

ALUMNI

# Adolescence

*Cephas Guillet*

BY

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BY CEPHAS GUILLET, PH.D., TORONTO.

It is about 150 years since the publication of Rousseau's "Emile," which was a protest against the artificial, cut-and-dried methods of education that then prevailed, and, strange to say, still too largely prevail. His slogan was Back to Nature. All is good, he said, issuing from the hands of the Author of things; all degenerates in the hands of man. The aim of education should be that of nature. The educator should do nothing but study under the head mistress, nature, and hinder her cares from being nullified. To the nature of the child himself, however, Rousseau seems to have given little attention. He seems generally to be thinking of physical nature. We must, he says, bring the child into direct contact with nature, with things, which will of themselves develop him aright. And he has a strange distrust of human nature, especially as seen in the family and in society. Hence Emile was hardly trained to be a social being. Rousseau thought much of the training of the senses and of the reason, but little of the training of the feelings. And yet, if the senses are the source, and sensations the raw material, of knowledge, the feelings are the source of power, the raw material of action. Indeed, emotion is the motive power of both thought and action. It is the root and spring of all the activities of body, mind, and soul. A strong body, with keen senses, must be inhabited by a soul rich in instinct-feelings to produce a noble, effective, well-rounded personality. The lack in Rousseau's great book was partly supplied for childhood by Froebel's "Education of Man," which was published in 1826. The lack has again been supplied in part by a work which has been only recently issued, and which promises to be as epoch-making as the "Emile" and the "Education of Man." I refer to Dr. G. Stanley Hall's "Adolescence." He insists that education must be based upon the study of the nature of the human being in all its aspects and throughout all the stages of growth and development.

Rousseau's work was rather destructive than constructive. Its merit lay in calling attention to an evil and in pointing

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ALUMIN

men in the right direction for its cure. But neither he, nor even the great and sympathetic Froebel, with all his insight and philosophic grasp of principles, was able to apply aright the method of nature. The fulfilment of such a task had to await the development of the sciences of physiology and psychology. Dr. Hall's work has the advantage of being squarely based upon these sciences which have of late years progressed with rapid strides.

The ideal condition of society consists in every man's doing what nature designed him to do. The educator, therefore, must appeal to the natural interests of his pupils, must satisfy their real needs, must develop their true capacities. To be able to do this, he must first study to understand those interests and needs and capacities. The chief business of the educational psychologist is, then, to determine the nascent stages of growth of the various powers and faculties of body and soul, the period, namely, when each has its rise or its most rapid growth. These nascent stages once determined, it will be the educator's plain duty to seize upon each betimes and develop it to the full as the only natural foundation and preparation for the next life-stage. Such is the genetic method of education; and it is opposed to the logical method, which bases itself upon the orderly development of the subject-matter of instruction without regard to the nature of the learner. Instruction that does not appeal to budding faculty is wasted, and neglect of any nascent stage weakens the force of even the best efforts in succeeding stages. Thus child-study, or paidology, using the word to cover the whole period of man's immaturity, is of the first importance to the educator. This fact is happily becoming recognized more and more in our day. A new enthusiasm for childhood is sweeping over the civilized world, and bids fair to bring about a new reformation dealing with the most fundamental part of our nature. It is giving us a new point of view from which to consider the greatest of all problems, the problem of the training of the young and the immature. This movement is an outcome of the wider biological interests stimulated by Darwin's notable works on Evolution.

Already before birth the infant has had a history and a most remarkable one. In a marvellous succession of changes of form he has recapitulated the early history of man from the dawn of life; and from being a simple one-celled animal he has become at last a higher mammal. But the child at birth is not yet structurally a human; he is even behind the

ape in some important respects, and particularly in the curvature of the spinal column, which is that of the lower quadruped, and does not fully acquire the curvature peculiar to the human biped until the second or third year. The hand is a mere prehensile organ like the ape's for some months, and while it possesses remarkable power of grip, it is not reached out to grasp objects till the fourth month, and even then with great uncertainty and little control. The development of the human faculty of manipulation is a long and slow process, involving fine muscles, that have been added late in racial history. Speech is another human faculty that is very slowly acquired by imitation. The first words, uttered toward the end of the first year, express feeling or desire, and do not properly denote any object or action, particular or general, or even intentionally communicate a wish. The power to denote and to communicate by words generally evolves a few months later with increasing clearness of perception.

During the first years the human being passes through the earliest and most simple stages in the more distinctly human history of man, stages of which we have scarcely a record, unless it be in the bones and instruments and ornaments of prehistoric man found in caves. This period, the period of childhood, is characterized by rapid physical growth. From the moment life begins in a human creature, there is an almost uninterrupted progressive decline in his rate of growth in size. Before birth the growth per cent. steadily diminishes during each month. In the first year after birth the growth is greater than in any succeeding year. During the first three months the child gains weight at the rate of an ounce a day. In the second year the growth in height is also greater than in any succeeding year, but not the growth in weight. Thereafter the growth is fairly uniform for several years. What is true of the general growth of the body is also true of the growth of the brain. This increases two and threefold in weight during the first year, about ten per cent. more during the second, and about the same during the third; while in the fourth year it increases more than it will during the rest of life, and is nearly full size by the sixth year.

At the seventh or eighth year there begins a retardation in growth in height and in weight, extending over several years, and most marked in the tenth. This period of retardation is the period of boyhood and girlhood, and lasts

roughly from eight to twelve. The second set of teeth is almost completed during this period, the first molars appearing in the seventh year. At its commencement the brain has nearly reached its full adult weight, the slight addition being made mostly during this period. It is now that the development of the sensory and motor areas of the brain takes place, and particularly of the association fibres that connect these; and control is established over the accessory muscles. The boy possesses an all-devouring curiosity or sensory and motor hunger, but his inquiries and experiments are not deep and far-reaching; his investigations are, indeed, rather physical than intellectual, rather to satisfy his sense-hunger and muscle-hunger than any true intellectual craving. His efforts are extremely tentative and capricious, and he is incapable of sustained interest in definite problems. The boy is completely developed for individual life; and is well adapted to living, independently of his parents, just such a life as is led by savages. Both these characteristics display themselves particularly in his plays, which owe their existence and their interest to the fact that they are the relics of the serious occupations of his savage ancestry. From seven to twelve, games are almost exclusively individualistic and competitive. The boy's games are predominantly physical, open-air games from the eighth year on. Games of chase are particularly prominent, especially at nine. The boy is eminently active and practical, his energy going rather to activity than to growth, this being the most active period of life. He is self-centred and independent, lives in the real and the actual, and has little interest in ideals, being quite satisfied with himself and his surroundings, if only he be left his freedom. He looks backward rather than forward, and lives in the present and the past rather than the future. He has the keenest interest in history and biography, and especially in tales of active life, of battle and adventure and exploration, of other times and other lands and other peoples. What is said of the boy holds true to a considerable extent of the girl. Apart from running games, however, the girl's amusements are chiefly imitative, and centre mainly in the doll, notably in the ninth year. "The number of motor-activities," says Dr. Hall, "that are both inspired and unified by this form of play, and that can always be given wholesome direction, is almost incredible, and has been too long neglected both by psychologists and teachers. Few purer types of the rehearsal by the individual of the history of the race can probably be

found, even though we cannot yet analyze the many elements involved and assign to each its phyletic correlate."

The method of teaching by excursion and ramble, the direct observation of environment, and the imitation in play of the serious occupations of primitive man, is clearly indicated. This is also the time for forming motor habits and acquiring skill and technique. The accuracy of movement of the hand increases rapidly from six to eight. Before the age of eight the fine accessory muscles of the hand should not be greatly exercised, a fact that is, unhappily, commonly ignored in our kindergartens. Here little children are made to busy themselves with fine work, requiring the functioning and control of these accessory muscles, before they are sufficiently developed to bear the strain, before, in fact, the nascent period for the functioning of these muscles has arrived. But from eight to twelve the boy should be taught to play musical instruments, to model in clay and snow, to carve in oak, to write, to draw natural and conventional forms with rapidity and facility rather than with accuracy of detail, especially in the earlier years—all with a view of getting easy control of the hand and ready co-ordination of hand and eye, and of hand and ear.

With the momentous physical changes of puberty, body, mind, and soul undergo a wonderful transformation, a veritable rebirth. Physical growth, both in size and strength, takes a bound forward. The heart increases greatly in size; indeed, during the whole period of adolescence (the teens and early twenties) the heart doubles in size, with consequently augmented pressure upon the blood-vessels and a rise in temperature of half a degree Fahrenheit. New feelings, new desires take possession of the soul. It is the age of aspiration. The youth is no longer so amenable to outer authority, but more and more he listens to an inner voice. It is the period of storm and stress, of great physical and psychical growth, change, and instability, of altruistic and predatory organizations, of conversions and crimes. The development of the powerful sex-instinct makes the youth a social being with vastly increased interest in his fellows and with vastly increased power of doing them both good and evil. This is the critical period of life. The youth's future is made or marred here. All depends in the last analysis upon the proper irradiation of the instincts of sex, upon their irradiation in healthful and wise directions. The more immediate satisfaction of the senses must be converted into a

higher kinetic equivalent, into enthusiasm for science, art, and philosophy, for humanity, for the ideal, for God.

With the approach of this unique period, at about eleven or twelve in girls, and thirteen or fourteen in boys, there occurs an acceleration in physical growth which reaches its height at twelve and thirteen in girls, and at fourteen or fifteen in boys, and then rapidly slows up, but is more prolonged in boys than in girls. There is a retardation at eighteen or nineteen, and thereafter little increase. On account of the girls' relative precocity of growth, there is a period during which they are taller and heavier than boys of the same age. For height this lasts from eleven or twelve to fourteen or later. The various parts and tissues of the body do not grow with equal and constant pace, but the energy of growth drives hither and thither. Boys grow stout most slowly while they are growing tall fastest, i.e., from April to August; and they grow tall most slowly while they are growing stout fastest, i.e., from August to December. Perverse or defective nutrition tends to retard growth, to delay the characteristic growth periods and to reduce the final size attained, as well as to produce criminality or moral arrest and reversion. Excessive functional activity has the same tendency, likewise disease and sexual precocity. The skeleton takes a prominent part in the increased growth of adolescence, especially the hips and chest. The circumference of the chest, which shows little increase from ten to twelve years, thereafter develops rapidly, reaching a maximum of growth at fifteen, but continuing to nineteen. Lung capacity, the most trustworthy index of vitality, likewise increases to a marked degree, especially from twelve to fourteen in girls and from fourteen to sixteen in boys. With deeper breathing is associated better oxidation of the blood, greater endurance power to resist disease, and intensity of life. According to Oppenheim, the muscular tissue grows faster during adolescence than any other tissue, unless it be fat in girls. This rapid growth of bone and muscle does not proceed symmetrically. Sometimes the muscles grow more slowly than the bones to which they are attached, which causes growing pains. Sometimes the reverse is the case, causing loose-jointedness. Again, the larger and more fundamental muscles take precedence of the smaller and accessory muscles in growth at early adolescence. It is little wonder if, with all this disproportionate growth, the adolescent is awkward and clumsy.



The central nervous system is divided into three layers or levels of successively later function. First and lowest come the spinal cord, medulla and pons, which mediate the reflex and spontaneous movements of infancy, and control the vital organs of the body. Then come the sensory and motor areas of the brain, which mediate controlled movements. These at adolescence develop a greatly increased power of innervation of the augmented mass of muscular tissue, resulting in a remarkable increase of strength. Lifting power increases fastest at fifteen, sixteen, and seventeen, biceps power at fifteen or sixteen, wrist power from fourteen to seventeen, and particularly leg power from thirteen to fifteen and at eighteen. Adolescents of both sexes nearly double their eleven-year-old grip by sixteen. This is evidently the golden period for the wise and judicious physical trainer. An English observer found that systematic gymnastics, which, if applied at the right age, produce immediate and often surprising development of lung capacity, utterly fail with boys of twelve, because this nascent period has not yet come. While strength and energy are increasing so rapidly, accuracy of movement, on the contrary, increases very little during the early teens. Disproportionate, inharmonious, saltatory growth would seem to be the order of nature. The energy of life flows now in one direction, now in another, so that strength and skill, structure and function, would seem to have a complementary or alternative development. That kind of education, therefore, that calls for motor control and precision in early adolescence, can only result in precocity and arrested development. At this period, on the contrary, it is the larger, more basal muscles that call for exercise and development; which nature sufficiently indicates by the sports and occupations to which, when not overburdened with lessons, youth naturally turns, namely, swimming, rowing, sailing, skating, hunting, hill-climbing, dancing (though its present form, unhappily, is degenerate), games of contest and rivalry, and the making of useful things. The plays and occupations of adolescence, unlike those of boyhood and girlhood, are mainly social and co-operative, and, in the normal, develop manly and womanly virtues, as well as that muscle and will power that is of such fundamental importance for all future growth and development.

The third and highest brain-level consists of the higher centres of the cortex front and back, which have no direct connection with the lower centres of sense and movement,

and mediate intellectual, esthetic, moral, and volitional activities and feelings. For these higher centres of reason, judgment, and imagination, adolescence is the nascent period of growth. The energy that earlier went to increase the size of the brain is now directed to increasing its complexity by the development of a network of finer fibres with which are co-ordinated the higher powers of the mind. The child cannot reason according to adult standards before fourteen, and any attempt to stimulate the reason before that age is unnatural and stunting. Says Dr. Hall: "The dawn of reason marked by the appetency for crude logical processes, the shadowy grasping of new and great conceptions, and the silent reverie and dreams of dawning adolescence, may be the first psychic function of new neural parts." Adolescence is the age, then, no longer of mere sense-curiousity, but of true intellectual investigation and analysis, of reflection and science. The youth is interested not merely in things themselves, but in their real nature, and in their relations to other things. The critical faculties are aroused and a higher self-consciousness evolves.

The imagination, which is in childhood so rich, but in boyhood and girlhood becomes submerged by the actual, has a new birth in adolescence, which is the nascent period for the appreciation of the beautiful and sublime in nature and art. It is interesting to observe the development of the art-instinct. The drawings of children under ten are not objective, but subjective. Young children draw not from immediate objects, but from mental images, which they freely put together in very strange and fragmentary, but often effective, ways to produce life in movement. To them drawing is not an art, but a language, which they love and should consequently be encouraged to develop in their own childish way. They take no account of perspective or proportion, and are not ready to solve perspective problems. Their drawings resemble the grotesque symbolic drawings by means of which primitive man expressed his ideas. At ten, however, boys and girls incline more and more to draw what they see, and they look more critically and see more understandingly. This, then, is the time to begin special instruction in imitative drawing that strives to reproduce the outer world. Boys and girls from eight to twelve take special interest in picturing continuous stories, displaying courage, energy, and naivete in their efforts. This is the nascent period, therefore, for this form of expression, a fact that should be, but seldom is,

recognized by teachers of drawing and painting. Boys and girls should be encouraged to express themselves artistically, and should not be kept everlastingly at the mechanical work of copying and drawing from objects. At puberty another change takes place. The youth is self-critical, he has keener perceptions, and new ideals of action and expression, and is less easily satisfied with his productions. His power of accurate expression in drawing also is lessened in the early years of adolescence by the predominant growth of the fundamental muscles and the comparatively weak control of the accessory muscles. Consequently, with rare exceptions, young people of this age, i.e., from twelve years on, lose all interest in drawing themselves, although their appreciation of the work of others is much greater than before. Of a class of some thirty boys in their early teens, whom I desired to illustrate a simple story, all except two either failed altogether, or made but the crudest efforts. Of these two, one had had no training, and the other only a little, chiefly in manual dexterity. Both have special artistic talent. I had similar results in two larger classes of boys and girls in their early teens. Nearly all failed utterly to illustrate, in any kind of interesting or effective way, either this simple story or any of the Greek myths which I read to them, and in which they showed great interest. From his own work and the work of others in the study of the drawings of the young, Dr. Lukens has been able to construct a curve, which shows the complementary development of receptive interest or appreciation and productive power or creation in art. In boyhood productive power is in the ascendancy, in adolescence appreciation. There is also a marked rise at fifteen in the powers of both the visual and the auditory memory. In later adolescence motor and creative power again rises. It is in later adolescence, then, that the motor element, so important in education, should be emphasized both in art and science. In early adolescence, on the contrary, artistic training should be addressed primarily to the perceptive faculties and to the imagination, and should develop the powers of appreciation of beauty, grace, and sublimity in form and color and sound and action. The mind will thus be stored and the ambition stimulated for the future bodying forth of the youth's own noble conceptions either in art, or, if he prove no artist, in the other activities of life. There is in the high schools of Ontario, so far as I know, no provision for this sort of training, the training in artistic appreciation. Even in literature, instead of striving to bring the youthful mind into inspiring

contact with a wide range of the best literary productions, we limit it, for the most part, to the minute and critical examination of a few set pieces. At adolescence there is a rebirth in the language interest, which is not now, as in the child, a mere interest in the words themselves, but rather an interest in words as instruments to express the many new thoughts and emotions that cry for utterance.

In early adolescence, the nascent period of cloud-fancies and moon-psychoses, the heart opens to nature; in later adolescence, the mind. In early adolescence, therefore, the training in nature should be addressed mainly to the heart, to the imagination; in later adolescence, to the intellect. Early adolescence is the age of sentiment, later adolescence the age of reason, of philosophy. The sciences, as sciences, being highly specialized studies, should be reserved for the age of specialization, which is later adolescence. Early adolescence should be devoted to developing that interest, that enthusiasm, that love for nature, which alone can carry the youth successfully through the scientific training which should follow.

Boyhood is the age of moral habits, of the supremacy of the law, which addresses itself sternly to the will. Adolescence is the age of ideals, of the supremacy of the Gospel, which appeals persuasively to the inner voice of conscience. The boy's religion is a clan religion, the primitive religion of the tribe, the church, the family; the youth's religion is a personal religion, the self-conscious religion of the individual. Adolescence, then, is the nascent period of true spiritual religion. Conversions before and after are rare, the great majority occurring between twelve and seventeen. If this fact were more clearly realized in our Sunday-schools, nay, rather in our families, there would be less need of sporadic revival services. The state schools, also, should not so utterly neglect the religious side of the youth's nature. The whole atmosphere of our schools is bare and hard and commonplace, whereas it ought to be filled with love and sympathy, with joy and beauty. Music, art, religion, sociability, ideals, which are the natural food, the native air of youth, are banished from our schools. Is it any wonder that under such conditions teachers and pupils so often fail to get into living contact with each other and with their work? To educate and to be educated is to live, to unfold—not to give and learn lessons.

In later adolescence, from about seventeen on, religion becomes more intellectual and philosophical, and many doubts

and questionings arise, which require all the tact and insight of a wise mentor to answer. Happy is the adolescent who has such a mentor, all through this period of storm and stress, in a trusted parent, or teacher, or friend. I have heard of parents who were far from this; who, in fact, either held their children at a distance in all questions touching not only religion, but sex, or else spoke without knowledge, in either case making still harder, and sometimes very bitter indeed, the inevitable struggles of this stormy stage of life. In matters of sex, thousands of young people on this continent turn from their natural advisers, so oblivious to the condition of their youthful minds, and address themselves to designing quacks. These nurse and prey upon their fears, fears which are generally based upon perfectly normal phenomena. Not content with this, these quacks actually sell these confidential letters at so much a thousand. While I was at Clark University, one of my fellow-students proved this by buying from a dealer several hundred of these letters. A frank statement of physiological facts by a wise and tactful friend in whom they had confidence would have saved every one of them much misery.

Adolescence is the plastic period par excellence, the period of the educator's opportunity. To the extent that the youth's and maiden's instincts and interests differ, to that extent should their education also differ. Training for wifehood, for parenthood, for home, and for social duties, should surely be central in the education of young women; training for manhood and the service of man in the education of young men. Later adolescence is pre-eminently a period of specialization and efforts at mastery. It is at this time that the youth should devote himself to the cultivation of his special talent. While musical talent is usually displayed earlier, and the talent of the writer and the inventor later, it is at seventeen or eighteen, on the average, that artists and poets first show unmistakable talent, that actors achieve their first great success, that scientists begin to feel a warm interest in science, and that noted pioneers leave their homes. To deal with this period of later adolescence the very highest ability is required in the educator. Of the three forces of which every man is a resultant, heredity, environment, and variation, variation now predominates. It is out of adolescence that the present period of civilization and Christianity has grown, and it is out of adolescence that a nobler future is being slowly but surely evolved.