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MATHEMATICS AND INDIVIDUALITY.

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In the ancient story of *Barlaam and Ioasaph*, which edified and delighted our medieval forefathers through many centuries, there is a charming apologue of a fowler and a nightingale whom the former had snared and was about to slay.* "Free me from my fetters," said the nightingale, "and I will give thee three precepts by the keeping of which thou shalt be greatly benefited all thy life long." The astonished fowler accepted the terms and set the bird free, receiving as his reward the precepts: "Never try to attain to the unattainable; never regret the thing past and gone; and never believe the word that passes belief." But as the bird flew aloft she cried to her captor, "Shame, sir, on thy recklessness! What a treasure thou hast lost to-day! For I have inside me a pearl larger than an ostrich egg." When the fowler heard this he was distraught and would fain have taken her again. "Come hither," he said, "into my house; I will make thee right welcome, and send thee forth with honour." But the nightingale replied, "Now I know thee to be a mighty fool. Though thou didst receive my words readily and gladly, thou hast gained no profit thereby. I bade thee never regret the thing past and gone; and behold thou art distraught with grief because I am escaped out of thy hands. I charged thee not to try to attain to the unattainable; and thou triest to catch me again. Besides which I bade thee never believe a word past belief; and behold thou hast believed that I had in me a pearl exceeding the size of my whole body."

The fable is capable of many useful applications; but the case I have in mind at the moment is that of a President of this Association who is tempted to dwell on his unworthiness to occupy the seat of his distinguished predecessors. Taking warning from the fowler's folly, I reject, as passing belief, the thought that I can be really fit to follow those eminent mathematicians, and yet refrain from deploring that such greatness has been thrust upon me. At the same time I decline to pursue the unattainable end of producing a mathematical address worthy of the traditions of this chair. There is, fortunately, another way open. My immediate predecessor is, in conjunction with Mr. Russell, the author of a mathematical work which a prescient and authoritative critic has saluted as marking an epoch in modern thought. Yet in his truly admirable presidential addresses Prof. Whitehead chose not to speak of the technical studies in which he is so great a master, but to set before us views on education as a whole in which his views on mathematics hold only a subsidiary, though a necessarily important place. I propose to follow this precedent—to follow it not merely because it suits my incapacity, but because I heartily approve of the policy it illustrates.

This society began as an Association for the Improvement of Geometrical Teaching. In the course of time it has widened the range of its activities, but remains true to its original impulse. We confine, and rightly confine, our activities to practical questions that concern us as teachers of mathematics to boys and girls at school. The view we have taken of the proper scope of our corporate activities serves also as a good working ideal for the individual member. The time is past when either Master Tommy Merton or his friend Harry Sandford could be adequately educated by mere companionship even with so highly cultivated and virtuous a preceptor as the Reverend Mr. Barlow, who exuded information, mingled with lofty principles, upon the slightest stimulus and in every conceivable direction. Education

*I condense it from the translation by Woodward and Mattingly in the Loeb Classical Library.

has become a highly technical business, requiring, especially in secondary schools, the co-operation of a corps of experts, each versed in a special kind of pedagogical craftsmanship. A certain limitation and concentration of interest on the part of the individual teacher has become, therefore, a virtue, since it is a condition of the higher efficiency promised by the new system.

I believe in that promise. It would, however, be foolish not to recognise that specialist instruction has its own dangers, some obvious, some more subtle. Among the latter I do not include the tendency of the specialist to deem his subject the only one worthy of serious study. That, it is true, is a common error. But it is not only common; it is vulgar, and no educated person should allow himself to fall into it. But I do include a more generous form of error that springs from the same root. The man who loves his subject, and is conscious of his mastery over the technique of teaching it, is liable, if not to mistake, at least to forget, the proper objective of his efforts. He is in danger of looking upon the pupil as provided in order that the subject may be taught instead of thinking of the teaching as provided in order that the pupil may be educated. Perverting a well-worn Latin tag, we may say that he is tempted *propter docendum perdere causas docendi.* A somewhat similar attitude of mind, magnificently exaggerated, once led a young man to declare in my hearing that the heavens and earth were created to illustrate the principles of Mr. Russell's mathematical philosophy!

If we are candid with ourselves we shall, I think, admit that an inordinate lust for giving instruction may easily drive any of us into regrettable excesses. This is a defect of the qualities of the enthusiastic and efficient teacher to which he is subject in proportion to his enthusiasm and efficiency. It makes more dangerous the common liability of the specialist to lose sight of the wider purpose of his departmental activities. It is desirable, then, if only to correct this inevitable bias, that we should sometimes turn from our special inquiries to consider their relation to the broader educational issues.

If there ever was a time when it was particularly incumbent on us to examine our educational faith and to make sure that our works accord with it, to purify our aims and to renew our inspiration, the present is surely the moment. The nation is at last seriously concerned about the results of its inveterate indifference to education. Even the lords of the Philistines are losing their belief in Dagon and are ready to hear the prophets of a nobler faith. If the teachers of England are not to lose this unprecedented opportunity it behoves them to make sure of themselves; to close their ranks; to harmonise their counsels. Their minds must become clear as to the common goal to be sought beyond the immediate objects they pursue, each in his own class-room or laboratory, and they must make a sincere attempt to coordinate their efforts for its attainment.

It would be foolish to maintain that the task is easy; misleading to pretend that we have already reached that agreement upon fundamentals that can be the only sound basis of a national movement forwards. Apart from the rather discreditable wrangle which we fail to dignify with the name "conflict of studies" there is a deeper lack of unity with regard to the ultimate aims of education. It may be that the dislike of clear thinking which foreign critics regard as innate in the English temperament makes the pursuit of intellectual unity, here as elsewhere, distasteful to us. In any case, we do little more than conceal our differences decently from one another and the public when we proclaim that we have a common aim, and that it is "the formation of character," or "the training of all the powers of the mind," or "*mens sana in corpore sano*," or "a preparation for complete living," and so forth. For these, as Mr. Keatinge has trenchantly pointed out, are "nebulous" generalities whose popularity is due precisely to the happy fact that everyone can give them, within comfortably wide limits, just the concrete interpretation he pleases. And when one examines these concrete interpretations—in institutions, in curricula, in principles of school government,

in methods of instruction—it becomes evident that the success of such attempts to express a universal aim of education is largely illusory. In short, differences in educational thought and practice, both now and in the past, are of such a character that it is impossible to attribute them merely to differences of opinion about the best means to a commonly accepted end, or to regard them as merely different manifestations of a common purpose that must necessarily be pursued in differing ways in differing circumstances. On the contrary, they are seen to spring in great measure from the adoption of substantially different ends and to be the expression of seriously divergent purposes.

This lack of agreement is not inscrutable, and the perception of its cause throws much light on the nature of education. The priest, the doctor, the lawyer, the soldier serve limited and specific needs of man or society. While there may be sharp differences of opinion about the value, the scope and the forms of their activities, there is little room for quarrels about their ultimate aims. But the functions of the educator touch life at every point, and are therefore concerned with it as a whole. It follows that all educational aims, when concrete enough to be of practical value, are correlative to ideals of life, and that the divergence between the former is simply the reflexion of the eternal conflict among the latter. For example, if the "Greek view of life" cannot be reconciled with that of the Puritan reformers, it is idle to look for harmony between the conceptions of education which sprang from them. Moreover, it is not only true that no ideal of life has for long reigned unchallenged over civilised men, even of the same race and nation; we must also recognise that among the nominal followers of an ideal there are always rival sections, doubtful adherents and secret rebels. Candid consideration of facts of this order suggests the doubt whether, strictly speaking, any ideal of life has more than one whole-hearted adherent: whether, if all men could know themselves and were sufficiently articulate, the number of ideals proclaimed to the world would not be exactly equal to the number of its human population!

This disturbing suspicion is greatly strengthened when we observe that the very conception of human beings as *individuals* implies the same conclusion. When we speak of a man as an individual we do not merely mean that he is an entity distinguished from other human entities by a particular name and address. What we have in view is something that makes him not only different from others, but unique. That something is his life—taking the word to cover all that issues from, or is expressed in, his physical, mental and spiritual nature. We need not puzzle ourselves with metaphysical riddles—asking whether two lives might not be so much alike as to make their owners (as the undergraduate said about S. John the Evangelist and S. John the Divine) "almost if not quite the same person." The common sense of mankind holds that different human beings are, through and through, themselves, and themselves only: that each contributes to the music of humanity a part which, however poor it may be, is yet his own and could never issue from another.

If this be true, it may be maintained, in a perfectly good sense of the words, that every man must have his own unique ideal. It would be the sense in which every work of art—for example, every poem—has its own ideal. A poet who recognises that his creative impulse has failed would never point to another poem and say, "that is what I intended to do." His ideal was concrete, and to be embodied, if at all, in *his* poem and in no other. It marks the perfect achievement from which *his* work has fallen short; not a goal that another has or might have reached.

From this train of thought it would follow that there can be no universal aim of education if that aim is to include the assertion of any particular ideal of life; for there are as many ideals as there are persons. Educational efforts, it would seem, must be limited to securing for every one the conditions under which individuality is most completely developed: that is, to enabling

him to make his original contribution to the variegated whole of human life as full and as truly characteristic as his nature permits; the form of the contribution being left to the individual as something which each must, by living and in living, forge out for himself.

Stated thus crudely this aim is not likely to win acceptance from every hearer. The impulse of some will be to dismiss it, regretfully, as impracticable; that of others to reject it, indignantly, as immoral. Since, however, it follows logically from a tenable view of life, let us waive for the moment the question of its practicability and see what can be said in defence of its moral character.

We may anticipate that the first charge to be met is that it permits no discrimination between good and bad ideals of life: between forms of individuality that ought to be encouraged and forms that ought to be suppressed. Is the schoolmaster, it will be asked, to foster with sympathetic impartiality the making both of an Émile Pasteur and of a Cesare Borgia?

The counsel for the defence must no doubt make a concession here. He will grant that the educator's duty does not require him to foster a bad life on the ground that it promises to achieve the uniqueness of a good poem. But he will point out that this admission does not invalidate the aim; it simply limits it to the field encircled by the moral law. Within that enclosure there remains infinite room for its application. A cook's life, for instance, may be as blameless as a missionary's; the world needs them both, and becomes richer as each becomes better after his own kind. Even where the moral law is positive, obedience takes forms endless and incalculable; "the spirit bloweth where it listeth." A motorist (it has been said) best shows his love for his neighbour by keeping to the left of the road. The point need not be laboured. It is manifest that there is no limit to the number of life-patterns into which good and blameless actions may be woven, and that it is impossible to formulate in advance the concrete principle of excellence of any of them.

The advocate may easily go further, and emphasise the difficulty of foreseeing whether a new type of individuality, a new form of expression in thought or action, will ultimately add to or detract from the real riches of the world. It is fatally easy to condemn as contrary to beauty, truth or goodness, what merely runs counter to our conservative prejudices. We know how often in the past men have sought to suppress the creative activity whose fruits have later been seen to be among mankind's greatest treasures. We need to remind ourselves—teachers, perhaps, more than laymen—that these "old, unhappy, far-off things" are constantly being repeated and paralleled; now in trivial instances, now in matters of serious importance. The younger of this generation have seen the "futurists" break away from the tradition of painting—a portent met here with ridicule, there with anger, with active reprobation all round. Their elders remember that the same phenomena attended (how incredible it is!) the emergence of Wagner and the "music of the future." And how long is it since the entrance of women into medical studies shook Victorian England to the very foundations of its respectability? *E pur si muovo.* The teacher will do well, then, always to have in mind the warning of Gamaliel * and to beware lest haply he should be found to fight against God.

But the accusation of immorality may be presented in a subtler form. The proposed aim, it may be said, heads straight for anarchy and "the breaking up of laws"; for it ignores the obligations of the individual towards society. Here we are brought face to face with a problem which, precisely because (from the days of Antigone downwards) it has given rise to some of the most perplexing and tragic situations in life, is necessarily a crux for educational theory. The counsel for the defence will, no doubt, avoid raising the more

* Also, perhaps, the aspiration of Anatole France: "Espérons dans ces êtres inconcevables qui sortiront un jour de l'homme, comme l'homme est sorti de la brute. Saluons ces génies futurs!"—*Le jardin d'Epicure.*

troublesome issues, but on the general question he may be expected to submit to the court some such plea as the following.

In the first place, the fact that social obligations are not explicitly mentioned in the aim does not mean that they are either ignored or overlooked. They cannot be ignored, for they are an essential part of the material out of which individuality is fashioned. The view that social bonds are imposed upon the individual from without and accepted under the terms of a "social contract" has long been exploded. It is now universally recognised that they originate within man's nature and are inextricably woven into the texture of his being. The strongest creative impulses cannot fashion a life which would not fall to pieces if the social elements were withdrawn. The most "original" personality is unintelligible apart from the social medium in which it grows; and no Thoreau could hide himself so deeply in the woods as to escape from the social in his own mind. We need not require, therefore, that our pupils shall be taught to feel the force of social bonds; the need is rather that budding individuality should not be warped from its ideal, and bent by influences "heavy as frost and deep almost as life."

Again, what was observed of positive morality holds good equally here. Social obligations can be discharged in an infinite number of ways, and none can foresee or set bounds to what the human spirit may do in this as in all other directions. A daring and powerful soul may raise the whole moral quality of the social structure by asserting an individuality that may at first seem hostile to its very existence. And the unheroic soul, too, will best serve society by becoming most fully and truly himself. In short, the claims of society upon its members are best satisfied not when each is made as like his fellows as possible, but when, in Dr. Bosanquet's language, "he values himself as the inheritor of the gifts and surroundings that are focussed in him, and which it is his business to raise to their highest power."

At this point the advocate may be supposed to turn from those who mistrusted the morality* to those who doubted the practicability of the aim he is defending. He will not fail to point out to the latter that individuality is not at all the same thing as eccentricity. The crowd and the hero have both such potent influence that few of us are likely in our development to wander far from the established types. But even though I choose, for example, to dress myself as nearly as possible like my companions, the fact that the choice is my own is the circumstance that should count. Moreover, I shall certainly wear the clothes with a difference which, though small, is all my own. In other words, my individuality consists not in the fact that I am different from others (though I am sure to be different), nor in any deliberate seeking after difference, but in the fact that what I am springs from my own nature (including the social tendencies that are part of it) and is not an artificial product of the will of another.

From the practical standpoint it appears, then, that the aim we are considering makes no extravagant demands upon educational administration; it does not require a separate school or a separate teacher for every pupil.

* The acute reader will notice that our advocate has avoided by far the most difficult question: namely, whether society (or, to be precise, the state) may not at times of crisis demand from its members services that entail the supersession, even the final sacrifice, of their individual development, and whether an affirmative answer would not greatly weaken the general force of his argument. To this we may imagine him to reply that mankind is not condemned for ever to endure its present evils; if there is a will to escape from them, its nobler spirits ("Saluons ces génies futurs!") will certainly find a way. But if it is lawful to dream of a world in which the good of all would be much more nearly the good of each than it is at present, it is lawful to do whatever may help to make the dream reality. What, then, could education do better than to strengthen men's sense of the worth of individuality—their own and others',—teaching them to esteem the individual life, not, indeed, as a private possession, but as the only means by which real value can enter into the world? In this, it may be claimed, is the strongest bulwark of freedom and the firmest guarantee against the rule of violence.

What it does require is that school government and teaching shall be so conducted, and educational institutions so planned, that while the undistinguished child may be tempted and helped to throw himself with spirit into the business of making (or "realising") himself, the brighter and stronger souls, on whom the progress of the world mainly depends, shall not fail to find the nutriment they need in order to grow to the full height of their spiritual stature.

You will observe that I have delegated the expression of these views to a supposititious advocate. Is it to be understood, you will ask, that I have briefed this gentleman, or that I decline responsibility for his arguments? The question is a fair one, and I will answer it frankly.

In the first place, then, I admit that the counsel's position is one I find it impossible to repudiate. I become more firmly persuaded of its essential soundness the more I reflect on the problems of education and the more I study the attempts that have hitherto been made to solve them. In my judgment it is congruent with all the surer teachings of philosophy, science and history about the nature and destiny of human beings. It is, I think, manifest that our traditional school methods are largely based upon presuppositions and infected with ideas radically opposed to those teachings. They assume that it is the teacher's duty to play the part of a subsidiary Providence in children's lives and assign no limit to his activities in this capacity. To realise what this assumption implies, imagine what your attitude would be towards a person who should take in hand to "form" both your tastes and your character, and—here is the gravamen—refused you the right to reject his unsolicited ministrations. Can we maintain, without far-reaching qualifications, that what would be an outrage upon maturity is nevertheless a sacred duty towards youth? If we think so it is because we have far too little faith in the creative impulses that are the mainspring of every young life, and are, therefore, far too timid in exploiting them. Moreover it is to be feared that we have far too little reverence for the forms of individual existence which only those impulses can shape and maintain. I agree with my advocate that if we could bring ourselves to entrust to boys and girls a much greater share in their own education the results would fully justify our courage and our self-restraint.

On the other hand, though I firmly believe these things I can bring but little first-hand evidence to their support from my experience as a schoolmaster. My apprenticeship was served under the older tradition. Hence, although (as the ancient moralist said) I both see the better way and approve it, I am not confident that my engrained professional habits would permit me to follow it with success. It was, you will understand, a delicate sense of this weakness in my position that caused me to express my convictions by the lips of another!

There is, however, a rapidly growing company of witnesses to the practical efficacy of the ideas which my advocate defends. Justice as well as courtesy demands the place of honour for Dr. Maria Montessori. I am not to be understood as accepting her "system" as a whole, but no unbiassed observer can, I think, doubt that the influences of her doctrine and her personality promise to revivify the whole field of primary education. At the other end of the school period there is the wonderful work accomplished by Mr. Homer Lane in the Little Commonwealth. Among the numerous experiments inspired, directly or indirectly, by these great teachers one calls here for special mention, if only because it indicates that the new ideas have power to transform even that formidable thing, the public-school tradition. I refer to the experiment in self-government described with admirable candour and clearness by Mr. J. H. Simpson in his recently published book *An Adventure in Education*.

The significance of these essays in revolutionary pedagogy is chiefly in relation to school government and discipline. They show that the old authoritarian ideas on these matters, which we thought as firmly based in the nature of things as the everlasting hills, were, after all, only prejudices

or, at best, conventions. They prove that when those ideas are superseded, the school society, instead of dissolving in hideous ruin, may actually become a vastly healthier medium for young people to live in and to grow in. This discovery is of fundamental importance and must in time greatly change the character of our scholastic institutions. But the question to which I wish to direct your thoughts concerns the bearing of the new notions upon teaching method; for we must, I think, agree that it will be impossible to keep the new wine in the old bottles. Our present methods of class instruction belong integrally to the old tradition of school organisation and discipline. As that tradition disappears those methods must vanish also or become profoundly modified.

Here again many energetic reformers are and have long been at work. As might be expected, the most striking results hitherto obtained are in the teaching of the arts and crafts and music. Genuine culture in these subjects —so vitally important and yet so deplorably neglected—is impossible unless based upon the pupil's discovery and exercise of his own creative powers. That is why teachers who can exploit those powers have brought about what seems to others an almost incredible revelation of human faculty. Forgetful of the long-buried tradition of our greatness as a nation of artists, craftsmen and musicians, we think of the power to produce beauty as a gift granted only to the few. These teachers have rediscovered that it is almost as universal as the capacity to do arithmetic.

As regards the "intellectual" subjects of the curriculum, Professor Armstrong's famous propaganda undoubtedly opened the way for still more radical reformers. In mentioning these it would be ungrateful not to pay a tribute to the pioneer work of Mr. M'Munn. Mr. Caldwell Cook has shown in his vigorous and entertaining book, *The Play Way*, what may be done in the teaching of English by a courageous desertion of the didactic attitude and a bold encouragement of the pupil's spontaneity. Many enterprising men and women are making experiments along similar lines in other subjects. I instance a friend, headmaster of an ancient grammar school, who has entirely abandoned the class-method in teaching Latin and Greek, and has found his wisdom justified even by the examiners for classical scholarships. He forbids me at present to mention his name, but promises to make his experience public when it is more mature.

It will, perhaps, be thought that while other subjects may, without great harm resulting, be handed over to these subversive enthusiasts, mathematics must at any rate be preserved from them. If we allow a boy to roam where he pleases in mathematics, and if our rôle is merely to follow his lead, what will become of our curriculum, with its venerable hierarchy of ideas and processes and the nice gradation of difficulties based on the experience of generations of teachers? What, above all, of the logical training which many of us value as the chief function of mathematical teaching? I own that I am little moved by the fears these questions express. I have long held that in mathematics the "play way" is the best way, provided it can be followed under proper conditions and (I must add) with proper seriousness. I reached that view by studying the progress of a boy whom I once had excellent chances of observing. His official instruction in mathematics was very meagre; I regret to say that he attached to it no importance whatever. But he had the adventurous imagination which is the common and supreme treasure of boyhood, circumstances gave him rather unusual freedom to indulge it, and he had access to a reasonably liberal library. He developed a passion for surveying on the grand scale, for astronomy, for the lore of men who go down to the sea in ships. I remember that he once absented himself from a Local Examination—to be precise, he "cut" the Scripture paper—in order to observe that rare phenomenon, the transit of Venus. He reflected that while one may run away from an examination and live to pass it another day, a transit of Venus, once missed, is missed for ever. These tastes could

not be pursued without mathematics, so he acquired a store of shockingly illegitimate knowledge of that subject. He could use sines and cosines long before he knew the Sixth Book of Euclid and seven-figure logarithms before he had heard of the theory of indices. He employed complicated formulae of spherical trigonometry to find the hour of day by the sun without having the least notion how they were established. I must, however, do him the justice of saying that he was never contented with this empiricism, and was glad enough to know the why and wherefore of truths that seemed relevant to his favourite pursuits. In short, his self-acquired mathematics were scandalously scrappy and scandalously illogical, but had for him a reality and a substantial importance compared with which the discourses of his accredited instructors were as the crackling of thorns under a pot.

Nevertheless it is not a paradox to say that this boy's chief need was a teacher. But he should have been a teacher who conceived it his function to be, as Dr. Montessori is fond of saying, an observer. This does not mean a merely passive observer, contented to watch the human specimen and to enter his peculiarities in a note-book; but an active observer, prepared to "stand by" in the nautical sense of the term: that is, ready to lend a hand when a hand is needed, but not given to officious interference when interference is not called for. Under such auspices he might have become, in a small way, a real mathematician. As it is, he has to be contented to know that such mathematics as he learnt was not a dead burden, carried for a while and then dropped with relief; but is something that helps to direct and to colour his outlook on the world and is an essential vehicle of his self-expression: in a word, that it is woven into the fabric of his individuality.

I have given some time to my young acquaintance, not because he is exceptional, but, on the contrary, because he is typical. There are abler boys and there are duller; but, whether able or dull, all have their impulses that can be satisfied only by knowledge. I am convinced that the ideal way to teach all of them is, in principle, the same: namely, to put them where those impulses are likely to be awakened, and then to "stand by." In mathematics, boys' impulses generally follow a few well-recognised tracks, but one must be prepared for divergencies, sometimes unexpected, occasionally startling. I once had a pupil—I am now well content to be his—who at the age of fifteen was deep in the theory of equations. At his side sat a second who would look at nothing except the mathematics of electrical engineering. And there were others. "Standing by" was in those circumstances often a strenuous form of exercise, but I look back upon that period in my professional experience with less dissatisfaction than upon any other.

These small experiments of mine were conducted in a Sixth Form, where the atmosphere is serene and the bonds of class work and discipline may easily be, and commonly are, relaxed. Many of my audience have no doubt done the same sort of thing in similar circumstances. But what our reformers envisage is nothing less than the adoption of this type of teaching throughout the school. The moment such a prospect is presented certain difficulties inevitably arise in one's mind. Let us briefly consider the more important.

The basal principle of the new gospel is that primacy must be given to the pupil's bent; for the real driving power in education is always from within, never from without: it is a *vis a tergo* not a *vis a fronte*. What guarantee is there, then, that the pupil's bent will lead him to learn the things he ought to know? Is he to be allowed to leave school ignorant of essential studies simply because he happens never to have felt their attraction?

To this question the reformer might fairly reply with another. Does the disaster you contemplate never happen under the present system? Do you really succeed, by "forcible feeding," in making your pupils assimilate what you think they ought to know? But the *tu quoque* form of argument generally covers an attempt to evade an issue. Let us face the issue, and agree that if a child does not give himself spontaneously to essential studies

he must be made to do so. It must not be assumed too readily that the compulsion need be external. At the Caldecott Community, for example, where the possibilities of "individual education" are being explored with admirable scientific caution, children of seven are taught to plan each day's work at the beginning of the morning, while older children map out in the same way their proposed activities for each week. As a matter of course they submit their programmes to their teachers. If essential but unattractive subjects seem to have less than their due, the defects are pointed out. The better judgment of the child as a rule accepts the criticism and makes it his own.

This is a simple instance of a procedure that must often be adopted if the new method is to be used with discretion and not followed with the blindness of the doctrinaire. External compulsion, except as a remote and last resort, has no place in the scheme; but persuasion and the prestige of age and experience retain their natural right to influence conduct. Indeed their sway is all the more powerful when there is no suspicion that they are merely the kid glove hiding the mailed fist. Thus, even Mr. Bernard Shaw, who allows to children the extreme of liberty in self-determination, still claims for the teacher the right to "bias" the child in the exercise of his freedom.*

In the next place, it must be admitted that the number of things that absolutely must be known by an educated person is rather surprisingly limited. When one has set down the power to read with ease and comprehension, the power to express oneself fluently and correctly in speech and writing upon subjects one understands, the power to do simple computations, the list is almost if not quite exhausted. Beyond these things there is much it is desirable to know; much, if you please to put it so, that everyone ought to know; but little that everyone must know. It is, I agree, deplorable that a boy or girl should leave school with wisdom at one of her main entrances quite shut out; but in saying so I am voicing, I suspect, the prejudice of a schoolmaster rather than the judgment of the world. Even the little world of "cultivated" people is by no means constant in its demands. Herbert Spencer complained bitterly that the man who would be covered with confusion if he misplaced the quantities in the word Iphigeneia could admit, unabashed, complete ignorance about his Eustachian tubes. Before very long the conventions of polite society may be reversed: for instance, a knowledge of Mendelism may become the "freemasonry of gentlemen" and a reference to Horace be regarded as a lapse from good taste. Meanwhile the greater world is widely tolerant of ignorance in most matters provided it is outbalanced by competent knowledge in others. We might with advantage, perhaps, admit more of this tolerance into the school.

But special cases of the kind now contemplated are and always will be rare. The great majority of boys and girls are like the busybody in Terence's play—nothing that possesses permanent and substantial interest for humanity leaves them unconcerned. Here, expressed in brief, is the psychological sanction for the school curriculum. If a subject that represents one of the main historical lines of human interest fails to attract a healthy young mind at the normal age the fault is most probably in the presentation. The teacher should try again.

This argument brings us to the second of our problems. If the teacher is not to teach nor, it would seem, to "keep order," what functions are left to him? As regards "keeping order" I must, for brevity's sake, refer the inquirer to Mr. Homer Lane and Mr. Simpson. As regards instruction, it is certain that the teacher's functions will not be less important or less difficult than at present. He must, as we have seen, practise certain negative virtues:

* Mr. Shaw has devoted one of his formidable "prefaces" to an acute and eloquent discussion of the main topic of this address: "Parents and Children," in the volume of plays entitled *Misalliance*.

he must keep the *docendi cacoethes* under firm restraint and learn to "stand by." But in addition he will have positive responsibilities whose exercise will give full scope to professional cunning. It will be his business to create an environment in which his pupils' impulses towards mathematical knowledge will naturally be wakened, and to shepherd them unobtrusively in the right directions. Himself steeped in the best traditions of his subject, it will be his task to see that by suggestion, inspiration and criticism those traditions enter into and form the minds of his pupils. He will be an "idea-carrier" between the great world and the artificial microcosm of school, infecting his pupils imperceptibly with germs that will fructify into ideals of sound workmanship and devoted labour.

Lastly, there is the difficulty of school organisation. It is incontestable that the rigid class-system and the rigid time-table are incompatible with the new method. For my own part I should rejoice to see those institutions replaced by others less violently unnatural. You all know how a familiar word, persistently stared at, suddenly becomes almost alarmingly strange and meaningless—how it seems to glare back from the page with no speculation in its eyes. You will have something like the same uncanny experience if you watch the operation of a school time-table after rigorously clearing your mind of its familiar associations. From 10.15 to 11 twenty-five souls are simultaneously engrossed in the theory of quadratic equations; at the very stroke of the hour their interest in this subject suddenly expires, and they all demand exercise in French phonetics! Like the agreement of actors on the stage, "their unanimity is wonderful"—but also, when one comes to think of it, ludicrously artificial. Can we devise no way of conducting our business that would bring it into better accord with the natural ebb and flow of interest and activity? It may be that the specialist system, often a tiresome complication of the present arrangements, would make a more fluid organisation perfectly feasible. There must still be, no doubt, certain fixed periods for collective work; but during the rest of the day each specialist's room might be a "pupil room" in which boys or girls of all standing would work, singly or in small groups, in independence of one another and for variable lengths of time. It would, ot course, be necessary to record each pupil's progress and to see that he followed a reasonable programme of studies; but I find no reason why in such matters methods like those of the Caldecott Community should not be universalised.

But it is time to check the flight of speculations which have already travelled, perhaps, too far from actuality. Indeed you may think that, like the poet, I "sing of what the world will be when the years have died away," but of what it can never be in finite time. That is quite possible; progress towards an ideal is necessarily asymptotic. The important question is whether the ideal marks out a desirable line of movement. I have confessed that freedom for each to conduct life's adventure in his own way and to make the best he can of it is for me the only universal ideal that has the support of nature and the approval of reason; the beckoning gleams of other ideals are but broken lights from this. That freedom is the source of all the higher goods. Apart from it duty has no meaning, self-sacrifice no value, authority no sanction. It offers the one possible foundation for a brotherhood of nations, the only basis upon which men can join together to build the city of God. Hunger for it is the secret source of much of the restless fever of our age. By a paradox as superb as cruel, millions of men who share our speech and millions more who share our hopes have given up their own claims to it so that in the end it may become the law of the world. For if "to make the world safe for democracy" means not this, it can mean nothing but to exchange one tyranny for another. Dare we take a lower, and can we find a higher, ideal to be our inspiration and guide in education?

T. P. NUNN.