction; and only after an ample fund of observations has been accumulated, should reasoning begin. As illustrative applications of this rule, we may instance the modern course of placing grammar, not before language, but after it; or the ordinary custom of prefacing perspective by practical drawing. By and by further applications of it will be indicated.

6. A second corollary from the foregoing general principle, and one which cannot be too strenuously insisted on, is, that in education the process of self-development should be encouraged to the uttermost. Children should be led to make their own investigations, and to draw their own inferences. They should be *told* as little as possible, and induced to *discover* as much as possible. Humanity has progressed solely by self-instruction; and that to achieve the best results, each mind must progress somewhat after the same fashion, is continually proved by the marked success of self-made men. Those who have been brought up under the ordinary school-drill, and have carried away with them the idea that education is practicable only in that style, will think it hopeless to make children their own teachers. If, however, they will consider that the all-important knowledge of surrounding objects which a child gets in its early years is got without help—if they will remember that the child is self-taught in the use of its mother tongue—if they will estimate the amount of that experience of life, that out-of-school wisdom, which every boy gathers for himself—if they will mark the unusual intelligence of the uncared-for London *gamin*, as shown in whatever directions his faculties have been tasked—if, further, they will think how many minds have struggled up unaided, not only through the mysteries of our irrationally-planned *curriculum*, but through hosts of other obstacles besides; they will find it a not unreasonable conclusion that if the subjects be put before him in right order and right form, any pupil of ordinary capacity will surmount his successive difficulties with but little assistance. Who indeed can watch the ceaseless observation, and inquiry, and inference going on in a child's mind, or listen to its acute remarks on matters within the range of its faculties, without perceiving that these powers it manifests, if brought to bear systematically upon studies *within the same range*, would readily master them without help? This need for perpetual telling results from our stupidity, not from the child's. We drag it away from the facts in which it is interested, and which it is actively assimilating of itself. We put before it facts far too complex for it to understand; and therefore distasteful to it. Finding that it will not voluntarily acquire these facts, we thrust them into its mind by force of threats and punishment. By thus denying the knowledge it craves, and cramming it with knowledge it cannot digest, we produce a morbid state of its faculties; and a consequent disgust for knowledge in general. And when, as a result partly of the stolid indolence we have brought on, and partly of still-continued unfitness in its studies, the child can understand nothing without explanation, and becomes a mere passive recipient of our instruction, we infer that education must necessarily be carried on thus. Having by our method induced helplessness, we make the helplessness a reason for our method. Clearly then, the experience of pedagogues cannot rationally be quoted against the system we are advocating. And whoever sees this, will see that we may safely follow the discipline of Nature throughout—may, by a skilful ministrations, make the mind as self-developing in its later stages as it is in its earlier ones; and that only by doing this can we produce the highest power and activity.

7. As a final test by which to judge any plan of culture, should come the question,—Does it create a pleasurable excitement in the pupils? When in doubt whether a particular mode or arrangement is or is not more in harmony with the foregoing principles than some other, we may safely abide by this criterion. Even when, as considered theoretically, the proposed course seems the best, yet if it produces no interest, or less interest than some other course, we should relinquish it; for a child's intellectual instincts are more trustworthy than our reasonings. In respect to the knowing-faculties, we may confidently trust in the general law, that under normal conditions, healthful action is pleasurable, while action which gives pain is not healthful. Though at present very incompletely conformed to by the emotional nature, yet by the intellectual nature, or at least by those parts of it which the child exhibits, this law is almost wholly conformed to. The repugnances to this and that study which vex the ordinary teacher, are not innate, but result from his unwise system. Fellenberg says, "Experience has taught me that *indolence* in young persons is so directly opposite to their natural disposition to activity, that unless it is the consequence of bad education, it is almost invariably connected with some constitutional defect." And the spontaneous activity to which children are thus prone, is simply the pursuit of those pleasures which the healthful exercise of the faculties gives. It is true that some of the higher mental powers, as yet but little developed in the race, and congenitally possessed in any considerable degree only by the most advanced, are indisposed to the amount of exertion required of them. But these, in virtue of their very complexity, will, in a normal course of culture, come last into exercise; and will therefore have no demands made on them until the pupil has arrived at an age when ulterior motives can be brought into play, and an indirect pleasure made to counterbalance a direct displeasure. With all faculties lower than these, however, the immediate gratification consequent on activity, is the normal stimulus; and under good management the only needful stimulus. When we have to fall back on some other, we must take the fact as evidence that we are on the wrong track. Experience is daily showing with greater clearness, that there is always a method to be found productive of interest—even of delight; and it ever turns out that this is the method proved by all other tests to be the right one.

With most, these guiding principles will weigh but little if left in this abstract form. Partly, therefore, to exemplify their application, and partly with a view of making sundry specific suggestions, we propose now to pass from the theory of education to the practice of it.

It was the opinion of Pestalozzi, and one which has ever since his day been gaining ground, that education of some kind should begin from the cradle. Whoever has watched, with any discernment, the wide-eyed gaze of the infant at surrounding objects knows very well that education *does* begin thus early, whether we intend it or not; and that these fingerings and suckings of everything it can lay hold of, these open-mouthed listenings to every sound, are first steps in the series which ends in the discovery of unseen planets, the invention of calculating engines, the production of great paintings, or the composition of symphonies and operas. This activity of the faculties from the very first, being spontaneous and inevitable, the question is whether we shall supply in due variety the materials on which they may exercise themselves; and to the question so put, none but an affirmative answer can be given. As before said, however, agreement with Pestalozzi's theory does not involve agreement with his practice; and here occurs a case in point. Treating of instruction in spelling he says:—

"The spelling-book ought, therefore, to contain all the sounds of the language, and these ought to be taught in every family from the earliest infancy. The child who learns his spelling book ought to repeat them to the infant in the cradle, before it is able to pronounce even one of them, so that they may be deeply impressed upon its mind by

frequent repetition.”

Joining this with the suggestions for “a nursery method,” set down in his *Mother’s Manual*, in which he makes the names, positions, connections, numbers, properties, and uses of the limbs and body his first lessons, it becomes clear that Pestalozzi’s notions on early mental development were too crude to enable him to devise judicious plans. Let us consider the course which Psychology dictates.

The earliest impressions which the mind can assimilate are the undecomposable sensations produced by resistance, light, sound, etc. Manifestly, decomposable states of consciousness cannot exist before the states of consciousness out of which they are composed. There can be no idea of form until some familiarity with light in its gradations and qualities, or resistance in its different intensities, has been acquired; for, as has been long known, we recognise visible form by means of varieties of light, and tangible form by means of varieties of resistance. Similarly, no articulate sound is cognisable until the inarticulate sounds which go to make it up have been learned. And thus must it be in every other case. Following, therefore, the necessary law of progression from the simple to the complex, we should provide for the infant a sufficiency of objects presenting different degrees and kinds of resistance, a sufficiency of objects reflecting different amounts and qualities of light, and a sufficiency of sounds contrasted in their loudness, their pitch and their *timbre*. How fully this *à priori* conclusion is confirmed by infantile instincts, all will see on being reminded of the delight which every young child has in biting its toys, in feeling its brother’s bright jacket-buttons, and pulling papa’s whiskers—how absorbed it becomes in gazing at any gaudily-painted object, to which it applies the word “pretty,” when it can pronounce it, wholly because of the bright colours—and how its face broadens into a laugh at the tattlings of its nurse, the snapping of a visitor’s fingers, or any sound which it has not before heard. Fortunately, the ordinary practices of the nursery fulfil these early requirements of education to a considerable degree. Much, however, remains to be done; and it is of more importance that it should be done than at first appears. Every faculty during that spontaneous activity which accompanies its evolution is capable of receiving more vivid impressions than at any other period. Moreover, as these simplest elements have to be mastered, and as the mastery of them whenever achieved must take time, it becomes an economy of time to occupy this first stage of childhood, during which no other intellectual action is possible, in gaining a complete familiarity with them in all their modifications. Nor let us omit the fact, that both temper and health will be improved by the continual gratification resulting from a due supply of these impressions which every child so greedily assimilates. Space, could it be spared, might here be well filled by some suggestions towards a more systematic ministration to these simplest of the perceptions. But it must suffice to point out that any such ministration, recognising the general law of evolution from the indefinite to the definite, should proceed upon the corollary that in the development of every faculty, markedly contrasted impressions are the first to be distinguished; that hence sounds greatly differing in loudness and pitch, colours very remote from each other, and substances widely unlike in hardness or texture, should be the first supplied; and that in each case the progression must be by slow degrees to impressions more nearly allied.

Passing on to object-lessons, which manifestly form a natural continuation of this primary culture of the senses, it is to be remarked, that the system commonly pursued is wholly at variance with the method of Nature, as exhibited alike in infancy, in adult life, and in the course of civilisation. “The child,” says M. Marcel, “must be *shown* how all the parts of an object are connected, etc.,” and the various manuals of these object-lessons severally contain lists of the facts which the child is to be *told* respecting each of the things put before it. Now it needs but a glance at the daily life of the infant to see that all the knowledge of things which

is gained before the acquirement of speech, is self-gained—that the qualities of hardness and weight associated with certain appearances, the possession of particular forms and colours by particular persons, the production of special sounds by animals of special aspects, are phenomena which it observes for itself. In manhood too, when there are no longer teachers at hand, the observations and inferences hourly required for guidance must be made unhelped; and success in life depends upon the accuracy and completeness with which they are made. Is it probable, then, that while the process displayed in the evolution of humanity at large is repeated alike by the infant and the man, a reverse process must be followed during the period between infancy and manhood? and that too, even in so simple a thing as learning the properties of objects? Is it not obvious, on the contrary, that one method must be pursued throughout? And is not Nature perpetually thrusting this method upon us, if we had but the wit to see it, and the humility to adopt it? What can be more manifest than the desire of children for intellectual sympathy? Mark how the infant sitting on your knee thrusts into your face the toy it holds, that you too may look at it. See when it makes a creak with its wet finger on the table, how it turns and looks at you; does it again, and again looks at you; thus saying as clearly as it can—“Hear this new sound.” Watch the elder children coming into the room exclaiming—“Mamma, see what a curious thing,” “Mamma, look at this,” “Mamma, look at that:” a habit which they would continue, did not the silly mamma tell them not to tease her. Observe that, when out with the nurse-maid, each little one runs up to her with the new flower it has gathered, to show her how pretty it is, and to get her also to say it is pretty. Listen to the eager volubility with which every urchin describes any novelty he has been to see, if only he can find some one who will attend with any interest. Does not the induction lie on the surface? Is it not clear that we must conform our course to these intellectual instincts—that we must just systematise the natural process—that we must listen to all the child has to tell us about each object; must induce it to say everything it can think of about such object; must occasionally draw its attention to facts it has not yet observed, with the view of leading it to notice them itself whenever they recur; and must go on by and by to indicate or supply new series of things for a like exhaustive examination? Note the way in which, on this method, the intelligent mother conducts her lessons. Step by step she familiarises her little boy with the names of the simpler attributes, hardness, softness, colour, taste, size: in doing which she finds him eagerly help by bringing this to show her that it is red, and the other to make her feel that it is hard, as fast as she gives him words for these properties. Each additional property, as she draws his attention to it in some fresh thing which he brings her, she takes care to mention in connection with those he already knows; so that by the natural tendency to imitate, he may get into the habit of repeating them one after another. Gradually as there occur cases in which he omits to name one or more of the properties he has become acquainted with, she introduces the practice of asking him whether there is not something more that he can tell her about the thing he has got. Probably he does not understand. After letting him puzzle awhile she tells him; perhaps laughing at him a little for his failure. A few recurrences of this and he perceives what is to be done. When next she says she knows something more about the object than he has told her, his pride is roused; he looks at it intently; he thinks over all that he has heard; and the problem being easy, presently finds it out. He is full of glee at his success, and she sympathises with him. In common with every child, he delights in the discovery of his powers. He wishes for more victories, and goes in quest of more things about which to tell her. As his faculties unfold she adds quality after quality to his list: progressing from hardness and softness to roughness and smoothness, from colour to polish, from simple bodies to composite ones—thus constantly complicating the problem as he gains competence, constantly taxing his attention and memory to a greater extent, constantly maintaining his interest by supplying him with new impressions such as his mind

can assimilate, and constantly gratifying him by conquests over such small difficulties as he can master. In doing this she is manifestly but following out that spontaneous process which was going on during a still earlier period—simply aiding self-evolution; and is aiding it in the mode suggested by the boy's instinctive behaviour to her. Manifestly, too, the course she is adopting is the one best calculated to establish a habit of exhaustive observation; which is the professed aim of these lessons. To *tell* a child this and to *show* it the other, is not to teach it how to observe, but to make it a mere recipient of another's observations: a proceeding which weakens rather than strengthens its powers of self-instruction—which deprives it of the pleasures resulting from successful activity—which presents this all-attractive knowledge under the aspect of formal tuition—and which thus generates that indifference and even disgust not unfrequently felt towards these object-lessons. On the other hand, to pursue the course above described is simply to guide the intellect to its appropriate food; to join with the intellectual appetites their natural adjuncts—*amour propre* and the desire for sympathy; to induce by the union of all these an intensity of attention which insures perceptions both vivid and complete; and to habituate the mind from the beginning to that practice of self-help which it must ultimately follow.

Object-lessons should not only be carried on after quite a different fashion from that commonly pursued, but should be extended to a range of things far wider, and continued to a period far later, than now. They should not be limited to the contents of the house; but should include those of the fields and the hedges, the quarry and the sea-shore. They should not cease with early childhood; but should be so kept up during youth, as insensibly to merge into the investigations of the naturalist and the man of science. Here again we have but to follow Nature's leadings. Where can be seen an intenser delight than that of children picking up new flowers and watching new insects; or hoarding pebbles and shells? And who is there but perceives that by sympathising with them they may be led on to any extent of inquiry into the qualities and structures of these things? Every botanist who has had children with him in the woods and lanes must have noticed how eagerly they joined in his pursuits, how keenly they searched out plants for him, how intently they watched while he examined them, how they overwhelmed him with questions. The consistent follower of Bacon—the “servant and interpreter of nature,” will see that we ought modestly to adopt the course of culture thus indicated. Having become familiar with the simpler properties of inorganic objects, the child should by the same process be led on to an exhaustive examination of the things it picks up in its daily walks—the less complex facts they present being alone noticed at first: in plants, the colours, numbers, and forms of the petals, and shapes of the stalks and leaves; in insects, the numbers of the wings, legs, and antennæ, and their colours. As these become fully appreciated and invariably observed, further facts may be successively introduced: in the one case, the numbers of stamens and pistils, the forms of the flowers, whether radial or bilateral in symmetry, the arrangement and character of the leaves, whether opposite or alternate, stalked or sessile, smooth or hairy, serrated, toothed, or crenate; in the other, the divisions of the body, the segments of the abdomen, the markings of the wings, the number of joints in the legs, and the forms of the smaller organs—the system pursued throughout being that of making it the child's ambition to say respecting everything it finds all that can be said. Then when a fit age has been reached, the means of preserving these plants, which have become so interesting in virtue of the knowledge obtained of them, may as a great favour be supplied; and eventually, as a still greater favour, may also be supplied the apparatus needful for keeping the larvæ of our common butterflies and moths through their transformations—a practice which, as we can personally testify, yields the highest gratification; is continued with ardour for years; when joined with the formation of an entomological collection, adds immense interest to Saturday-afternoon rambles; and forms an admirable introduction to the study of physiology.

We are quite prepared to hear from many that all this is throwing away time and energy; and that children would be much better occupied in writing their copies or learning their pence-tables, and so fitting themselves for the business of life. We regret that such crude ideas of what constitutes education, and such a narrow conception of utility, should still be prevalent. Saying nothing on the need for a systematic culture of the perceptions and the value of the practices above inculcated as subserving that need, we are prepared to defend them even on the score of the knowledge gained. If men are to be mere cits, mere porers over ledgers, with no ideas beyond their trades—if it is well that they should be as the cockney whose conception of rural pleasures extends no further than sitting in a tea-garden smoking pipes and drinking porter; or as the squire who thinks of woods as places for shooting in, of uncultivated plants as nothing but weeds, and who classifies animals into game, vermin, and stock—then indeed it is needless to learn anything that does not directly help to replenish the till and fill the larder. But if there is a more worthy aim for us than to be drudges—if there are other uses in the things around than their power to bring money—if there are higher faculties to be exercised than acquisitive and sensual ones—if the pleasures which poetry and art and science and philosophy can bring are of any moment; then is it desirable that the instinctive inclination which every child shows to observe natural beauties and investigate natural phenomena, should be encouraged. But this gross utilitarianism which is content to come into the world and quit it again without knowing what kind of a world it is or what it contains, may be met on its own ground. It will by and by be found that a knowledge of the laws of life is more important than any other knowledge whatever—that the laws of life underlie not only all bodily and mental processes, but by implication all the transactions of the house and the street, all commerce, all politics, all morals—and that therefore without a comprehension of them, neither personal nor social conduct can be rightly regulated. It will eventually be seen too, that the laws of life are essentially the same throughout the whole organic creation; and further, that they cannot be properly understood in their complex manifestations until they have been studied in their simpler ones. And when this is seen, it will be also seen that in aiding the child to acquire the out-of-door information for which it shows so great an avidity, and in encouraging the acquisition of such information throughout youth, we are simply inducing it to store up the raw material for future organisation—the facts that will one day bring home to it with due force, those great generalisations of science by which actions may be rightly guided.

The spreading recognition of drawing as an element of education is one among many signs of the more rational views on mental culture now beginning to prevail. Once more it may be remarked that teachers are at length adopting the course which Nature has perpetually been pressing on their notice. The spontaneous attempts made by children to represent the men, houses, trees, and animals around them—on a slate if they can get nothing better, or with lead-pencil on paper if they can beg them—are familiar to all. To be shown through a picture-book is one of their highest gratifications; and as usual, their strong imitative tendency presently generates in them the ambition to make pictures themselves also. This effort to depict the striking things they see is a further instinctive exercise of the perceptions—a means whereby still greater accuracy and completeness of observation are induced. And alike by trying to interest us in their discoveries of the sensible properties of things, and by their endeavours to draw, they solicit from us just that kind of culture which they most need.

Had teachers been guided by Nature's hints, not only in making drawing a part of education but in choosing modes of teaching it, they would have done still better than they have done. What is that the child first tries to represent? Things that are large, things that are attractive in colour, things round which its pleasurable associations most cluster—human beings from whom it has received so many emotions; cows and dogs which interest by the many phenomena

they present; houses that are hourly visible and strike by their size and contrast of parts. And which of the processes of representation gives it most delight? Colouring. Paper and pencil are good in default of something better; but a box of paints and a brush—these are the treasures. The drawing of outlines immediately becomes secondary to colouring—is gone through mainly with a view to the colouring; and if leave can be got to colour a book of prints, how great is the favour! Now, ridiculous as such a position will seem to drawing-masters who postpone colouring and who teach form by a dreary discipline of copying lines, we believe that the course of culture thus indicated is the right one. The priority of colour to form, which, as already pointed out, has a psychological basis, should be recognised from the beginning; and from the beginning also, the things imitated should be real. That greater delight in colour which is not only conspicuous in children but persists in most persons throughout life, should be continuously employed as the natural stimulus to the mastery of the comparatively difficult and unattractive form: the pleasure of the subsequent tinting should be the prospective reward for the labour of delineation. And these efforts to represent interesting actualities should be encouraged; in the conviction that as, by a widening experience, simpler and more practicable objects become interesting, they too will be attempted; and that so a gradual approximation will be made towards imitations having some resemblance to the realities. The extreme indefiniteness which, in conformity with the law of evolution, these first attempts exhibit, is anything but a reason for ignoring them. No matter how grotesque the shapes produced; no matter how daubed and glaring the colours. The question is not whether the child is producing good drawings. The question is, whether it is developing its faculties. It has first to gain some command over its fingers, some crude notions of likeness; and this practice is better than any other for these ends, since it is the spontaneous and interesting one. During early childhood no formal drawing-lessons are possible. Shall we therefore repress, or neglect to aid, these efforts at self-culture? or shall we encourage and guide them as normal exercises of the perceptions and the powers of manipulation? If by furnishing cheap woodcuts to be painted, and simple contour-maps to have their boundary lines tinted, we can not only pleasurably draw out the faculty of colour, but can incidentally produce some familiarity with the outlines of things and countries, and some ability to move the brush steadily; and if by the supply of tempting objects we can keep up the instinctive practice of making representations, however rough; it must happen that when the age for lessons in drawing is reached, there will exist a facility that would else have been absent. Time will have been gained; and trouble, both to teacher and pupil, saved.

From what has been said, it may be readily inferred that we condemn the practice of drawing from copies; and still more so that formal discipline in making straight lines and curved lines and compound lines, with which it is the fashion of some teachers to begin. We regret that the Society of Arts has recently, in its series of manuals on “Rudimentary Art Instruction,” given its countenance to an elementary drawing-book, which is the most vicious in principle that we have seen. We refer to the *Outline from Outline, or from the Flat*, by John Bell, sculptor. As explained in the prefatory note, this publication proposes “to place before the student a simple, yet logical mode of instruction;” and to this end sets out with a number of definitions thus:—

“A simple line in drawing is a thin mark drawn from one point to another.

“Lines may be divided, as to their nature in drawing, into two classes:—

“1. *Straight*, which are marks that go the shortest road between two points, as A B.

“2. Or *Curved*, which are marks which do not go the shortest road between two points, as C D.”

And so the introduction progresses to horizontal lines, perpendicular lines, oblique lines,

angles of the several kinds, and the various figures which lines and angles make up. The work is, in short, a grammar of form, with exercises. And thus the system of commencing with a dry analysis of elements, which, in the teaching of language, has been exploded, is to be re-instituted in the teaching of drawing. We are to set out with the definite, instead of with the indefinite. The abstract is to be preliminary to the concrete. Scientific conceptions are to precede empirical experiences. That this is an inversion of the normal order, we need scarcely repeat. It has been well said concerning the custom of prefacing the art of speaking any tongue by a drilling in the parts of speech and their functions, that it is about as reasonable as prefacing the art of walking by a course of lessons on the bones, muscles, and nerves of the legs; and much the same thing may be said of the proposal to preface the art of representing objects, by a nomenclature and definitions of the lines which they yield on analysis. These technicalities are alike repulsive and needless. They render the study distasteful at the very outset; and all with the view of teaching that which, in the course of practice, will be learnt unconsciously. Just as the child incidentally gathers the meanings of ordinary words from the conversations going on around it, without the help of dictionaries; so, from the remarks on objects, pictures, and its own drawings, will it presently acquire, not only without effort but even pleurably, those same scientific terms which, when taught at first, are a mystery and a weariness.

If any dependence is to be placed on the general principles of education that have been laid down, the process of learning to draw should be throughout continuous with those efforts of early childhood, described above as so worthy of encouragement. By the time that the voluntary practice thus initiated has given some steadiness of hand, and some tolerable ideas of proportion, there will have arisen a vague notion of body as presenting its three dimensions in perspective. And when, after sundry abortive, Chinese-like attempts to render this appearance on paper, there has grown up a pretty clear perception of the thing to be done, and a desire to do it, a first lesson in empirical perspective may be given by means of the apparatus occasionally used in explaining perspective as a science. This sounds alarming; but the experiment is both comprehensible and interesting to any boy or girl of ordinary intelligence. A plate of glass so framed as to stand vertically on the table, being placed before the pupil, and a book or like simple object laid on the other side of it, he is requested, while keeping the eye in one position, to make ink-dots on the glass so that they may coincide with, or hide, the corners of this object. He is next told to join these dots by lines; on doing which he perceives that the lines he makes hide, or coincide with, the outlines of the object. And then by putting a sheet of paper on the other side of the glass, it is made manifest to him that the lines he has thus drawn represent the object as he saw it. They not only look like it, but he perceives that they must be like it, because he made them agree with its outlines; and by removing the paper he can convince himself that they do agree with its outlines. The fact is new and striking; and serves him as an experimental demonstration, that lines of certain lengths, placed in certain directions on a plane, can represent lines of other lengths, and having other directions, in space. By gradually changing the position of the object, he may be led to observe how some lines shorten and disappear, while others come into sight and lengthen. The convergence of parallel lines, and, indeed, all the leading facts of perspective, may, from time to time, be similarly illustrated to him. If he has been duly accustomed to self-help, he will gladly, when it is suggested, attempt to draw one of these outlines on paper, by the eye only; and it may soon be made an exciting aim to produce, unassisted, a representation as like as he can to one subsequently sketched on the glass. Thus, without the unintelligent, mechanical practice of copying other drawings, but by a method at once simple and attractive—rational, yet not abstract—a familiarity with the linear appearances of things, and a faculty of rendering them, may be step by step acquired. To which advantages add these:—that even thus early the pupil learns, almost unconsciously, the true

theory of a picture (namely, that it is a delineation of objects as they appear when projected on a plane placed between them and the eye); and that when he reaches a fit age for commencing scientific perspective, he is already thoroughly acquainted with the facts which form its logical basis.

As exhibiting a rational mode of conveying primary conceptions in geometry, we cannot do better than quote the following passage from Mr. Wyse:—

“A child has been in the habit of using cubes for arithmetic; let him use them also for the elements of geometry. I would begin with solids, the reverse of the usual plan. It saves all the difficulty of absurd definitions, and bad explanations on points, lines, and surfaces, which are nothing but abstractions.... A cube presents many of the principal elements of geometry; it at once exhibits points, straight lines, parallel lines, angles, parallelograms, etc., etc. These cubes are divisible into various parts. The pupil has already been familiarised with such divisions in numeration, and he now proceeds to a comparison of their several parts, and of the relation of these parts to each other.... From thence he advances to globes, which furnish him with elementary notions of the circle, of curves generally, etc., etc.

“Being tolerably familiar with solids, he may now substitute planes. The transition may be made very easy. Let the cube, for instance, be cut into thin divisions, and placed on paper; he will then see as many plane rectangles as he has divisions; so with all the others. Globes may be treated in the same manner; he will thus see how surfaces really are generated, and be enabled to abstract them with facility in every solid.

“He has thus acquired the alphabet and reading of geometry. He now proceeds to write it.

“The simplest operation, and therefore the first, is merely to place these planes on a piece of paper, and pass the pencil round them. When this has been frequently done, the plane may be put at a little distance, and the child required to copy it, and so on.”

A stock of geometrical conceptions having been obtained, in some such manner as this recommended by Mr. Wyse, a further step may be taken, by introducing the practice of testing the correctness of figures drawn by eye: thus both exciting an ambition to make them exact, and continually illustrating the difficulty of fulfilling that ambition. There can be little doubt that geometry had its origin (as, indeed, the word implies) in the methods discovered by artificers and others, of making accurate measurements for the foundations of buildings, areas of inclosures, and the like; and that its truths came to be treasured up, merely with a view to their immediate utility. They would be introduced to the pupil under analogous relationships. In cutting out pieces for his card-houses, in drawing ornamental diagrams for colouring, and in those various instructive occupations which an inventive teacher will lead him into, he may for a length of time be advantageously left, like the primitive builder, to tentative processes; and so will learn through experience the difficulty of achieving his aims by the unaided senses. When, having meanwhile undergone a valuable discipline of the perceptions, he has reached a fit age for using a pair of compasses, he will, while duly appreciating these as enabling him to verify his ocular guesses, be still hindered by the imperfections of the approximative method. In this stage he may be left for a further period: partly as being yet too young for anything higher; partly because it is desirable that he should be made to feel still more strongly the want of systematic contrivances. If the acquisition of knowledge is to be made continuously interesting; and if, in the early civilisation of the child, as in the early civilisation of the race, science is valued only as ministering to art; it is manifest that the proper preliminary to geometry, is a long

practice in those constructive processes which geometry will facilitate. Observe that here, too, Nature points the way. Children show a strong propensity to cut out things in paper, to make, to build—a propensity which, if encouraged and directed, will not only prepare the way for scientific conceptions, but will develop those powers of manipulation in which most people are so deficient.

When the observing and inventive faculties have attained the requisite power, the pupil may be introduced to empirical geometry; that is—geometry dealing with methodical solutions, but not with the demonstrations of them. Like all other transitions in education, this should be made not formally but incidentally; and the relationship to constructive art should still be maintained. To make, out of cardboard, a tetrahedron like one given to him, is a problem which will interest the pupil and serve as a convenient starting-point. In attempting this, he finds it needful to draw four equilateral triangles arranged in special positions. Being unable in the absence of an exact method to do this accurately, he discovers on putting the triangles into their respective positions, that he cannot make their sides fit; and that their angles do not meet at the apex. He may now be shown how, by describing a couple of circles, each of these triangles may be drawn with perfect correctness and without guessing; and after his failure he will value the information. Having thus helped him to the solution of his first problem, with the view of illustrating the nature of geometrical methods, he is in future to be left to solve the questions put to him as best he can. To bisect a line, to erect a perpendicular, to describe a square, to bisect an angle, to draw a line parallel to a given line, to describe a hexagon, are problems which a little patience will enable him to find out. And from these he may be led on step by step to more complex questions: all of which, under judicious management, he will puzzle through unhelped. Doubtless, many of those brought up under the old regime, will look upon this assertion sceptically. We speak from facts, however; and those neither few nor special. We have seen a class of boys become so interested in making out solutions to such problems, as to look forward to their geometry-lesson as a chief event of the week. Within the last month, we have heard of one girl's school, in which some of the young ladies voluntarily occupy themselves with geometrical questions out of school-hours; and of another, where they not only do this, but where one of them is begging for problems to find out during the holidays: both which facts we state on the authority of the teacher. Strong proofs, these, of the practicability and the immense advantage of self-development! A branch of knowledge which, as commonly taught, is dry and even repulsive, is thus, by following the method of Nature, made extremely interesting and profoundly beneficial. We say profoundly beneficial, because the effects are not confined to the gaining of geometrical facts, but often revolutionise the whole state of mind. It has repeatedly occurred that those who have been stupefied by the ordinary school-drill—by its abstract formulas, its wearisome tasks, its cramming—have suddenly had their intellects roused by thus ceasing to make them passive recipients, and inducing them to become active discoverers. The discouragement caused by bad teaching having been diminished by a little sympathy, and sufficient perseverance excited to achieve a first success, there arises a revulsion of feeling affecting the whole nature. They no longer find themselves incompetent; they, too, can do something. And gradually as success follows success, the incubus of despair disappears, and they attack the difficulties of their other studies with a courage insuring conquest.

A few weeks after the foregoing remarks were originally published, Professor Tyndall in a lecture at the Royal Institution “On the Importance of the Study of Physics as a Branch of Education,” gave some conclusive evidence to the same effect. His testimony, based on personal observation, is of such great value that we cannot refrain from quoting it. Here it is.

“One of the duties which fell to my share, during the period to which I have referred,

was the instruction of a class in mathematics, and I usually found that Euclid and the ancient geometry generally, when addressed to the understanding, formed a very attractive study for youth. But it was my habitual practice to withdraw the boys from the routine of the book, and to appeal to their self-power in the treatment of questions not comprehended in that routine. At first, the change from the beaten track usually excited a little aversion: the youth felt like a child amid strangers; but in no single instance have I found this aversion to continue. When utterly disheartened, I have encouraged the boy by that anecdote of Newton, where he attributes the difference between him and other men, mainly to his own patience; or of Mirabeau, when he ordered his servant, who had stated something to be impossible, never to use that stupid word again. Thus cheered, he has returned to his task with a smile, which perhaps had something of doubt in it, but which, nevertheless, evinced a resolution to try again. I have seen the boy's eye brighten, and at length, with a pleasure of which the ecstasy of Archimedes was but a simple expansion, heard him exclaim, 'I have it, sir.' The consciousness of self-power, thus awakened, was of immense value; and animated by it, the progress of the class was truly astonishing. It was often my custom to give the boys their choice of pursuing their propositions in the book, or of trying their strength at others not to be found there. Never in a single instance have I known the book to be chosen. I was ever ready to assist when I deemed help needful, but my offers of assistance were habitually declined. The boys had tasted the sweets of intellectual conquest and demanded victories of their own. I have seen their diagrams scratched on the walls, cut into the beams upon the play ground, and numberless other illustrations of the living interest they took in the subject. For my own part, as far as experience in teaching goes, I was a mere fledgling: I knew nothing of the rules of pedagogics, as the Germans name it; but I adhered to the spirit indicated at the commencement of this discourse, and endeavoured to make geometry a *means* and not a *branch* of education. The experiment was successful, and some of the most delightful hours of my existence have been spent in marking the vigorous and cheerful expansion of mental power, when appealed to in the manner I have described."

This empirical geometry which presents an endless series of problems, should be continued along with other studies for years; and may throughout be advantageously accompanied by those concrete applications of its principles which serve as its preliminary. After the cube, the octahedron, and the various forms of pyramid and prism have been mastered, may come the more complex regular bodies—the dodecahedron and icosahedron—to construct which out of single pieces of cardboard, requires considerable ingenuity. From these, the transition may naturally be made to such modified forms of the regular bodies as are met with in crystals—the truncated cube, the cube with its dihedral as well as its solid angles truncated, the octahedron and the various prisms as similarly modified: in imitating which numerous forms assumed by different metals and salts, an acquaintance with the leading facts of mineralogy will be incidentally gained.¹

After long continuance in exercises of this kind, rational geometry, as may be supposed, presents no obstacles. Habituated to contemplate relationships of form and quantity, and vaguely perceiving from time to time the necessity of certain results as reached by certain means, the pupil comes to regard the demonstrations of Euclid as the missing supplements to his familiar problems. His well-disciplined faculties enable him easily to master its successive propositions, and to appreciate their value; and he has the occasional gratification of finding some of his own methods proved to be true. Thus he enjoys what is to the unprepared a dreary

task. It only remains to add, that his mind will presently arrive at a fit condition for that most valuable of all exercises for the reflective faculties—the making of original demonstrations. Such theorems as those appended to the successive books of the Messrs. Chambers’s Euclid, will soon become practicable to him; and in proving them, the process of self-development will be not intellectual only, but moral.

To continue these suggestions much further, would be to write a detailed treatise on education, which we do not purpose. The foregoing outlines of plans for exercising the perceptions in early childhood, for conducting object-lessons, for teaching drawing and geometry, must be considered simply as illustrations of the method dictated by the general principles previously specified. We believe that on examination they will be found not only to progress from the simple to the complex, from the indefinite to the definite, from the concrete to the abstract, from the empirical to the rational; but to satisfy the further requirements, that education shall be a repetition of civilisation in little, that it shall be as much as possible a process of self-evolution, and that it shall be pleasurable. The fulfilment of all these conditions by one type of method, tends alike to verify the conditions, and to prove that type of the method the right one. Mark too, that this method is the logical outcome of the tendency characterising all modern improvements in tuition—that it is but an adoption in full of the natural system which they adopt partially—that it displays this complete adoption of the natural system, both by conforming to the above principles, and by following the suggestions which the unfolding mind itself gives: facilitating its spontaneous activities, and so aiding the developments which Nature is busy with. Thus there seems abundant reason to conclude, that the mode of procedure above exemplified, closely approximates to the true one.

A few paragraphs must be added in further inculcation of the two general principles, that are alike the most important and the least attended to; namely, the principle that throughout youth, as in early childhood and in maturity, the process shall be one of self-instruction; and the obverse principle, that the mental action induced shall be throughout intrinsically grateful. If progression from simple to complex, from indefinite to definite, and from concrete to abstract, be considered the essential requirements as dictated by abstract psychology; then do the requirements that knowledge shall be self-mastered, and pleurably mastered, become tests by which we may judge whether the dictates of abstract psychology are being obeyed. If the first embody the leading generalisations of the *science* of mental growth, the last are the chief canons of the *art* of fostering mental growth. For manifestly, if the steps in our *curriculum* are so arranged that they can be successively ascended by the pupil himself with little or no help, they must correspond with the stages of evolution in his faculties; and manifestly, if the successive achievements of these steps are intrinsically gratifying to him, it follows that they require no more than a normal exercise of his powers.

But making education a process of self-evolution, has other advantages than this of keeping our lessons in the right order. In the first place, it guarantees a vividness and permanency of impression which the usual methods can never produce. Any piece of knowledge which the pupil has himself acquired—any problem which he has himself solved, becomes, by virtue of the conquest, much more thoroughly his than it could else be. The preliminary activity of mind which his success implies, the concentration of thought necessary to it, and the excitement consequent on his triumph, conspire to register the facts in his memory in a way that no mere information heard from a teacher, or read in a school-book, can be registered. Even if he fails, the tension to which his faculties have been wound up, insures his remembrance of the solution when given to him, better than half-a-dozen repetitions would. Observe, again, that this discipline necessitates a continuous organisation of the knowledge he acquires. It is in the very

nature of facts and inferences assimilated in this normal manner, that they successively become the premises of further conclusions—the means of solving further questions. The solution of yesterday's problem helps the pupil in mastering to-day's. Thus the knowledge is turned into faculty as soon as it is taken in, and forthwith aids in the general function of thinking—does not lie merely written on the pages of an internal library, as when rote-learned. Mark further, the moral culture which this constant self-help involves. Courage in attacking difficulties, patient concentration of the attention, perseverance through failures—these are characteristics which after-life specially requires; and these are characteristics which this system of making the mind work for its food specially produces. That it is thoroughly practicable to carry out instruction after this fashion, we can ourselves testify; having been in youth thus led to solve the comparatively complex problems of perspective. And that leading teachers have been tending in this direction, is indicated alike in the saying of Fellenberg, that “the individual, independent activity of the pupil is of much greater importance than the ordinary busy officiousness of many who assume the office of educators;” in the opinion of Horace Mann, that “unfortunately education amongst us at present consists too much in *telling*, not in *training*,” and in the remark of M. Marcel, that “what the learner discovers by mental exertion is better known than what is told to him.”

Similarly with the correlative requirement, that the method of culture pursued shall be one productive of an intrinsically happy activity,—an activity not happy because of extrinsic rewards to be obtained, but because of its own healthfulness. Conformity to this requirement, besides preventing us from thwarting the normal process of evolution, incidentally secures positive benefits of importance. Unless we are to return to an ascetic morality (or rather *im*-morality) the maintenance of youthful happiness must be considered as in itself a worthy aim. Not to dwell upon this, however, we go on to remark that a pleasurable state of feeling is far more favourable to intellectual action than a state of indifference or disgust. Every one knows that things read, heard, or seen with interest, are better remembered than things read, heard, or seen with apathy. In the one case the faculties appealed to are actively occupied with the subject presented; in the other they are inactively occupied with it, and the attention is continually drawn away by more attractive thoughts. Hence the impressions are respectively strong and weak. Moreover, to the intellectual listlessness which a pupil's lack of interest in any study involves, must be added the paralysing fear of consequences. This, by distracting his attention, increases the difficulty he finds in bringing his faculties to bear upon facts that are repugnant to them. Clearly, therefore, the efficiency of tuition will, other things equal, be proportionate to the gratification with which tasks are performed.

It should be considered also, that grave moral consequences depend upon the habitual pleasure or pain which daily lessons produce. No one can compare the faces and manners of two boys—the one made happy by mastering interesting subjects, and the other made miserable by disgust with his studies, by consequent inability, by cold looks, by threats, by punishment—without seeing that the disposition of the one is being benefited and that of the other injured. Whoever has marked the effects of success and failure upon the mind, and the power of the mind over the body, will see that in the one case both temper and health are favourably affected, while in the other there is danger of permanent moroseness, or permanent timidity, and even of permanent constitutional depression. There remains yet another indirect result of no small moment. The relationship between teachers and their pupils is, other things equal, rendered friendly and influential, or antagonistic and powerless, according as the system of culture produces happiness or misery. Human beings are at the mercy of their associated ideas. A daily minister of pain cannot fail to be regarded with secret dislike; and if he causes no emotions but painful ones, will inevitably be hated. Conversely, he who constantly aids children to their ends, hourly provides them with the satisfactions of conquest, hourly encourages them through their

difficulties and sympathises in their successes, will be liked; nay, if his behaviour is consistent throughout, must be loved. And when we remember how efficient and benign is the control of a master who is felt to be a friend, when compared with the control of one who is looked upon with aversion, or at best indifference, we may infer that the indirect advantages of conducting education on the happiness principle do not fall far short of the direct ones. To all who question the possibility of acting out the system here advocated, we reply as before, that not only does theory point to it, but experience commends it. To the many verdicts of distinguished teachers who since Pestalozzi's time have testified this, may be here added that of Professor Pillans, who asserts that "where young people are taught as they ought to be, they are quite as happy in school as at play, seldom less delighted, nay, often more, with the well-directed exercise of their mental energies than with that of their muscular powers."

As suggesting a final reason for making education a process of self-instruction, and by consequence a process of pleasurable instruction, we may advert to the fact that, in proportion as it is made so, is there a probability that it will not cease when schooldays end. As long as the acquisition of knowledge is rendered habitually repugnant, so long will there be a prevailing tendency to discontinue it when free from the coercion of parents and masters. And when the acquisition of knowledge has been rendered habitually gratifying, then will there be as prevailing a tendency to continue, without superintendence, that self-culture previously carried on under superintendence. These results are inevitable. While the laws of mental association remain true—while men dislike the things and places that suggest painful recollections, and delight in those which call to mind by-gone pleasures—painful lessons will make knowledge repulsive, and pleasurable lessons will make it attractive. The men to whom in boyhood information came in dreary tasks along with threats of punishment, and who were never led into habits of independent inquiry, are unlikely to be students in after years; while those to whom it came in the natural forms, at the proper times, and who remember its facts as not only interesting in themselves, but as the occasions of a long series of gratifying successes, are likely to continue through life that self-instruction commenced in youth.

Herbert Spencer. *Essays on Education and Kindred Subjects*. London: J.M. Dent and Sons, 1911.

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