

THE PHYSICAL WELFARE
OF
THE SCHOOL CHILD

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SCHOOL CHILD

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CHAPTER I

THE IMPORTANCE OF PHYSICAL EDUCATION

RECOGNITION OF THE CHILD

The Supreme Factor in Education.—This is the century of the child. There has never been a time in the history of the world when the needs and the interests of children have received anything like the consideration and the study that they do to-day. Progressive educators and teachers throughout civilization now regard the child as the supreme factor in education. This view is gaining ground in every department of modern national life, and public opinion is gradually becoming conscious of the fact that education will have its greatest influence only when the child is put first and is permitted to occupy the very centre of all educational systems.

Until recently the significance attached to the educational system obscured the teacher's vision of the individual child and was responsible for the emphasis being placed upon secondary factors. For centuries the subject-matter was the centre of gravity and the dominating feature in education. More lately, through the influence of Herbart and his followers, the emphasis was transferred in a measure from the subject-matter to the methods of instruction to which undue importance was often attached. The Herbartian doctrine rightly taught that the teacher is more important than the subject-matter, but failed to appreciate that the child to be educated is more important than either teacher or subject-matter and that both the latter are in reality subordinate factors in education. The school exists for the child, not for the teacher or the curriculum. For centuries school children were sacrificed to the curriculum, but a gradual shifting of the emphasis is now occurring. At present, in all enlightened communities at least, the curriculum is very properly regarded as a means to an end and is accordingly assigned its proper place. The modern teacher teaches the child rather than the subject, and recognizes that the curriculum is made for the child, and not the child for the curric-

ulum. Modern educational inquiry has shifted the emphasis from an examination of the ideals, traditions, theories, and practices of the past to an investigation of the nature of the child. Although a few prominent educators of the seventeenth, eighteenth, and nineteenth centuries, such as Locke, Rousseau, Pestalozzi, Froebel, Seguin, and Spencer, recognized the supreme importance of the individual child, it remained for the twentieth century to discover and reveal to teachers generally the child's proper place in the educational system. This has resulted in unprecedented activity and interest in the scientific investigation and study of the school child, which in turn largely accounts for the keen, general interest in children which prevails at present.

The Nation's Greatest Asset.—Every enlightened nation of to-day recognizes in its children its most valuable asset. It realizes that latent in them are all its physical, intellectual, moral, and social possibilities. Moreover, it recognizes that not its prestige alone, but its very existence, depends upon the conservation of the child. Thus, intelligent nations are turning their attention as never before to the careful and serious consideration of the best methods and devices of guarding and promoting the interests of childhood for the sake of both the child and the state. Child psychologists and other students of child welfare are gradually forcing upon public opinion and upon state authorities the view that it is of supreme importance that immeasurably greater emphasis should be placed upon the conservation of the child than upon the conservation of any other national resource whatsoever. It is gradually being recognized that it is not the forests, nor the minerals, nor the agricultural or industrial possibilities of a country, but the children, that are the greatest asset of any state. The investigations of child life by private individuals, social organizations, and universities have proceeded far enough to establish their value and to convince governments of the wisdom and urgent need of making very much larger appropriations for the education of the school child than for researches in agriculture, or for any other state activity.

Surely researches, concerned with the complex physical and mental needs of school children and with the intelligent supervision and direction of their lives, will yield an immeasurably greater return to the present and future welfare of the nation than any conceivable amount of research work in purely material resources. The conservation of the child is one of the most compelling world-necessities, one of the clearest obligations of intelligent people, one of the great programmes of modern society. It is the most vital of all human problems, for upon it depend both the welfare of the individual and the ultimate destiny of our civilization. In relative importance all other questions become mere, trivial, academic discussions.

PHYSICAL WELFARE OF PRIMARY IMPORTANCE

In this great problem of conservation, primary attention should be given to the physical welfare of the child, for in the order of development the physical is prior to the mental and should be educated first both for its own sake and for the purpose of laying the best possible basis for mental and moral growth. In the past many teachers did not seem to realize that the child to be educated has a body as well as a mind and that the physical is the foundation of all life, mental included. The mind has often been developed at the expense of the body, with disastrous results to both. For centuries, in fact, the main attention of parents and of teachers and educators generally was directed toward the purely mental development of the school child. The pendulum is now moving in the other direction, and for the moment it would appear as if the physical education of the child is to receive almost undue consideration. There is, however, no danger of this occurring, as the whole movement is based on a more intelligent and scientific conception of the nature of the human organism and of the value of human life. In reality the emphasis is being transferred from the purely mental side of the child's nature, not to the physical, but rather to the whole child, whose entire individuality is regarded as an essential

unity, every phase of which should receive adequate care and training in order that a proper balance may be maintained. It is now generally conceded that Locke, Rousseau, Froebel, Seguin, Spencer, and other prominent educators since their time were right in so far as they claimed that the true interests of childhood, as well as of maturity, are best promoted when the purely physical side of the child's nature receives primary consideration.

The First Function of Home and School.—With all the authority of biology it may be affirmed that the first function of both home and school is to secure and maintain the physical well-being of the child, for upon this chiefly depend his mental progress and his social value. Until the world pays due reverence to the human body, the most wonderful and beautiful of structures, intellectual, moral, and spiritual advancement cannot attain their maximum growth. Modern nations have a clearer conception than that held by the nations of the past of the significance of the fact that the children of to-day are the citizens of to-morrow, and that the care given to their physical development determines to a large extent their intellectual and moral growth and ultimately the status of the nation itself.

A Sound Mind in a Sound Body.—If the brain power of a nation is to be increased, steps must be taken not only to conserve that which exists, but also to awaken in every child as well as adult an early and intelligent reverence for the body and its needs. It was Plato who said, "To educate the mind and neglect the body is to produce a cripple." "A sound mind in a sound body" is a familiar maxim, which points out in an effective manner the necessity of a substantial physical basis for all educational effort and mental superiority, but comparatively few people even in this twentieth century take anything like proper care of their bodies, notwithstanding the fact that it is all but impossible to have a thoroughly sane mind unless it is in a sound body.

MIND AND BODY VITALLY RELATED

Although philosophers, psychologists, and scientists are not yet agreed as to the exact nature of the relation existing between mind and body, owing to the fact that this great mystery has not yet been successfully penetrated, there is absolutely no doubt that the body and the mind, the entire individuality, develop together from the structure and the activities of the germ cells, and that they are very intimately and vitally related, as shown by their constant interaction upon each other during life. The mutual dependence existing between body and mind is becoming scientifically determined and better understood. The modern scientific view does not regard the body as being the cause of the mind, or the mind as the cause of the body, but affirms that the mind is related to the body in much the same way, in all probability, that function is to structure, and that both are inherent in one common organism or individuality, the entire organism being a unity. It regards the mind and the body of an individual as merely two aspects of the same unitary life process.

Clearer Recognition of this Relation Essential.—The important thing, however, is not the determination of the nature of the relationship, but rather a clearer recognition of the supremely important facts, that close and vital connection exists between the body and the mind throughout the entire life of the individual, and that proper care of the body is one of the most essential tasks of society. It is now well known that mental development rests upon a physical basis and that all mental operations are more or less dependent upon physical conditions and processes which occur in the brain or central nervous system. Every normal individual is well aware of the influence of the body upon the mind and does not require a scientific demonstration in order to be convinced. He knows something about the effects of fatigue, rest, stimulants, anæsthetics, and disease or injury upon the mind. He also knows that mental activity is dependent upon nervous energy and that mental excitement is accompanied by physical disturbance. It is only when the vital relation existing

between mind and body is clearly grasped that the importance and the far reaching influence of good health and physical vigour can be fully and truly realized. When the profound influence of bodily conditions upon the mind is duly considered and when it is fully comprehended that the brain continually participates in mutual co-ordination and interdependence with every other bodily organ and that it is so sensitive as to register the slightest physical disturbance, the urgent need of attending to the physical welfare of the school child may in a measure be appreciated.

MENTAL LIFE RESTS ON A PHYSICAL BASIS

Every mental process is accompanied by a definable change in the nervous system and leaves its effect upon the body. In other words, "There is no psychosis without neurosis." This is one of the most striking and far-reaching conclusions in modern psychology. On the other hand, every physical condition, state, or activity influences mental life through its effect upon the nervous system. The immediate physical basis of mental life, according to modern psychologists, is in the highest centres in the cortex of the cerebral hemispheres. These centres represent the highest levels of the nervous system and are intimately connected with every part of the body. When stimuli reach the cortical centres of the brain, the mind interprets the impressions. Improved mental development rests primarily, therefore, upon highly developed brain areas, which in turn are dependent upon bodily energy and vitality. A highly developed nervous system cannot be secured unless the individual gives primary and constant attention to his physical welfare.

Importance of Conserving Nervous Energy.—As mental activity is dependent upon nervous energy, it is evident that the state of the brain and body has a determining influence upon one's mental efficiency at any given moment. It is well known that the brain is in the best condition for mental work after sound sleep, during which uninterrupted repair has been effected; that it is in a comparatively poor condition

after several hours of close application and strenuous mental effort; and that, in general, brain energy corresponds closely with the amount of physical vigour. Although the mind is superior to the body in its potential reach, it is only when the body is in the condition of good health and abounding energy that the mind is capable of doing its most efficient work.

HEALTH INSTRUCTION

Early Knowledge of Laws of Health Essential. — Inasmuch as human efficiency and happiness depend upon good health and physical vitality, the school child should be furnished with such instruction as will tend to inculcate an early knowledge of and a permanent respect for the laws of health. Trained intelligence, directed and controlled by high moral ideals and made effective through vigorous physical powers, is of the greatest value to both the individual and the state. The need of awakening early in the school child a health consciousness and a true conception of the value of normal physical development is apparent to every adult, especially to those who have frequently transgressed the simple laws of health. That the problem is a somewhat difficult one owing to the inexperience of the school child cannot be denied, but that persistent, honest effort in this direction should go unrewarded cannot be conceived. Young children should grasp a knowledge of the simple rules of health as readily at least as they do those of arithmetic.

The mere teaching of the rules of health will not suffice, however; they must be impressed both by example and precept if the child is to learn to control his experience in such a way as best to promote his health and physical education. The constant observance during childhood and youth of the laws governing right living would result in incalculable benefit not only to the individual but also to his associates and the nation itself. It would be impossible to measure even the economic and social gain that would be accomplished by one generation which had sensed early the importance of the rules of health and right living and had consistently respected those rules

throughout life. There can be no hope of even approximating such an ideal, however, unless through the combined efforts of parents, teachers, social organizations, and other agencies there is firmly implanted in every school child a fixed determination to control his or her experience so as to harmonize with the natural laws of health and of physical development. Every effort should be made to place the child in conscious control of his physical experience. He should be impressed as early as possible with the idea that life is a developing process whose possibilities at any moment are determined largely by all the experiences that precede, and that a wrong use is made of the present when it is out of harmony with the highest good of the whole life. He should be taught that it is only by living perfectly in the moment that the best in life can be realized.

To keep well is one of the supremely important duties of every human being. Sickness is usually the penalty for neglecting or violating the simple laws of health or for exposure to disease. Herbert Spencer declared that, until all the breaches of the laws of health are regarded as physical sins and until the preservation of health is considered a duty, the physical education of the young would not receive all the attention that it deserves. The deplorable and vicious results of wrong living which are everywhere evident furnish abundant evidence of the incalculable benefit to both the individual and society of the early formation of habits conducive to good health and physical righteousness.

Value of Correct Views.—Although there should be implanted in every school child as strong a view as possible of the dangers resulting from bodily transgressions, there should be no exaggerations or overdrawn pictures, and the teaching for the most part should be positive rather than negative. The information imparted should be authoritative and the theories advanced scientifically sound. School children properly instructed in the laws of health will not only profit directly themselves, but will also carry on a health propaganda in their own homes and elsewhere, and will thus bring to the

present adult generation the most scientific methods for controlling health conditions and for promoting greater interest and intelligence generally regarding the value of physical education. It is only when correct views are given to the school child that these wide-spread and valuable results can be expected.

The Individual a Unity.—In emphasizing the importance of giving early and careful attention to the physical education of school children, it is not forgotten that the child is a unity, whose functions and activities should be developed and trained with a clear consciousness of such unity. The great problem of the school in this respect is to provide a scheme of education which will be broad enough in its scope to embrace the whole child and to develop his instincts, capacities, and powers in such a way that his functions, bodily and mental, may acquire the greatest activity, growth, and precision. In such a scheme the various physical activities and mental processes involved should be so correlated as to work in harmony and in the best interests of the whole child, care being taken to avoid the over-cultivation of one function or physiological structure at the expense of impairing another.

Good Health a Priceless Possession.—Good health is a priceless possession which must be earned by right living under sanitary conditions. The significance of this vital fact should be continually impressed upon the school child until its meaning is fully grasped and carried into practice. All health instruction which is not associated directly and persistently with right living is fruitless in its results, and this right living includes right thinking as well as right acting. Excesses of every kind should be avoided and correct habits established. Moreover, parents, teachers, and others must permit and assist the child to live rightly by setting him a good example, by securing for him a proper environment, by maintaining a right attitude towards him, and by avoiding undue pressure of any kind that may conflict with his physical welfare. The most needful thing of all, however, is the awakening of the right personal attitude toward the problem of health, which will

reveal itself in the child's constant desire to put forth effort on his own behalf. In the last analysis, true physical education must be self-evolved and self-directed, for without the active co-operation of the individual physical righteousness cannot be permanently established.

THE MODERN PHYSICAL WELFARE MOVEMENT

Its Importance.—The present movement in the interest of physical welfare and efficiency is unparalleled in the history of the world. Even that of Ancient Greece at the time when Sparta and Athens reached the zenith of their glory fell short of the modern ideal. At its best the Greek ideal aimed at securing the physical perfection of the few only, whereas the modern movement aims at including everyone. As Greek citizenship included only about one-quarter of the population of Greece, the remainder being slaves, probably not more than ten per cent. of the total population received the benefits of its educational scheme in this respect. To-day the aim is to care for the physical welfare of one hundred per cent. of the population.

The comprehensiveness and the superiority of the present movement on behalf of physical education are due to the fact that it rests upon a scientific basis. In this important respect it differs from similar movements in the past, which chiefly because they lacked such basis were doomed ultimately to failure. The discoveries of modern science have proved conclusively that vital relationship exists between psychical processes and the functional activities of the brain. They have demonstrated the fact that every mental process not only registers its effect upon nervous structure but is conditioned by and correlated with physical processes. Hence, arises the vital importance of giving due attention to both body and mind. No other course is rational.

Place Given to Physical Education at Different Periods in History.—At different stages in the history of the race, different ideals in regard to human values have been held, and these ideals have been largely responsible for the treatment

given the body. The predominant aim of primitive peoples was to survive in the struggle for existence, and as the nature of this struggle was primarily physical and only secondarily mental, almost exclusive attention was given to physical training. The Greeks aimed at securing both physical and mental perfection. Their great desire was to produce a highly efficient citizen. They regarded physical training as most vital in securing the harmonious development of mind and body. The Middle Ages were characterized by the absence of bodily training except among the knights who formed but a small percentage of the population of Europe. Through the influence of asceticism, attention in most of the monastic institutions was entirely devoted to the cultivation of the mental and spiritual life, and the body was neglected and abused. From primitive to mediæval times there was a gradual rise in the mental training curve and a constant decline in the physical training curve, the former attaining its highest point and the latter its lowest level about the tenth or eleventh century when the influence of asceticism was at its climax. Since the Middle Ages there has been a gradual rise in the physical training curve, the need of developing the physical as well as the mental receiving greater and greater recognition with the passing centuries. The present renaissance of physical education is one of the most significant features of modern civilization. Unprecedented attention is being given to the care of the body. No generation in the history of the race can compare with the present in respect to the care given to the physical welfare of the school child.

Its Purpose. — Recognizing the intimate relation existing between body and mind, that physical education in its broadest sense is essential to the highest interests of true citizenship, and that the foundation of individual and national efficiency rests upon physical vigour and vitality, the modern movement aims at giving due consideration to every factor which has a bearing upon the physical welfare of the individual. To teach the child how to live and how to control his physical experience in order to secure and maintain good health, physical

and mental superiority, the greatest individual happiness, and the maximum social worth, is its supreme purpose.

Its Scope.—The modern movement on behalf of physical education is introducing into the schools medical inspection, physical training, improved systems of heating, lighting, ventilation, and sanitation, as well as more rational courses of study, and saner methods of instruction and discipline. It is placing a new emphasis upon the importance of providing attractive, hygienic surroundings, large play areas, proper food, pure drinking water, modern sewerage systems, and sanitary conditions and equipment in schools and homes. It is giving parents and teachers a truer conception of their responsibilities in respect to the physical care and guidance of children, bringing home especially the urgent necessity of giving proper attention to positive health instruction and the removal of physical defects, and of becoming familiar with the simple laws of physical growth and development and with the influence of heredity. In a word, the modern movement has due regard for all the agencies of heredity and environment. It recognizes that both these factors are constantly at work in determining the character of the individual. Heretofore the hereditary factor has been largely neglected by those in charge of the education of children, but at present leading educators are urging the supreme value of ascertaining early a knowledge of the germinal equipment of the individual child and of its bearing upon his physical, mental, and moral growth and development. There is vital need on the part of parents and teachers of duly recognizing both factors in every phase of education, otherwise the problem of caring for the physical, mental, and moral welfare of children can be neither adequately understood nor properly solved. The child's nature, his instincts, his reactions, his character-tendencies and habits, his capacities and powers, and the laws of his growth and development can never be scientifically investigated nor fully appreciated unless proper regard for the bearing of both heredity and environment obtains. An adequate appreciation of the

nature and the extent of the influence of each of these complementary factors in education would tend to place the instruction and guidance of children upon a truly scientific basis.

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CHAPTER II

HISTORIC VIEWS OF PHYSICAL EDUCATION

A brief examination of the leading historic views as to the relative significance of body and mind and the value and place of physical training will serve not only to pass in review various positions taken by mankind on this important problem but also to impress a deeper appreciation of the attitude which obtains at present among the leading civilized nations of the world toward the physical education of school children. Men's views as to the value of caring for their physical welfare are determined chiefly by their conceptions of the nature of the body, its relation to the mind, and the prevailing ideals of human excellence. The person who has a wrong idea of the nature of the body and of its relation to the mind and who places a low or otherwise incorrect estimate on the value of human life cannot be expected to give proper care to either body or mind. It is, therefore, of supreme importance that right ideals should be inculcated and maintained, for upon these alone depends the physical righteousness of both the individual and the nation.

The chief ideals of human values held at different periods in the history of the race, and responsible in a large measure for the prevailing conceptions regarding the treatment of the body, may be characterized as the Greek, the ascetic, the knightly, and the modern or scientific.

THE GREEK IDEAL

The Greek ideal was the production of the best possible citizen. It recognized the unity of body and mind and embraced the training of both so that with the perfect development of the body the soul might become "a mansion for all lovely forms." It was Plato who said, "There is no symmetry greater than that of the soul to the body." The pre-eminence of the ancient Greeks was largely due to the attention given to their physical welfare. They actually aimed at physical perfection, and at one time did not fall very far short of attaining their praiseworthy ideal.

By means of gymnastic exercises and by very special attention to their physical welfare, they developed among themselves the most beautiful bodies and thus laid a sound basis for their supremacy in the realms of literature, art, and sculpture. Both the Spartans and the Athenians assigned physical training a prominent place in their schemes of education. Athletic, gymnastic, and military exercises were organized and ordered for the purpose of producing good soldiers, good citizens, and good men. The all-round development of the individual was aimed at and often secured. Bodily exercises were regarded as most vital in the development of the higher social qualities. To the Greeks, only the physically fit could be efficient citizens. Their young men were trained under proper supervision in the various forms of exercises designed and approved to produce physical perfection, great emphasis being placed upon imparting to the body dignity, gracefulness, freedom, and beauty. To render the body a ready, obedient, and effective instrument of the mind, and to make it beautiful at the same time, were the fundamental aims underlying the Greek ideal. This characterization applies mainly to the Athenian system.

Its Limitations.— Notwithstanding the fact that the Greeks excelled in physical training as a practical art, they lacked a clear grasp of the scientific principles upon which that art is placed, and, partly as a result, they did not stand long on the unparalleled, high pedestal of physical culture. Their political ideals deteriorated, and physical degeneration soon revealed itself. Their history amply demonstrates that mind and body ascend or descend together, for their mental superiority was contemporary with their physical perfection and their political and intellectual decline was accompanied by their marked physical degeneration.

In placing an estimate on the Greek conception of physical education, it should be borne in mind that it represents a pagan view, which largely accounts for its narrowness. Notwithstanding its limitations, however, over eighteen centuries of the Christian era elapsed before the development of the modern

theory reached a point worthy of comparison with it. To the ancient Greeks, the world stands forever indebted for a clear, sane, and practical view of the value of caring for the physical welfare of the individual. As a national institution, Greek physical education has no parallel in the history of the human race.

ASCETICISM

The ascetic ideal of the age of Monasticism was the antithesis of the Greek ideal. The body and the mind of an individual were regarded as a unity by the Greeks. During the Middle Ages, however, educational systems gradually became more and more rigid until there arose a failure to recognize the necessary harmony and balance between the body and the mind, which was the basis of the Hellenic conception of education. This was due mainly to the increasing separation of literary education from that of the art of war and to the appropriation of the field of education by the monks, many of whom regarded the body with contempt in comparison with the mind.

According to the ascetic view, the mind and the body are independent and mutually antagonistic entities. The application of this pernicious doctrine meant not only the neglect and the complete abandonment of physical education by the monks, but the abuse and maltreatment of the body as well. For centuries, both church and society frowned upon any attempt to make proper and adequate provision for the care of the body. Delicate health in women was extolled and physical strength in men condemned. All efforts and influences designed to elevate bodily achievements were suppressed so far as the monks were concerned. Asceticism placed a low estimate on the value of this life which it regarded as merely preparatory to the life to come, and not as an integral part of it. It regarded the body as vile and corrupt, worthy only to be neglected, abused, and maltreated. The mind was said to be the spiritual element in man, representing the immortal part of his nature, and was therefore the only part worthy of attention in an educational system. To attain spiritual excellence and insight as

well as mental superiority, it was necessary according to the absurd view of asceticism that the body should be entirely subdued by fasting and other enervating methods, and that all natural and material interests should be completely eradicated. The ascetic ideal carried to its logical conclusion meant the renunciation of the world and the inhuman disciplining of the body and its needs in order that the mind should be unfettered in its contemplation of the higher life.

Asceticism misinterpreted the true meaning of Christianity, and as a result the degradation and the torture of the body became the chief concern of religion. The religious enthusiast who could inure himself to the most terrible deprivations and bodily mutilations received special commendation. In fact, the ascetic was distinguished from others by his desire to subject himself to physical torture and to live in utter disregard of physical comfort or personal decency. The religious teaching of the Dark Ages led to a conviction that spiritual advancement could be best promoted through the abasement of the body, and this doctrine was largely responsible for the vicious practices carried on by the monks and other religious enthusiasts.

It has taken centuries to outgrow the influences of this monstrous and degrading doctrine and to root out its practice. Even in this twentieth century there are evidences of the iniquitous and vicious influence of asceticism which has done more than any other doctrine to retard and antagonize physical education. The ascetic view has been overthrown, however, by the modern or scientific view, and its last traces will gradually disappear. It is both interesting and instructive to note that the Dark Ages represent the centuries dominated by asceticism, when physical education was either neglected or condemned by the church and when the physical needs of children received little or no attention. The ascetics failed utterly to realize that physical education is an integral and essential part of the whole educational process and that the individual or the nation that neglects it can never attain the intellectual and spiritual advancement and the social efficiency otherwise possible.

THE KNIGHTLY IDEAL

The Knightly ideal of human excellence, which represented the secular point of view current during the age of Monasticism, was the production of finished soldiers and of cultured gentlemen. Chivalry represents the Middle Age conception of the ideal life of the knights, the only class outside the clergy who had any real power. The form of chivalry was martial, but its objects were chiefly social and religious. The aims of chivalry made it necessary to care for those phases of education which had been either neglected or condemned by the Church, particularly physical training and social service. As social distinction, upon which chivalry placed such a high value, could be obtained only by military achievements, it was essential that special care should be given to bodily training throughout childhood and youth. Chivalry recognized personal merit, and if a man became distinguished an honorary rank was given the family which was then considered noble.

Its Value and Limitations.—Although the knightly ideal exerted a profound influence for centuries, it fell far short of its possibilities owing largely to the fact that it was adopted by only those of the nobility or gentry who voluntarily took upon themselves the duties and the obligations of the order. The children of the common people were not trained in the courtly manners of the knight, as the privilege of receiving such education was extended to only those of gentle birth and independent estate. Nevertheless, the knightly ideal counteracted in an effective manner the influence of asceticism and helped the ordinary man to resist its teaching. At the tournaments, which were held frequently, the graceful knight displayed on his plumed steed the nobleness of his bearing and the superiority of his body which had been trained during youth in gymnastic and martial activities of every kind. The qualities of knighthood tempered and refined all classes of society, awakened a reverence for womanhood, dignified social service, and gave rise to a higher conception of personal merit, all of which helped to improve the standard of living.

Knightly education placed the emphasis on physical strength, gracefulness, courage, chivalry, and gentlemanly conduct. It made comparatively little provision for intellectual training which was regarded as less important than good manners and proper deportment. It dignified the ideal of service and taught the young knight the need of rendering his body obedient to his will, able to withstand the hardships of life, and capable of performing efficiently his social and military duties. Although lacking a scientific basis, the knightly ideal of education was responsible for awakening a new interest in the proper care of the body, which exerted a favourable influence for centuries.

THE MODERN OR SCIENTIFIC VIEW

The modern or scientific ideal of physical education is based on the belief that every mental activity is accompanied by correlated neural activity. By the aid of the recent discoveries of modern science the interconnection existing between the psychical processes and the functional activities of the nervous system is gradually becoming more clearly and definitely established. It is now believed by most psychologists that the immediate physical basis of mental life is to be found in the highest centres in the cortex of the cerebral hemispheres and that the amount of mental ability at any moment depends directly on the amount of disposable cerebral energy. The fact that every mental process is conditioned by and correlated with physical processes makes it imperative that proper care should be taken of the body in order that efficient cerebral action may be maintained. The scientific view of physical education rightly places the emphasis on the conservation of nervous energy which conditions mental growth, and which can be secured only by proper thinking and right living under sanitary conditions. To conserve one's brain power is one of the supremely important duties of life, which if neglected results not only in the curtailment of the individual's happiness and serviceableness but also in failure to attain the maximum reach of his possibilities in every direction.

Differs from Preceding Views.—The modern view of physical education, which has developed during the last three centu-

ries, differs from all preceding views in that it is based on a more extensive knowledge and a more adequate appreciation of the relation existing between body and mind and of the nature of their interaction and mutual dependence. It is deeply indebted to the researches, especially in biology, physiology, and psychology which have furnished a scientific basis for the study and the application of the laws of governing the development and the education of human beings. The knowledge of these and of other physical sciences has furnished man with a clearer insight into the nature of the relationship existing between the body and the mind, has given him a more adequate appreciation of childhood, has implanted a truer conception of the function of life, and has extended immensely his knowledge of himself in every respect. Among intelligent people the mind and its processes are no longer regarded as intangible and incomprehensible and altogether beyond the realm of physical laws, a theory which was held for centuries, but as indissolubly connected with bodily processes and dependent upon physical conditions. This means that the mind has a physical basis with which in some way it is vitally and inseparably associated so far as this life is concerned.

Emphasizes Value of Good Health and Physical Fitness.—

The scientific view of physical education necessarily emphasizes the supreme importance of good health, the urgent need of conserving brain power and nervous energy, and the value of psycho-motor training in securing proper mental and physical control. It urges the need of a wise economy of vitality by all individuals and nations who hope to attain success in the highest and truest sense. Moreover, it is responsible for the present unparalleled interest in the best methods of securing and maintaining the physical welfare of the school child, a problem which touches the basal needs of society in a most vital manner.

Further, the widespread influence of the scientific ideal can be readily traced in every phase of modern education. The need of making adequate provision for the physical factor is now recognized by all progressive educationists, and a be-

ginning, at least, has been made in reshaping the curricula of modern schools in such a way as to conform to the physical requirements of school children. It is now believed that the best nations of the future will be those that give the most intelligent care to the body. Hence, organized effort for the purpose of conserving the vital resources of modern nations is everywhere evident. Medical inspection, school clinics, open air classes, physical training, personal and sex hygiene, psychological examination of exceptional children, special schools for defectives, and numerous other child welfare movements, all of which are beginning to attract public attention and support in an unusual manner, are direct products of the scientific ideal. A few of the most important of these movements, in so far as they have a bearing upon the physical welfare of the school child, will be examined briefly in the following chapters.

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CHAPTER III

MEDICAL INSPECTION

A MODERN MOVEMENT

Although the growth of the medical inspection of schools in the modern sense has taken place chiefly during the past ten years, the movement originated in the year 1833 when France passed a national law providing for the sanitary inspection of its schools. Since that time laws requiring a system of medical inspection of school children have been passed in many of the leading countries of the world, including Sweden, Argentine Republic, Austria, Roumania, Serbia, Hungary, Switzerland, Norway, France, Japan, parts of Russia, Germany, United States, Great Britain, Australia, and Canada. The early inspection in all these countries was practically restricted to the detection of contagious diseases. The city of Brussels was probably the first to inaugurate a modern system of school inspection, school physicians having been appointed in the year 1874. The first city in North America to adopt the system was Boston, where it was begun in 1894. Montreal, Halifax, Hamilton, and Toronto were pioneers in the movement so far as Canada is concerned, the preliminary steps being undertaken in Toronto in 1910, and in the other cities mentioned a year or two earlier. The systematic health examination of school children is now assuming great importance among all civilized nations, and is being rapidly adopted in all progressive educational centres.

The imperative need of the medical inspection of school children for the purpose of detecting contagious and communicable diseases has long been recognized by all intelligent observers, but it is only recently that attention has been given to their systematic physical examination for the purpose of detecting physical defects and of giving timely suggestions as to habits of right living. The public is just awakening to a partial realization of the extent to which school children are handicapped by disease and physical defects and is be-

ginning to realize that a large percentage of their ills may be prevented by intelligent prevision and appropriate care and that serious consequences may be avoided by the timely visit of the medical supervisor or school nurse.

It was through a desire to promote the intellectual education of the child that adults first noticed the retarding influence of physical defects and poor health. Defective vision, for example, was corrected primarily for the sake of aiding the child to keep up with his school work rather than for the larger purpose of saving his eyes and protecting his health. But the larger view now obtains in all enlightened communities. The physical needs of school children are beginning to receive as much attention as the mental. Inasmuch as the highest mental attainments are conditioned upon good health, no system of education which provides for the training of the mind only or chiefly can win any truly great and abiding success.

HEALTH SUPERVISION OF SCHOOL CHILDREN A CIVIC DUTY

The health supervision of school children is a civic responsibility. To give instruction in the simple rules of health, to correct physical defects where possible, to discover congenital diseases and incipient ailments, and to make definite provision for giving proper directions to parents and guardians for the application of simple but correct methods of treatment are primary duties of public school authorities. A state that compels its children to attend school at the age of greatest susceptibility to disease and expects its schools to produce socially efficient citizens is under moral obligation to pass compulsory legislation for the purpose of safe-guarding their health. It has no right to enforce school attendance unless it has made full provision for guarding the physical, mental, and moral health of its pupils. True education is impossible to unhealthy children. Hence, the state must recognize and assume its permanent responsibility in regard to health supervision. No question is now raised as to the right of the state to assume responsibility for the formal education of

school children. This fundamental principle is accepted by all modern nations. It is essential, however, that the state should more fully realize that its educational scheme must be comprehensive enough to embrace the education of the whole child, the physical and the moral as well as the mental. The British Board of Education claims that the medical inspection of schools is based on a recognition of the close connection which exists between the physical and mental condition of the children and the whole process of education.

ITS PURPOSE AND SCOPE

The medical inspection of schools was instituted primarily for the detection and control of infectious and contagious diseases, and has extended to include practically everything that has a bearing upon the school child's educational progress. It now aims not only to prevent sickness, to recognize mental and nervous disorders, to check the spread of contagion, to discover physical defects, and to detect and check incipient disease and serious chronic ailments, but also to economize the time and energy of the pupils, teachers, and parents; to assist in solving problems of school government; to amass a body of reliable information relating to health problems; to disseminate a knowledge of the natural laws of health; and incidentally to acquaint the community with simple preventive measures. The supreme purpose of medical inspection, however, is to instruct the school child in the art of right living and to secure for him conditions that will make this possible.

The school building, its equipment, the methods of lighting, cleaning, seating, heating, and ventilating, and the play grounds, should be included in the scope of medical inspection. Nor should the frequent examination of the teacher's health be overlooked, for the good health of the teacher is essential. In fact, everything that has a bearing on the school child's health should be included. The report of a school physician, or of a competent school nurse, ought to prove invaluable to a teacher in regard to such matters as

classifying and seating the pupils, constructing a scientific daily programme, planning suitable physical exercises, and correcting unsanitary conditions.

PRE-SCHOOL AGE IMPORTANT

The physical examination of school children in the primary grades has established beyond doubt that they suffer widespread physical deterioration in the pre-school age, and further that most of their defects are preventable if properly attended at the right time. That extremely important period in the life of the child, which covers the interval between infant consultation and supervision by the school physician, requires urgent attention. Most children are healthy at birth and throughout the first year, after which physical defects of different kinds begin to appear in a very large percentage. Dental caries, rickets, adenoids, malnutrition, and diseased tonsils are responsible for most of the defects at this age. In order to avert physical deterioration during this crucial period, some scheme of state medical supervision should be adopted, together with facilities for remedial treatment and for the instruction of parents who are not competent to safeguard the health of their children. Everything possible should be done to permit the child to enter upon his school career free from the handicap of physical defects. The state is gradually realizing that it has a right to safeguard the health of its citizens from birth to death, and that the pre-school age is especially important. The most logical method of reducing the number of school children with physical defects is to treat them before rather than after they enter school. Preventive and remedial measures undertaken in the pre-school age will do much toward the elimination of physical defects in school children. It is the duty of departments of public health to safeguard the health and lives of all from infancy to old age. It would appear logical and proper, therefore, to place the medical inspection of schools under the control of the municipal department of public health, where such department is well

organized and thoroughly efficient. This plan has been adopted by many large cities in the United States and gives excellent results. Until efficient departments of public health are established, however, school authorities should assume the responsibility for the medical inspection of school children.

DUTIES OF THOSE RESPONSIBLE FOR ITS SUCCESS

Those who must bear the responsibility of improving and guarding the health of the school child from the standpoint of medical inspection are the school doctor, the school nurse, the teacher, the trustees, the municipal board of health, and the pupil himself. Each of these has specific duties to perform if the health of the child is to be cared for properly. The active co-operation of parents and guardians is also essential.

The School Doctor.—The school doctor must determine the causes of illness, suggest proper treatment, and see that all the requirements of cleanliness and sanitation are maintained; instruct pupils, teachers, and parents in preventive measures; insist on proper systems of lighting, heating, and ventilation; and regard himself as the ultimate authority on all questions relating to the health of school children. For this exacting work he must be very specially qualified in children's diseases and in preventive medicine. More than ordinary sympathy, a keen insight into the nature of educational processes, an investigating attitude, and a proper appreciation of the importance of his work are essential if he is to fulfil his duty toward the child.

The Nurse.—The school nurse forms an efficient link between the school and the home. Her chief duties at school are to detect signs of ill-health, to note physical defects of every kind, to assist the school physician in making physical examinations and to report results, to promote the efficiency of school work by improving the health of the children and thus securing greater regularity in attendance, to give first aid in the case of sickness and minor injuries, and to see that the directions and prescriptions of the doctor are carried out.

As the home is the place where the health of the child must be controlled ultimately, the nurse should aim at securing the sympathy and the co-operation of parents and guardians in order that healthful habits at home may be established and that the treatment recommended by the school doctor in special cases may be properly followed up. She should be competent to give parents information necessary to secure improved health conditions for the child. Her intimate knowledge of the child's school and home environments, her personal contact with parents, teachers, and children, and her skill in carrying out the directions of the school physician should make her invaluable in any system of medical inspection. Tact, cheerfulness, optimism, and a minimum supply of sensitiveness are among the essential qualifications in a good nurse.

The Teacher.—The teacher stands in closer relationship to the child than either the school doctor or the school nurse, and upon him the ultimate success of medical inspection largely depends. He should note evidences of chronic illness, skin eruptions, physical defects, nervous disturbances, swollen glands, and other abnormal physical conditions, and report them to the school physician or nurse. He should be able to detect the ordinary contagious diseases and to test the vision and hearing of his pupils. It is his duty to secure the active co-operation of the school janitor in order that his efforts to maintain the proper sanitary standard may be successful. Further, he should be familiar with the principles of hygiene and the simple laws of health, and he should exhibit a proper attitude toward the whole problem of physical education. The teacher's part in the health supervision of his pupils is very important, and should be kept clearly defined and limited if effective co-operation of the necessary forces in the health field is to obtain. These requirements indicate that greater attention should be given in training schools to the preparation of teachers for their responsibilities in caring for the health of school children.

The Trustees.—The trustees are responsible for the school site and building, the installation of proper systems of drainage, heating, lighting, and ventilation, the purity of the water supply, the sanitary control of the building and grounds, the facilities for healthy exercise and play, the scheme of medical inspection, and for the appointment of teachers and officers who are to use these and other agencies in the physical interests of the school child.

The Board of Health.—The municipal board of health is especially charged with the responsibility of checking contagious and preventable diseases, of insisting on the public and private observance of sanitary and health regulations, and of giving the community authoritative information on all problems relating to health. It should issue health bulletins from time to time, containing health suggestions and statistics and articles on timely topics written by competent authorities. Further, the medical health officer should be required to give lectures on health conditions, for the purpose not only of imparting knowledge and instruction but also of awakening a proper interest in the general public health. The function of the board of health has changed progressively from special responsibility in regard to the cure of contagious diseases to their prevention, to the reducing of preventable deaths to a minimum, and to the promotion of individual and community efficiency through health measures.

The Parents.—Any successful scheme of medical inspection necessarily includes the sympathetic co-operation of the parents, who should carry out the instructions of the school doctor or nurse if at all possible, provide hygienic home conditions, and insist on their children observing the simple rules of health. Arrangements should be made from time to time for parents to attend the physical examinations of their children and to receive advice from the school physician as to their proper treatment.

The Child.—The interest of the child in his own health and his responsiveness to the efforts of others on his behalf

are absolutely essential if medical inspection is to attain its maximum value, for the improved physical condition of school children can be secured only when such efforts are supplemented by a sense of personal responsibility. Every effort, therefore, should be made to impress children from their earliest years with the idea that the care of their bodies is of supreme importance, and that their chief duty is to keep well. To gain gradually a masterly control of his physical well-being should be the conscious aim of every school child.

Need of Co-operation.—It is only through the sympathetic co-operation of all the agencies concerned that it is possible to establish right habits of living and to eradicate false knowledge and ignorance which are the sources of the greatest dangers to the health of school children. The physical examination of the school child should be constantly correlated with information furnished by parents and teachers as to both hereditary and environmental factors. Every effort should be made to familiarize school children with the basic conditions and principles of good health and to impress them with the thought that their highest personal success and social value depend primarily upon clean, hygienic, wholesome living.

PHYSICAL HISTORY OF EACH CHILD ESSENTIAL

In a properly organized system of medical inspection it is essential that physical record cards, showing a brief physical history of each school child, should be kept. These records should accompany the child throughout his school career, and should be available for entry and for ready reference at any time. They should be unusually complete and accurate. They should include such entries as those relating to age on first entering school; previous health record; dates of physical examinations; physical appearance, measurements, and defects; diseases, medical diagnoses, and accidents; consultations; treatment and results; exclusions; attendance record; conduct; class standing and general school efficiency; home visits; and recommendations and directions to parents and teachers. Several cards are needed to meet the requirements

of the different phases of the system. For example, the reports of medical supervisors, dental inspectors, and school nurses to the medical department and to parents should be made on appropriate record forms. The value of accurate health records of school children can scarcely be over-estimated. They constitute an indispensable factor in solving the health problems of schools.

ITS NEED AND VALUE

The need of medical inspection is beyond question. The prevention of the spread of communicable diseases alone justifies its adoption in every school, and there are other very strong arguments in its favour. For example, the need of educating the school child to observe at all times and in every circumstance the simple rules of health is of infinitely greater importance. If these rules are violated, nature exacts the inevitable penalty. Competent authorities state that fully sixty per cent. of the elementary school population are to a greater or less extent handicapped by disease and physical defects which can be prevented. Among the diseases and defects which afflict school children the following are the most injurious: adenoids, enlarged glands, defective hearing, defective eyesight, dental caries, tuberculosis, and malnutrition. Dr. Thomas Wood, Teachers' College, Columbia University, New York, has estimated recently that two per cent. of the children attending the schools of United States have organic heart disease, five per cent. a tendency toward tuberculosis, five per cent. curvature of the spine, five per cent. defective hearing, twenty-five per cent. defective vision, twenty-five per cent. signs of malnutrition, thirty per cent. adenoids, enlarged tonsils, and swollen glands, and fifty to ninety per cent. defective teeth. Further, he believes that most of these physical defects are partly or wholly remediable if attended to at the proper time. A better idea of what these percentages mean can be grasped if they are applied to the public schools of Ontario with their half million pupils. They mean that ten thousand suffer from organic heart disease, twenty-five thousand have a tendency toward tuberculosis,

twenty-five thousand show evidence of curvature of the spine, twenty-five thousand have defective hearing, one hundred and twenty-five thousand have defective vision, one hundred and twenty-five thousand show signs of malnutrition, one hundred and thirty thousand have adenoids, enlarged glands, or enlarged tonsils, and from two hundred and fifty thousand to four hundred and fifty thousand have defective teeth. The significance of these percentages may be even more forcibly impressed if they are applied to the average class of thirty or forty pupils. Physical handicaps unduly prolong the period required to complete the course of study and lower the efficiency of the pupils in every respect, thereby resulting in both economic and social loss to the nation.

It is not yet fully realized, however, that medical inspection of all children in both elementary and high schools is an essential feature in any properly organized modern system of education. Not all fully appreciate that it provides the best possible safe-guard for the growth of the child along proper lines and that it will ultimately become the most effective agency for the attaining of a higher national vitality. With a truer appreciation of its value, there will be a greater readiness to pay the cost of its maintenance. Further, the medical treatment of school children touches so vital a part of the whole well-being of the state that the only possible point of view is that the removal of physical defects in school children should not depend solely upon the financial status of the parents. The time is ripe for the organization of school clinics where proper facilities for remedying physical defects at the expense of the state may be provided, for from an economic point of view the state cannot make a better investment than that required in establishing and maintaining a complete medical inspection system. Many children, especially in urban centres, who are handicapped by physical defects, belong to parents who are unable to pay for private professional treatment. A recent investigation of the physically defective school children of New York indicated that fully fifty per cent. were in this class. In order to meet this situation, provision should be made where

necessary for the free treatment of the physical defects of school children, the municipality assuming the expense. The return in social efficiency resulting from the removal of physical defects, thus insuring normal school progress, would amply repay the community for its investment in this respect. Inasmuch as tuition and frequently school books and other supplies are furnished free to pupils, it would seem only reasonable that facilities for the full use of these benefits should be provided. Neglected children usually develop into unproductive and inefficient citizens, and thus become an economic and social burden to the state.

Health inspection tends to create and establish new ideals and new standards of health and to give an inspiring vision of a more abundant life. It creates a clearer conception of the relation and the responsibilities of individuals to human welfare, and promotes a more intelligent view of the significance and purpose of life generally. It shows that the best education, the highest efficiency, and the greatest happiness are inseparable from good health. This means that the problem of health becomes merged in the larger problem of education. Genetic psychology, experimental pedagogy, and scientific investigations of the nature of the child are furnishing a more adequate conception of the possibilities of the race, and health inspection in schools and elsewhere indicates an attempt to adjust the various educational activities in the direction of these possibilities.

When it is considered that medical men and statisticians, after carefully estimating the annual loss of life, have declared that nearly forty per cent. of the deaths in any community are due to preventable disease and ignorance, the value of developing healthful habits among the young, of improving sanitary conditions, and of using other preventive measures can scarcely be calculated. Moreover, the loss to the world through physical inefficiency is absolutely incomputable. What people need is a knowledge of the simple rules of health and the desire and the determination to live rightly, all of which should be inculcated during childhood.

ITS ORGANIZATION AND EXTENSION

When the tremendous importance of national health is more fully realized by society as a whole, adequate administrative machinery will be established for carrying out the measures which sanitary science has determined are indispensable for the improvement and preservation of public health. It is now known that public health is purchasable, and that within certain natural limitations a community can determine its own death rate.

The whole work in connection with the health supervision of schools needs proper organization upon an educational basis. Both urban and rural schools should be included. Recent investigations prove that rural schools especially are in urgent need of health inspection. Teachers should be equipped with a thorough knowledge of the pedagogy of hygiene, otherwise there can be no assurance that the physical education and the hygienic instruction of the pupils will be secured, and that sanitary conditions in the school will be maintained. Adequate provision should be made for the expansion and the permanency of medical inspection and for the distribution of authoritative information regarding health problems. It is especially important that a superintendent of medical inspection should be appointed for each province or educational unit in order that the whole system may be properly organized, directed, and maintained. Nor need there be any hesitation in completing the organization of the system, for the results of the medical inspection of school children have been so beneficial as to cause the movement to grow rapidly in public favour, and to warrant its universal adoption. As the situation now exists in Ontario, the adoption of medical inspection is optional with the local school authorities. But inasmuch as the present optional system does not sufficiently encourage the introduction of health inspection into the rural schools, it will, no doubt, be replaced in due course by a compulsory measure.

An incalculable gain will be made when all school children in every grade throughout the elementary course receive definite instructions in the art of living healthfully, but inas-

much as most children at the age of thirteen or fourteen, even with the great advantage accruing from positive health instruction received prior to that age, have not fully grasped what is involved in right living, medical inspection should be undertaken in high schools and universities as well. Children should be very carefully guided through the crucial period of adolescence, during which they should be constantly impressed with the need of observing the natural laws of health learned in the elementary school. To expect children in the public school, however, with their limited experiences, to learn all they need to know about the laws of health is unreasonable. But if health instruction is continued throughout the secondary and higher courses and by extra school agencies until maturity is reached, the state will have performed a large part of its duty in this respect.

At present there is an immense gap between scientific medicine and the knowledge possessed by the school and the home in matters of health. This chasm can be bridged in a large measure by better trained health officials and through the distribution of discoveries in medical research. If a school of hygiene and public health were established in every province or state for the training of school physicians, nurses, and public health officials, a tremendous advance would be effected. Until such schools are established, efficient high-grade medical inspection and public health service can scarcely be expected.

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CHAPTER IV

PHYSICAL TRAINING

THE MODERN VIEW

Medical inspection and physical training are complementary agencies in the proper physical development of the school child. They should go hand in hand, otherwise the child will not attain the maximum reach of his possibilities either physically or mentally. Both aim to secure ultimately for every school child the full and effective development of his organic functions, his special senses, and his mental powers.

The physical training of school children is not a new movement in education, but as a result of the influence of the scientific conception of education, a more rational view of its purpose, nature, and value obtains at present than that held at any other period in the history of civilization. Extremes are being avoided, but muscular exercise, adequate in kind and suitable in quantity to promote physical health and vigour, is strongly recommended by all competent authorities. The modern view of physical training is strongly and unalterably opposed to mere athleticism which aims at establishing world records and at winning championships in speed and endurance tests, but favours building up the human body to its highest stage of harmony, beauty, and perfection.

As a result of a clearer recognition of the larger purpose of education and of the vital and intimate interdependence existing between the physical and the mental aspects of life, greater attention is being paid to the physical training of school children than heretofore. It still occupies, however, far too small a place in the programme of the average school. Only when physical training is regarded as an integral, indispensable, and basal factor in education as a whole will it be given its proper place in the schools. Researches in the sciences of physiology and psychology have demonstrated beyond all doubt that physical exercises exert a profound influence upon both mind and body. It was largely through the ceaseless

practice of systematic physical exercises, for example, that the ancient Greeks not only developed the most beautiful bodies, but also achieved an exalted position in art and literature.

Physical training is not merely a school subject. It is rather an essential factor in the normal growth and development of school children. It constitutes one of the most important phases of education. As a formative agency whose aim is consistent with that of education as a whole, it should never be used as a hastening process, but should be given rationally and judiciously, with due regard to the age, growth, and physical condition of the child. It is now generally recognized that proper exercise encourages the harmonious co-operation of the various bodily organs, exerting a beneficial influence upon them all.

ITS NEED

Physical training is a question which is attracting wide attention among modern civilized nations. The present artificial age has resulted in greatly lessening the need for muscular work in the ordinary activities of life and in vastly increasing the avenues for the expenditure of nervous energy. The opportunities for natural physical development are greatly restricted by the conditions of modern civilization. Until comparatively recent times, school children received sufficient muscular activity through play and co-operation in the work of their parents. But adequate exercise for growing school children, especially in the cities, can be no longer secured in this natural fashion. Hence, well-organized systems of physical training, including such activities as those expressed in play, games, athletics, military drill, and other systematic physical exercises, are essential in the health interests of school children. Further, the exacting demands of modern life with all its complexities, struggles, and hardships require the maintenance of a very high standard of physical manhood. From every point of view there is urgent need of a firmer physical foundation for education, which the proper physical training of school children should in a large measure supply.

ITS OBJECTS

The supreme purpose of physical training in schools is to aid each child to build up a strong healthy body, and to approach the ideal of perfect physical and mental development. The source of human power is perfect physical health and purity and soundness of mind. Through the cultivation of these elements the tree is grown from which is gathered the fruitage of all human excellence. The individual child is the ultimate test of the value of physical training. If such training does not improve the child's health, simultaneously develop his muscular and nervous systems, sharpen his intellect, and strengthen his moral fibre, it fails to accomplish its chief aim. Physical exercises of various kinds provide an excellent medium through which to instruct the young in the art of right living. Moreover, they afford opportunities for impressing children with the importance of good health as a basic factor in education. Physical training aims at fitting the body for all its possibilities and at maintaining maximum physical and mental efficiency. It should be systematically required of every child during his entire school course.

The second aim of physical training is the correction of defects. The child with spinal curvature, flat feet, round shoulders, or with narrow chest is from every humane point of view entitled to individual physical instruction and care. The inconveniences and the dangers resulting from faulty posture are not sufficiently realized by teachers, although faulty positions often interfere with lung and heart action and frequently result in the displacement of the vital organs, in decreased vitality, and in greater susceptibility to disease. Corrective exercises, if undertaken seriously and used scientifically, have a beneficial effect in all cases of physical deformity resulting from faulty posture. Inasmuch as every physical defect exerts an unfavorable influence upon the nervous system, which is so vitally associated with every bodily structure and function, the value of inculcating correct postural habits early in the life of

the school child is incalculable. The importance of securing economic postures and movements, as well as harmonious and correct proportions, can scarcely be estimated.

NATURE OF EXERCISES

In any system of physical training, exercises which are natural, spontaneous, and enjoyable, and which serve the desired ends of motor training should be selected, and all those which have a tendency to produce an anatomical defect of any kind, or which have an injurious effect upon the nervous system, should be rigorously excluded. During the pre-school age, the natural activities of life supply all that is necessary in the way of physical training. Activity is the key note of proper physical development, and the self-chosen activities of young children represent nature's method of providing for their physical welfare. But the school with its restrictions of the child's natural activities makes necessary the introduction of appropriate physical exercises of different kinds. Such exercises as are ensured by the use of the Swedish system, which is regarded by competent authorities as one of the best physical training systems in the world, are now recognized as being almost necessary complements to the less formal activities associated with field games, swimming, dancing, and play. Physical exercises will become less formal and less artificial as education becomes more rational, more hygienic, and more purposeful. Manual training, school gardening, nature study, school excursions, and dramatic work are among the newer school activities which mark an attempt to meet in a natural way the need for greater attention to the motor training of the school child. The principle of utility in physical exercise is receiving greater emphasis than heretofore.

Both indoor gymnastics and outdoor activities are essential in any well-organized system of physical training. Each supplements the other. For a time the emphasis was placed on the gymnasium, which caused it to assume a place of undue importance. Then there came a strong reaction in favour of outdoor games and other outdoor activities. It would seem,

however, that the best results are secured by a rational combination of both forms of exercise. Although games and other forms of outdoor exercise are immeasurably superior in their general physiological effects, they are dependent to some extent upon weather conditions, and have only a limited corrective value. Play, for example, will not correct round shoulders or contracted chests.

Their Selection.—The selection of suitable physical exercises for school children is a matter of very great importance. In this connection it may be stated that, "The Syllabus of Physical Exercises for Schools," issued by The Strathcona Trust, and now in use in Canadian schools, has been very highly commended by competent authorities. It is based on the Swedish System of physical training which has become world famous. Seventy-two tables of exercises are divided into three series, known as A, B, and C, each containing twenty-four exercises. Series A is for children from seven to nine years of age, B for children from nine to eleven, and C for those from eleven to fourteen. These tables provide for a continuous natural progression throughout the school life of the child. The following exercises are included under each table:

1. Introduction and breathing exercises.
2. Trunk bending, backward and forward.
3. Arm bending and stretching.
4. Balance exercises.
5. Shoulder blade exercises, (Abdominal exercises).
6. Trunk bending and turning sideways.
7. Marching, running, jumping, and games.
8. Breathing.

These graduated exercises have been designed to promote the continuous growth and development of the child, to train the body harmoniously, and to aid in correcting physical defects. They are readily adaptable to the radically different needs of the sexes.

Proper Adaptation Essential.—In directing the physical activities of his pupils, the teacher should be competent to detect the first signs of fatigue and to determine the amount and kind of daily exercise which should be required in order to bring about the highest efficiency. This can be ascertained only by a careful consideration of each child's capacity and needs. Individual prescription in regard to physical exercise is as imperative as it is difficult. Health examinations, however, conducted by the school physician provide a scientific basis for the individual adjustment of physical exercises. The more the teacher knows about the exact physical condition of each child the better. Good health and continuous muscular power come through the expenditure of a moderate amount of nerve force. Violent use of the muscles and undue expenditure of nervous energy are frequently followed by functional derangements of the vital organs. In physical exercises of all kinds, therefore, there is urgent need of appreciating the distinction between doing and over-doing in the rational pursuit of health and happiness.

Value of Group Activities.—It should be borne in mind by all concerned with the physical training of school children that it is very difficult to bridge the gap between knowledge and practice. Most people of the present age realize the urgent need of sufficient bodily exercise to maintain a healthy physical condition, but they lack the determination and the motive power to put their knowledge into practice. Failure is the usual result of individual attempts to maintain the practice of physical culture exercises. In group or community activities alone is there any substantial hope of theories on physical exercise being carried into systematic practice. When methods are devised for doing things together, for taking physical exercises in social groups, the best results will obtain, for physical training must be continuously associated with social relations in order to be most beneficial. Wholesome, social exercise of moderate amount carried out systematically under sanitary conditions and proper supervision furnishes an excellent physical foundation for a well-balanced life.

EQUAL ATTENTION TO BOTH SEXES

Equal attention should be given to the physical training of boys and girls. It is to be regretted that girls in most countries have not heretofore received the same opportunities as boys for physical exercise during their school life. It is gradually being recognized, however, that every argument for the physical training of boys applies with equal force to girls, and the progressive schools of to-day are making proper provision for the physical education of both. Physical exercises for girls should be intelligently selected and properly adapted to their peculiar conditions and needs.

NEED OF TRAINED TEACHERS

The proper adaptation of physical exercise to the varying needs of school children of both sexes in the successive stages of their growth and development constitutes a very important problem for the teacher, who should be properly trained for this feature of his work. Such training should include a fairly comprehensive knowledge of anatomy and physiology, of the kinds and value of physical exercise, and of the chief characteristics of the different periods of growth; some familiarity with the principles of hygiene and of educational psychology; as well as experience in teaching under skilful supervision. Many of the leading universities in the world, recognizing the vital importance of scientific physical training in education, have added during recent years a department of physical education under the direction of a skilled physician who has expert knowledge of every kind of physical exercise. Our Canadian universities should not be behind others in taking this important step, for the university must lead in this as in all other phases of education. Only when adequate attention is given to physical training in the university can there be any assurance of its employment in a scientific manner in other schools. Inasmuch as physical training should be safe and hygienic for each individual child and as there are dangers attending certain types of exercise, this whole work in our schools should be vested in the hands of competent school physicians until such time, at least, as teachers are

graduated with a scientific knowledge of the subject. Even then it might be best to leave the ultimate control and sanction of school athletics and gymnastics with the school physician, whose scientific knowledge of the physical condition of school children should prove invaluable.

FROM FUNDAMENTAL TO ACCESSORY

The normal development of a human being is impossible unless the fundamental and the accessory muscles receive proper exercise during the period of growth. The activities of the fundamental muscles, which are comparatively few, are associated with the larger bodily movements, such as those of the trunk, neck, knees, shoulders, back, legs and elbows. The accessory muscles, which are very numerous, are those associated with the finer bodily movements, such as those of the face, fingers, and articulatory organs. In the order of development, the emphasis at first is naturally placed on the fundamental muscles. The accessory muscles develop later, and are very closely connected with psychic activity and with the arts of expression. Their tension is modified by the slightest mental change. Young children should not be required to do fine work which puts an undue strain on the accessory muscles, which if continued tends to produce arrested development and lack of finer muscular control. Nor should the fundamental muscles be developed at the expense of the accessory, thus making response to finer stimuli impossible. The school activities should be so regulated and adjusted as to maintain a proper proportion and balance in developing these different sets of muscles. Any prolonged use of the accessory muscles should be followed by basal movements, inasmuch as these have a tendency to restore balance and control.

In discussing the significance of the accessory muscles and the relation of exercise thereto, Dr. G. Stanley Hall states that, "The education of these muscles is as near mental training as physical culture can get, for these are the thought muscles and movements, and their function is to reflect and to express by slight modifications of tension and tone every psychic

change. Only the brain itself is more closely and immediately an organ of thought than are these muscles and their activity." These muscles are the special organs of volition, the thought carriers, the executive branch of the mind's machinery. During the period of growth, their functional activities are gradually organized and adapted to express the mental life with increasing accuracy and delicacy. As mental processes are functionally related to the voluntary muscles, there is direct mental discipline in the thought-out movements of physical activity. Muscular readiness, not massive muscle, is what is needed in physical development. The facts, that thinking is not only a mental but a physical process and draws upon the vital stores of very organ, and that all work, mental as well as physical, is a test of endurance, suggest the importance of a strong and well-developed body and healthful habits of living.

The co-operation of all the muscles of the body is necessary to good health. To secure this result, well-balanced development of the different parts of the body is required. This necessitates a proper adjustment of mental and physical activity, as well as properly graded and varied exercise. Regularity and moderation are the chief factors for success in striving for ideal physical development. It should be remembered that this is an age of enormous expenditure of mental and nervous energy, and that any extended neglect of the proper care of the body must speedily result in the collapse of the whole being.

ITS VALUE AND INFLUENCE

Physical training has a direct effect upon the health and physique of the child and an indirect effect upon his mental and moral development. Appropriate physical exercises judiciously given tend to relieve brain disturbance, to correct physiological defects, and to produce correct proportions, form and carriage. They promote the functional activity of the various parts of the body, improve the quality of the blood and the vigour of the circulation, increase the efficiency of the nerve

centres, develop muscular control, and benefit the general tone and condition of the whole nervous system. Probably the functional improvement of the nervous system is the most important immediate result of physical training. The exercise of an organ within certain limitations is followed by an increase in its functional capacity and in its power to resist fatigue. During activity an organ is more freely supplied with better oxygenated blood than when it is at rest. Its special functional vitality and its power of recuperation are increased. In fact, the functional power of an organ and the vitality of the whole system can be maintained and developed only by proper activity. Physical training, if properly directed, tends to correct the injurious effects resulting from emphasizing the mental at the expense of the whole being, to conserve the entire personality, and to establish closer and more harmonious relations between the mind and the body.

Physical exercise has an invaluable mental and moral influence. It stimulates mental precision and responsiveness, strengthens the memory, awakens initiative, and enlarges mental capacity. It develops the will, and aids the individual in acquiring the power associated with self-direction and self-control, which are moral qualities of supreme importance. That physical training has an effect upon character no less valuable than its effect upon bodily health and bodily power is a fact not sufficiently taken into account.

The school child of to-day will enter upon his adult life with such physical foundation as has been furnished by heredity and improved by environmental agencies. He should be well-equipped physically and mentally for the duties, tests, and responsibilities of maturity. This can be best accomplished by keeping him physically fit throughout the period of growth and development.

The influence of the body upon the mind is not sufficiently recognized. Disease and physical deterioration lower the quality of the thinking and the power of resistance, rob the brain of its nourishment, and make impossible intellectual work of a high order. Physical activity is nature's method

of restoring proper equilibrium and of maintaining tone and vigour. Inasmuch as every organ of the body has some share in the mental functions, the importance and the advantages of physical training and good health are incalculable. The nation that fully realizes that the highest mental development is dependent upon the energies of the body and upon judicious physical training, and takes as its ideal the practice of rationally combining physical and mental education, will excel in all that makes a people great.

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CHAPTER V

PHYSICAL CONDITIONS OF EFFICIENCY IN THE SCHOOL CHILD

The school child's physical and mental growth, his power to resist fatigue and disease, his chance of attaining individual excellence, and his social value depend primarily and chiefly upon his health and bodily vigour. In fact, every vital value in life and education is integrally bound up with and dependent upon health and physical fitness. The school is now regarded as the physical as well as the mental conservator of the child. It is putting more and more emphasis on the need of developing and conserving physical vitality and energy and of adequately providing for the health needs of every school child at every stage of his development. In their aim to produce children who are organically sound and who have the biological basis essential for the attainment of full and effective personalities, both parents and teachers should more fully recognize the importance of providing proper physical conditions. Due attention should be given, at least, to such essential factors of physical efficiency as those relating to food, air and sunshine, exercise, rest, and personal cleanliness.

FOOD

Importance.—The most powerful environmental influence on the child's physical development is food. It is the controlling factor in life and the primary source of human power. Without food, growth and life itself are impossible. Moreover, no human being can attain his maximum value, who is not properly supplied with sufficient, pure, wholesome food. To maintain the body in a condition of health and strength and to establish the highest degree of efficiency—mental and physical—are primarily problems of nutrition. Both parents and teachers should have a more adequate conception of the physiological importance of the subject of nutrition and a more definite knowledge as to what constitutes proper dietary

standards, especially for school children. It is especially important that parents should have a more exact knowledge of the foods that are essential to the growth and maintenance of the body and a more intelligent conception of their uses.

Classes.—There are two great classes of foods: (a) the inorganic, or those belonging to the mineral kingdom, and (b) the organic, or those belonging to the plant and animal kingdoms. The inorganic food substances are water and mineral salts. Water, which is contained in all the tissues of the body, comprises about sixty per cent. of its weight. Common salt is the most important mineral food, and forms an essential constituent of the blood and tissues. Several other salts such as the phosphates and those of potash and iron are also essential to the existence of the body. The organic food substances are divided into two sub-classes: (1) nitrogenous, (2) non-nitrogenous. It has been demonstrated by chemical analysis that all foods, so far as known, can be properly included in this classification.

Values.—The ultimate uses of all food are to supply the body with materials for growth and renewal and with energy for doing work. Any substance which does not perform one or both of these functions cannot be regarded as food in the proper sense. Further, no substance is a good food unless it fulfils the conditions of easy assimilation and complete combustion.

It is very important that parents should know that the nitrogenous and the non-nitrogenous classes of foods have distinct and specific functions to perform, and that they should be familiar with the chief articles of diet in each class. Nitrogenous foods supply material for building tissues, bones, muscles, nerves, and the internal organs, and also furnish energy in the form of animal heat and muscular movement. Non-nitrogenous foods furnish the body with energy only. It should be borne in mind that the school child is passing through a most important and critical epoch as regards nutrition, a period of continuous growth and development and of great activity, demanding a liberal supply of properly selected and

well-cooked foods. The growing child needs all kinds of food, and in sufficient quantities, including an abundance of pure water. The following classification of organic foods should be familiar to those who have charge of the diet of school children: (1) nitrogenous foods—lean meat, eggs, milk, fish, cheese, oysters, nuts, peas, beans; (2) non-nitrogenous—a. starches, b. sugars, syrups, honey; c. fats, fish oil, butter, cream, olive oil. A large proportion of bread, rice, sago, cereals, fruits, potatoes, and vegetables is non-nitrogenous material. It should be noted in examining this list of the chief articles of diet that some foods, such as milk and eggs, furnish energy in addition to tissue-building material. The most important constituents of a food determine its classification. It is important to have a scientific knowledge not only of the different articles of diet but also of their relative food values. For example, it is worth while to know that fat is two and one-fourth times as valuable as either starch or sugar for producing energy. The food range should be as wide as possible, including especially such articles of diet as have been proved during centuries of experience to possess the greatest nutritive value and digestibility.

Selection.—The selection of proper foods for children of school age is an exceedingly important and difficult problem. In the first place it must be recognized that such children are in different stages of growth and development and that they have for that reason alone widely different needs. Further, these differences are greatly increased when their individual constitutional tendencies and varying tastes are taken into consideration. Parents can best solve the problem of food selection for their children by becoming well-informed as to the function of the different kinds of foods, by careful discrimination, by studying the tastes of the individual child, and by noting the effects of different diets.

Right Habits in Eating Essential.—The school child, as a rule, readily conforms to a wide range of food material and to a mixed diet, but usually requires instruction as to habits of eating. In regard to the quantity of food required, Chittenden

who made an experimental study of the subject claims that the smallest amount of food that will keep the body in an efficient state is from a physiological point of view the most economical and the best adapted for the needs of the body, and that all excess food results in physiological waste and in the expenditure of energy that should be conserved for more useful purposes. As it is extremely difficult, however, to measure exactly the amount of food required by the school child, even if such a practice were desirable, and as individual needs vary greatly, it would appear wise to furnish school children with a liberal supply of wholesome food, together with instructions from time to time as to its proper use. More school children are underfed than overfed. This is especially true of children in the large centres of population where a considerable percentage are physically unfit for their school duties owing to lack of food. School authorities are beginning to recognize the importance and the seriousness of this problem and are taking steps to solve it. On the other hand, school children when not properly controlled at their meals often eat too much. They should be taught early that an excessive use of food is injurious and that temperance in eating is an important factor in maintaining good health. In this connection it may be worth while to quote the words of Professor Huxley: "But whatever the circumstances, if the quantity of food taken exceeds the demands of the system, evil consequences are sure to follow. Overtaxing the digestive organs deranges their functions, and is a common and efficient cause of dyspepsia. If the food is not absorbed from the digestive apparatus into the system, it rapidly undergoes decomposition. Large quantities of gas are thus generated. If the digestion be strong and its products are absorbed, an excess of nutriment is thrown into the blood and the circulation is overloaded. If the food is not expended in force, the natural alternative is its accumulation in the system. This is accompanied by congestion of important organs, malassimilation of nutritive material, and increased proneness to derangement and diseased action." School children should be taught that temperance in eating and careful

mastication are of primary importance in maintaining the efficiency of the body. Perfect digestion is impossible without thorough and complete mastication. Those who eat slowly get the greatest amount of nourishment from either wholesome or poor food and have the greatest amount of enjoyment as well.

If food is to be properly assimilated, if it is to perform its nutritive function most effectively, it should be eaten to the accompaniment of a pleasurable emotional state. To enjoy one's food is a direct nerve tonic as well as one of the best aids to digestion. For this reason, cheerfulness and pleasantry should be insisted upon, if insistence is necessary, and hurry, excitement, and other unfavourable emotional states should be avoided. It is especially important that anger and worry should be eliminated as both are deeply injurious to mental health and also, by reaction, to one's physical well-being.

Relation of Nutrition to Health.—Far greater attention should be given to the nutrition of school children, as it is undoubtedly the greatest factor in determining the character of their health. Nutrition, it should be noted, is not merely a question of food, although that source of growth and energy is the main problem. It is a process which reveals itself in a variety of signs and symptoms, and which serves as an excellent health index, designating probably more accurately and more delicately than any other means the state of an individual's physical condition. The subject of nutrition, which involves the whole body in its scope, including the relative balance and co-ordination of its different functions, deserves closer study and investigation by experts, whose discoveries should be promptly given to the public. In the meantime, school children whose nutrition is impaired should receive careful supervision and medical treatment also, if necessary. When more is known about nutrition, the medical inspection of school children will rest on a more scientific basis.

Control.—There is a very great need of the careful sanitary control of all food consumed by human beings. The hygienic conscience of people is awakening, and as a result

there is a general demand, which is gradually becoming more insistent, for clean, fresh, wholesome foods. Governments are now beginning to give the problem the consideration and the study that it deserves and are passing laws having for their object the inspection and sanitary control of all foods. They feel that every effort should be made by the state to secure for every individual clean food, free from all impurities. This means that the sources of foods, their manufacture, transportation, marketing, storage, handling, serving, and other treatment of any kind should be carefully guarded in the interests of individual and public health. Special care should be exercised in respect to animal foods, such as meat and milk, which are very apt to carry infections and are the most readily decomposable. Milk and its products are the most susceptible of all foods to decomposition, and as bacteria grow well in them a very slight infection may produce such widespread and serious results as those accompanying tuberculosis, typhoid, scarlet fever, and diphtheria. Pasteurization is a simple, inexpensive, and reliable method of rendering infected milk safe, but it cannot eliminate filth. It must be combined with efficient inspection in order to give thoroughly satisfactory service. Further, the process of pasteurization and the work of inspection should be under competent and reliable official supervision. It is especially important that the whole food problem in all its many phases should be better understood by all who are in any way responsible for the health of the school child, and that every effort should be made to maintain the highest possible food standards at all times. A constant warfare should be waged against the thousand menaces to health that are connected with the production and consumption of food, for good health depends primarily and chiefly upon clean, wholesome food.

AIR AND SUNSHINE

Not only pure food but pure air is absolutely essential to the maintenance of good health. Every inhalation of pure, fresh air has a tonic effect, influencing beneficially every tissue of the body. The more hours school children spend outdoors

the better defence they are building against disease and physical deterioration, and the better they are equipping themselves for their school duties and other work. This is a strong argument in favor of short school sessions and frequent recesses, especially for pupils of the lower grades. An abundance of pure air, vitalized by sunlight, should be supplied in all schools and homes, and modern architecture should be responsive to the vital needs of children and adults in this respect. Children should be taught that fresh air and sunlight are nature's tonics, that they have an invigorating and strengthening influence on body and mind, and that they play an important part in checking the spread of contagious diseases. The germs of infectious disease cannot live long in well-lighted and well-ventilated rooms. On the other hand, absence of sunlight and poor ventilation supply the conditions under which disease germs best live and retain their malignancy. Notwithstanding all that has been said on this subject, however, parents and teachers are still neglecting to attend properly to the problem of ventilation. It is now well known that impure, stagnant air plays an important part in reducing vitality and in predisposing to disease, and yet the great majority of parents permit their children to sleep in rooms with the windows closed, and the great majority of teachers pay practically no attention to the proper ventilation of school rooms. An incalculable gain in the health of nations would be accomplished if children during both school and pre-school age were brought up in an atmosphere of pure, fresh air. This is the ideal at which both parents and teachers should constantly aim. Every child has a right to the privilege of breathing at all times pure, fresh, health-conserving air, and should be instructed early as to the importance of good ventilation. He should be taught that the moment he enters a building the question of ventilation becomes an important one for him. If school children get a clear and adequate conception of the great need of breathing fresh air, they are much more likely to insist on getting it, and will thus aid materially in solving the problem of ventilation in both home and school.

In fact, improved standards of ventilation will result largely from school children acquiring the habit of insisting on a proper air supply.

Indoor Air Conditions.—The three prime requisites for better indoor air conditions are greater freedom from dust, more humidity, and lower temperatures. These conditions can be readily secured in almost any type of school or home, and at no prohibitive expense. Among other things, they involve the use of cloth window screens, vacuum cleaners, thermometers, dustless chalk, electric fans, proper heating apparatus, and in some buildings mechanical systems of ventilation. As a rule, the more simple the means of ventilation, consistent with the nature of the building, the better and the more satisfactory the results. Window ventilation, judiciously controlled, is notwithstanding its obvious limitations the best and simplest means of getting fresh air quickly into a room, of providing the necessary variation in temperature, and of securing the proper humidity. Further, no system of mechanical ventilation thus far devised gives complete satisfaction without the periodical aid of the open window.

Dust.—Dust exists everywhere in the atmosphere, and is a normal constituent of air. It performs many important functions, such as limiting the humidity of the air, helping to control the temperature, and decreasing the transparency of the atmosphere. Normal atmospheric dust, free from bacteria, is not injurious to health, but an excessive amount of it irritates and inflames the respiratory organs and frequently causes colds, pneumonia, and other serious infections of the air passages. Owing to the presence of a greater number of bacteria, indoor dust particularly in badly ventilated and ill-kept rooms is much more harmful than outdoor dust. Waxed and oiled floors are good dust preventives and should replace the ordinary house carpet with its attendant evils. Dry dusting and dry sweeping should be abolished, and the vacuum cleaner, cotton window screens, the dampened dust cloth, and free ventilation should be introduced into every home and school. Schools and homes should be kept as clean as hospitals.

There is urgent need of giving more thought and attention to the problem of keeping the air breathed by school children free from excessive dust.

Humidity.—A perfect method of ventilation would provide for a constant influx of fresh, clean air at a relative humidity of about sixty to sixty-five per cent., and of a proper temperature, and for the extraction of the vitiated air without interfering with the perfect balance of the system. To secure the proper humidity in living rooms constitutes a difficult problem, because water vapor is the most variable constituent of air. Air completely saturated with water is said to have one hundred per cent. humidity. The humidity of outdoor air varies from about thirty per cent. to the point of saturation. When the relative humidity reaches eighty to eighty-five per cent., moisture condenses and begins to show on surrounding objects, if the temperature becomes low. By means of suitable clothing, food, and activity, the body may adapt itself to a wide range of humidity and temperature. If possible, however, the relative humidity of living rooms should be kept between fifty and seventy per cent. Cold, damp air, warm, moist air, and excessively dry air, all affect the health injuriously and lower physical and mental efficiency. Cool moist air is chilling, depressing, and enervating, while moderately dry air is usually bracing, tonic, and stimulating. A marked increase in relative humidity and temperature tends to depress the circulatory system, to decrease the blood pressure, and to increase the breathing rate. On the other hand, excessively dry air takes up the moisture from every object in the room, including occupants, and tends to promote infections of the skin, nose, throat, and air passages. The relation of humidity to health depends largely upon the temperature, air motion, diet, clothing, and muscular activity. The amount of moisture required to saturate the air rises with the temperature, and humidity depends on the amount of moisture relative to the quantity required to saturate the air. For example, air at seventy degrees F. will hold twice as much moisture as air at fifty degrees F. Air that is

too moist or too dry has an injurious effect on health and vitality. Experience has proved that air in living rooms at sixty per cent. humidity is the most conducive to good health. In schools with mechanical systems of ventilation, special methods for increasing the relative humidity of the heated air should be provided. A good plan is to pass a jet of live steam into the air-chamber beyond the heating coils, or to force the heated air through a fine spray of warm water. Either of these plans supplemented by window ventilation should solve the problem of humidity for school buildings. In private dwellings and schools, which are not mechanically ventilated, the humidity may be improved by keeping pans of water on the stoves, furnaces, or radiators, by having growing plants in the rooms, and by using electric fans in conjunction with the open window. In order to deal intelligently with this phase of ventilation, parents and teachers should be familiar with simple, scientific methods of determining humidity.

Temperature.—It has been determined by repeated experiments that a temperature from sixty-four to sixty-eight degrees F. produces the best conditions for satisfactory school work. If the school room floors, however, were properly warmed, it is the opinion of many authorities that a temperature of about sixty degrees F. would result in improved health and more efficient work. Private dwellings and school rooms are usually kept too warm, with the result that their occupants become restless, inattentive, and listless. Lower temperatures are more favorable to mental alertness, accuracy, and efficiency, provided the individual feels comfortable. On the other hand, temperatures above sixty-eight degrees give rise to definite subjective symptoms such as inattention, headache, and marked deterioration in mental capacity. Further, variations in indoor temperature within the limits of about five or six degrees are more healthful than a constant temperature. Frequent variation of temperature is nature's method outdoors, and such variations are healthful, except when sudden, unseasonable, or extreme, when they often predispose to colds and other infections of the air passages. Man's greatest progress has

been made in the variable climate of the North Temperate Zone, practically all the great centres of human achievement in the world being situated near the fortieth parallel of latitude which is known to be the line of greatest variation in temperature. The consensus of opinion at present seems to favor temperatures ranging from fifty-eight to sixty-four degrees F. for private dwellings and school buildings, and about ten degrees lower for bedrooms. The temperature of the air at the beginning of a school session should be about fifty-eight degrees F. and should never be permitted at any time during the day to exceed sixty-eight degrees, if the outdoor temperature does not rise above this point. In the interests of the health of school children, teachers should strictly observe this rule. School rooms should be provided with recording thermometers which should be suspended freely in the atmosphere in order that accurate records may be registered.

Test of Good Ventilation.—Any good system of ventilation must maintain the air within the room at a proper temperature and humidity, and keep it in gentle and continuous motion. It must also remove the gases, odors, dust, bacteria, and other contaminating substances, and it must bring in a continuous stream of fresh air from outdoors to replace that which is being constantly vitiated. The results obtained at the breathing zone are the ultimate test of the efficiency of any ventilating system. The air surrounding the school child as well as that breathed by him should be of good quality.

The Modern View.—Recent experiments, carried out with great care as to all the details of observation and control, by Heymann, Paul, Angelici, Leonard Hill, and others, indicate that the symptoms and ill-effects resulting from a vitiated atmosphere are not due to an excess of carbon dioxide nor to a diminution of oxygen, but rather to physical changes, especially to mixture of gases from the alimentary tract and to odors from unclean clothing and bodies. This view is rapidly gaining strength, with the result that the emphasis is now being placed on the vital need of regulating the humidity,

temperature, and movement of the air. It would appear to be premature and unscientific, however, to insist that the organic properties in expired air and the chemical changes involved may be disregarded simply because these are not yet understood and because most of the ill effects of breathing impure air may be attributed to its physical conditions. Prolonged exposure to an atmosphere of re-breathed air, even when the physical conditions of temperature, humidity, and air movement are maintained, would in all probability result in a marked decrease in physical and mental efficiency. The results of the open air treatment of the sick supply ample evidence of the paramount importance of fresh air.

EXERCISE

Physical activity is essential to good health. It stimulates the bodily functions, and promotes growth and development. It strengthens the heart and the lungs, raises the temperature, improves the quality of the blood supply, repairs worn-out tissues, sharpens the senses, and quickens the mental powers. It is an essential functional and structural requirement of the body, which cannot be ignored by any one who desires physical vitality and good health.

Fortunately there is no difficulty in getting the school child to take sufficient exercise. All he requires is the opportunity, which the teacher should see is not denied him. In his pre-school age his ordinary activities are quite ample to secure all the benefits accruing from physical exercise. When he enters upon his school career with its restrictions, there is placed upon the teacher the responsibility of making due provision for a wide range of physical activities, including play, drills, marches, folk dances, and other approved exercises. It is very important that the play instinct should be allowed free expression. The fundamental appeal, the vigorous action, the freedom, the inherent delight, all combine to make play the ideal exercise for school children. Within a reasonable limit, their play and other physical activities should be so organized and controlled as to insure an equal opportunity

for every child to secure such benefits as will best promote his physical growth and development. Play as a means of recreation and of physical training is unparalleled inasmuch as it develops vital and functional strength and meets naturally a fundamental requirement in the life of all children. Experimental psychology and pedagogy have proved conclusively that a rational, wholesome, and sane motor life throughout childhood and youth affects beneficially not only the physical health but the mental and moral as well.

REST

Physical and mental activity invariably result in the expenditure of nervous energy and, if unduly prolonged, in fatigue. School children frequently play and occasionally work to the point of exhaustion. Their activity at times is too intense and too strenuous, breaking down the cellular tissue more rapidly than it can be repaired, and lowering the recuperative power of the cells to the extent that more waste is produced in them than can be eliminated. Physical activity of any kind tends to produce waste and to consume nutritive material. Fatigue results from the accumulation of poisonous substances in the cells and tissues. Mosso, an eminent authority on the subject of fatigue, says that there is only one kind of fatigue, namely, nervous fatigue. This is simply another way of saying that fatigue ultimately affects the nervous system which is the real centre of physical energy.

Rest is the sure cure of fatigue. Change of activity is often beneficial, especially when it involves a different set of muscles, but gradually there is a decrease in the power to work, and finally the body demands rest. It is very important that teachers should have an approximate idea of the amount of school work that may be safely undertaken by pupils at different stages of their progress, otherwise excessive strain may result. Relaxation periods should be frequent, especially in the lower grades. A recess of ten minutes every hour is strongly recommended for school children under ten years of age. Young children cannot concentrate their attention

very long upon a subject without becoming fatigued. Most authorities agree that the maximum length of lesson periods for public school children should range from fifteen to forty minutes according to age and physical condition. The effects of fatigue decrease as children rise in age and mental capacity. The period of rest required for complete recovery bears direct relation to the duration of the work, its nature, and the amount of concentration. Long periods of intense application should be followed by relatively long periods of rest. More and better work can be done by avoiding the fatigue point. There is urgent need that teachers should become conversant with the laws of fatigue and competent to detect its signs in school children. If effective work is to be accomplished, and if the health of the individual pupil is to be maintained, the periods of concentrated mental activity must be generously interspersed with periods of rest and relaxation. Mental relaxation at frequent intervals is imperative if efficient work is to be done in any sphere of intellectual activity. Proper rest and relaxation keep the brain in control of all its functions and conserve nervous energy. For the school child, play, work and rest should be properly blended, in order that his emotional life may be kept buoyant and satisfying, and that a high standard of efficiency may be maintained.

Sleep.—Sleep furnishes the best kind of rest. It is nature's great restorer of bodily vigour and nervous force. It supplies not only a general need of the body but also a specific and imperative requirement of conscious life. The complete suspension of conscious effort at regular intervals is necessary for the restoration of the body. Loss of sleep predisposes to loss of voluntary control, slower mental reactions, defective memory, disease, and to the general impairment of bodily functions. School children require on the average from nine to eleven hours sleep every night in well-ventilated rooms. Parents can do few things of greater value for the welfare of their children than to insist on their getting sufficient sleep, especially during school age.

CLEANLINESS

Cleanliness is the first requirement of the laws of advanced sanitary science. In its broadest sense, it involves the individual, his habits, food, social relations, and conduct. It means fit and proper food, air, clothing, personal habits, and surroundings, and it implies a body and a mind free from impurity. In a word, it means right living under hygienic conditions.

The importance of a clean environment cannot be overestimated. The well-kept hospital presents a standard of cleanliness at which the school and the home should persistently aim. Unless high standards are adopted in matters of sanitation, ill-health and disease are sure to result. A clean environment should be provided for every school child. The use in many modern schools of sanitary drinking fountains and of individual towels and cups is evidence of the application of the principles of sanitary science.

Personal cleanliness is a duty which every human being owes to himself and to society. Frequent washing and bathing of the body are imperative in the interests of good health. Children should be taught early that the skin is an important excretory organ for the removal of waste products, and that only when it is clean can it properly perform its functions. They should be taught to have a wholesome respect for soap and water and to regard cleanliness as one of the most desirable virtues. Further, they should be informed that only the physically clean from the sanitary point of view are physically efficient in the truest sense. It is very important that a vigorous attempt should be made by teachers and parents to awaken in school children a love of cleanliness, for only through a proper attitude toward this subject and the development of a hygienic conscience can there be any likelihood of establishing clean personal habits that will persist throughout life.

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CHAPTER VI

FACTORS IN SCHOOL LIFE AFFECTING THE HEALTH AND PHYSICAL DEVELOPMENT OF THE CHILD

The school introduces the child to a new world, exposes him to new influences, and subjects him to definite duties and responsibilities, all of which have a greater or less effect upon his health and physical welfare. Both the entrance into this new environment and the environment itself should be made as natural as possible for the child. If the artificial and the formal are given undue prominence, school life becomes unreal and unnatural, and thus loses much of its value. The nature of this new environment into which the child is forced by the state is usually a fair index of the estimate which the municipality places upon the education of its children. Where high standards prevail, the school grounds, building, equipment, sanitation, curriculum, and teaching force are the best that can be obtained; the rooms in which the children work are properly seated, ventilated, cleaned, and heated; and the assembling of pupils is not attended by physical or moral harm to any individual child. School conditions should be such as to increase the child's physical vitality, promote his growth, and improve his health. Within certain limits, environment always exerts a transforming influence, determines the functioning of the child's native disposition, and gives direction to his thinking, quality to his feeling, and determination to his will. Education consists to a great extent, therefore, in providing school children with appropriate, effective environments.

PHYSICAL SURROUNDINGS

It is the duty of school authorities to provide the best possible environment in grounds, buildings, equipment, and teaching force. This implies, among other things, the vital need of placing the control of schools in the charge of the best educated and most intelligent and progressive members of the community. School authorities should be men of large vision

and of mature experience in educational matters, men with open and unbiased minds, who desire to keep pace with the advance in educational thought and practice. It is to be regretted that members of school boards are often chosen, whose chief aim is to reduce school expenditures to a minimum in order to comply with the popular demand for a low tax rate, which can be accomplished only at the vital expense of child efficiency. The real significance of the work of a school board does not lie in financial economy, but rather in handling effectively the education of the children committed to its care.

The School Site.—From the point of view of health, the location of the school site is very important. The ground should be high, dry, and well drained. It should be spacious, reasonably sheltered by trees, vines, and shrubs, and located in an appropriate and pleasing environment. In cities it is very important that schools should be well removed from smoky, noisy, and congested districts. Every effort should be made to secure for all schools freedom from the distracting influences of the noises from industries, street cars, and busy thoroughfares. In fact, quiet zones for schools should be obtained regardless of cost. There should be in every school ground ample space for trees, flowers, gardens, play areas, suitable equipment, and necessary buildings. Every rural school should have a drilled well. Large separate play spaces for the older boys and girls and special areas for the children in the kindergarten and the primary grades should be provided. Suitable equipment for play and games should be furnished, including swings, teeters, giant strides, sand piles, tennis and basket ball courts, and other approved devices. In the health interests of school children, there is urgent need in most municipalities for vast improvements in selecting, planning, and equipping school grounds. The need of such improvements is more pressing at present than heretofore in view of the popular modern tendency to make greater use of school grounds as play and recreation centres for the community.

The School Building.—The school building is the most important public building in any community. It should be

designed primarily in the interests of the health of school children. All other considerations are of secondary importance. The supreme value of a school is determined chiefly by the extent to which it conserves and improves the health and physical efficiency of every individual child during school life. In this function of the school, the type of building plays an important part. It should embody in its construction the most recent scientific ideas with respect to light, heat, ventilation, sanitation, and size and arrangement of rooms and halls. The basement should be provided with proper means of ventilation and underdrainage and with suitable playrooms for use during inclement weather. It should be well lighted and carefully protected against dampness. Special attention should be given to the installation of the toilets and lavatories and to the sanitary conditions connected therewith. The building should be a substantial and artistic structure, easily reached from all sides by sun and air. It should be as nearly fireproof as modern architectural plans can make it, and should have at least two exits with doors opening outward.

In planning new buildings, modern school authorities in progressive centres are consulting the best architects available and are thus securing scientific and expert opinions on all matters of construction relating to safety, sanitation and health. Further, they are acquiring broader conceptions of the physical needs of school children, and are making ample provision for gymnasiums, baths, assembly rooms, cloak rooms, work shops, and kindergartens. A scientifically planned school building, suitably located, and intelligently used, supplies a basic health condition, productive of incalculable benefits to the growing school child.

The Class Room.—The class room should be taken as the unit in planning the shape and the size of the school building, otherwise proper provision may not be made for the physical needs of the child while at work. The number of pupils to be accommodated should determine its size. The consensus of opinion in this respect would seem to indicate that at least two hundred cubic feet of air space and twenty square feet of floor

space should be provided for each child. A standard school room to accommodate thirty pupils, and to provide for the most satisfactory arrangement of seats should be about twenty-two feet wide, twenty-eight feet long, and thirteen feet high. It is believed by many competent authorities that the health interests of school children will be best served when the maximum number in any class is placed at thirty. To look carefully and adequately after the individual needs of thirty school children as to health and physical welfare alone places a serious responsibility upon the teacher, demanding much thought and attention.

School Furniture.—From the hygienic point of view, the most important articles of school furniture are the desks and the seats. The best modern desks and seats, readily adjustable to the size and the growth of the child and to the requirements of different occupations, should be provided. In seat and desk adjustments, variations in height and growth and certain anatomical differences of proportion between boys and girls should receive due consideration. A normal child seated in a chair that fits tends to assume correct posture. The seat should be of such a height as to permit the feet to rest wholly on the floor, the thigh and the lower leg forming a right angle. Foot rests should not be used, as they restrict the free movement of the pupil's feet, collect dust, and induce faulty posture. The distance between the seat and the desk should be such that the pupil may read and write without assuming a wrong position. The desk should be of a proper height, size, and slope to permit a perfect posture in writing and in other seat work. The best authorities at present favour a slope of ten to fifteen degrees for the desk top. It is extremely important that school children should be required to assume correct postures when sitting, as faulty posture at the desk tends to cause myopia, contracted chest, round shoulders, curvature of the spine, faulty respiration and heart action, and displacement of the internal organs. The practice of requiring school children to stand and take corrective exercises at frequent intervals should be rationally combined with that of insisting

on proper posture at the desk, for even with the most approved desks and seats pupils often acquire faulty habits of sitting, if permitted to do so. Owing to its close association with the perfect functioning of the body, few things are of greater importance than perfect posture in establishing correct bodily habits.

School Room Decoration.—School room decoration is also a hygienic factor of importance which deserves greater attention. Artistic surroundings have a favourable psychological influence upon children, tending to produce a pleasurable state of mind, which is a valuable factor in the learning process. There is inspiration and moral health for children in well-chosen and appropriate pictures, attractive mural decorations, and neatly kept school equipment. In such surroundings children improve in orderliness, neatness, and general conduct, and their standards of taste are elevated, all of which react favourably upon their physical development. The environment of the child in the school room should be one of wholesome beauty and attractiveness as well as of sanitary perfection. In his book on *Class Management*, Joseph S. Taylor says, "A beautiful class room is in itself an eloquent teacher. The very walls become a means of grace to the child. His aesthetic ideals are refined, his judgment is cultivated, and he will thus be prepared to enjoy the beautiful in nature and in art." The initial cost of appropriate school room decoration is comparatively small and is amply justified. The decorations should not be extravagant, but simple and artistic. The walls should be tinted with colors that will absorb the least light and prove the most restful to the eyes. A green-gray tint is favoured by many authorities. Plants and flowers, appropriately arranged and placed, add materially to the attractiveness of school rooms. Teachers should give systematic attention to the aesthetic details of school environment and should encourage their pupils to co-operate in the work necessary to keep the school room attractive.

Illumination.—The proper illumination of the school room is a problem which is receiving much greater attention than heretofore. It is now recognized that there is no single element involved in the construction of school buildings that plays so important a part as the lighting. School work demands a constant and strenuous use of the eyes during the formative period of the child's life, when their overstrain or abuse often causes irreparable injury. The effects of lighting are actually measurable in terms of physical and mental efficiency. A bright, well-lighted room has a stimulating and tonic effect upon a class, while poor light has a depressing, fatiguing effect. Good illumination improves the quality of work whether in the home, workshop, or school. The earnings of workmen have been known to increase from ten to fifteen per cent. after the installation of an improved system of lighting. At any hour of the day and at any season of the year, it should be possible for the child to read diamond print without difficulty in any part of the room. This is generally regarded as a satisfactory test of school room illumination. The light should not be excessive and it should not shine directly into the eyes of the pupils. It should be of proper intensity, equally diffused, and come from the proper directions. Ample window space to the left and rear of the pupils should be provided. As the upper portion of a window furnishes the most and best light, the windows should extend as close to the ceiling as the construction of the building will permit, and shades should be attached to the bottom of the frame as well as to the top. All school windows exposed to the direct rays of the sun should be provided with opaque or semi-opaque shades, which should be so adjusted during school hours as to secure proper illumination continuously. Excessive light is injurious. In the past comparatively little attention has been given to this important matter, especially in rural schools where pupils have often been exposed for long periods every day to the glare and direct rays of the sun. Again, the natural means of lighting is not sufficient at times, owing to storms, darkness, and other causes, to illuminate the

class room, and as a result artificial lighting must be used if the children are to continue their school-room work. In the health interests of the children, however, it would be much better to permit them to play or to dismiss them if the artificial lighting is unsatisfactory. Where electric power is available, school rooms should be equipped with nitrogen lamps, which should be properly shaded and judiciously placed. The nitrogen lamp has high illuminative power and is considered by many authorities to be the best artificial light known at present for the purpose of ordinary illumination. The indirect method of lighting class rooms by powerful nitrogen lamps, which is very highly commended, distributes the light evenly all over the room, does not dazzle the eyes, and approaches as nearly as possible diffused sun light.

Defective lighting is prejudicial to good health in many ways. It causes headache, eyestrain, nervousness, and fatigue and frequently results in permanently defective vision. A good lighting system illuminates the field of vision evenly, gives the highest scale of visual efficiency, and produces the greatest degree of eye comfort. In view of the heavy demands made upon the eyes of school children, every effort should be made to furnish proper light in every part of the room during school hours.

Water Supply.—The water supply should come from a safe source and should be carefully guarded against impurity. The water in rural school wells and urban water systems should be tested frequently by competent health officials. School buildings equipped with water systems should have sanitary drinking fountains conveniently located. Where such fountains are in use, the children should be taught how to use them. In drinking they should never permit their lips to touch any part of the fountain. The children of other schools should be supplied with individual cups, which should be kept in cabinets designed for the purpose and not in the desks of the children. Under no circumstances should the common drinking cup be tolerated.

Care of the School Premises.—School premises should present to the community a high standard of sanitation and orderliness. The mechanical devices installed for the purpose of assisting in securing proper temperature, humidity, sanitation, and ventilation should be intelligently used. The cost of maintaining efficient janitor service is amply justified. The floors, walls, ledges, and school furniture should be kept scrupulously clean. A recent test by school authorities in Birmingham, England, demonstrated that oiled floors after agitation showed an average of 40% increase in bacterial colonies, whereas unoiled floors after agitation showed an increase of 222.6%. The old practice so long encouraged and approved by both teachers and school trustees in rural sections of allowing the pupils to sweep the rooms at recesses was nothing short of criminal in view of the causal relation known to exist between dust and disease. A prime requisite for the health and physical comfort of school children is that they shall work under favourable conditions as to light, temperature, ventilation, and cleanliness. It is particularly important that the class rooms should be well flushed with outdoor air before the pupils assemble in the mornings and at each recess. Every factor that has a bearing on the physical well-being of the school child should receive due attention. School authorities should aim to make the school environment hygienic and sanitary in every respect, to eliminate every deleterious influence, and to maintain a wholesome atmosphere for every child during his school career.

INSTRUCTION, GOVERNMENT, AND DISCIPLINE

The nature of the instruction, government, and discipline has an important bearing upon the health of school children. School life in favourable and suitable physical surroundings furnishes a health regime for the activities of the brain and of the nervous system as a whole, if the work is interesting, varied, and not excessive, and due regard is had for the various stages of growth and for individual differences. In the physical interests of school children both the methods of instruction

and the principles of government should rest on a scientific basis, involving especially an intimate acquaintance with each individual child. If right relationships between the teacher and each individual child are established and maintained, the result will be an interplay of sympathy that will inevitably produce a favourable influence upon both the mental and the physical development of the child. As the school child is extremely sensitive to his environment, the teacher has, in his methods of instruction and government, control of instruments of incalculable influence upon the child's health. This great truth is usually overlooked by teachers, who in their efforts to train the mind rarely concern themselves about the physical and the physiological effects of school instruction and discipline. The result is physical deterioration and mental inefficiency. The true teacher never loses sight of the physical basis of education, and adapts his methods accordingly.

Teaching is highly technical work, involving special aptitude and training if the work is to be done in an artistic and expert manner. In many respects, teaching is both the greatest and the most difficult work that can be undertaken by a human being, a work requiring delicate adjustments, untiring patience, deep insight, scholarly attainments, technical skill and genuine sympathy, as well as a true conception of the significant purposes of life. Child study has revealed the more important functions of the teacher, pointing out that he must direct the development of the child as well as instruct him and that he should enlarge the pupil's experience in a natural way. A knowledge of the teaching process, as at present understood, does not come by inspiration or intuition. The teacher should have expert knowledge of the pupil to be taught, of the subject to be studied, and of the most scientific, hygienic, and economical method of bringing pupil and subject together. Without technical study, sympathy, and right attitude no teacher can expect to succeed in the truest sense. He must become familiar primarily with the physical and the mental needs of the learner, and only secondarily with the subject, for the child is the conditioning factor in all methods

of instruction. The demand everywhere is for trained teachers who have had ample opportunity to become familiar with the scientific principles of education and with the physical and the mental characteristics of children of every type in the various stages of their development. There is no greater need in the educational world at present than that of trained teachers for schools of every kind, teachers with large vision, deep convictions, scientific opinions, optimistic outlook, and right educational attitudes.

In considering the health effects of instruction and government, too much emphasis cannot be placed on the desirability of the teacher establishing proper relations with each individual child. The entire personality of the child is affected either favourably or unfavourably by the attitude of the teacher and the nature of the treatment received. Irreparable physical injury has been done to thousands of sensitive school children by ill-tempered, cranky, nagging, irritable teachers. Parents of nervous children taught by this type of teacher know something of the injurious effects resulting from such treatment. Worry, nervousness, depressed spirits, lowered vitality, sleepless nights, and sickness are often directly traceable to wrong treatment by the teacher. In fact, instances are common where, owing to the unfavourable influence of the teacher's attitude, parents have found it necessary to keep their children at home or to have them placed in the charge of a different teacher. Pedagogy will make a tremendous advance when it succeeds in impressing teachers with a true conception of the supreme importance of maintaining right attitudes toward the child in the work of instruction and government. There is neither time nor place in the school for nagging, ill-temper, scolding, or sarcasm. In their stead, sympathetic direction and guidance should be substituted. The greater scientific knowledge of children has resulted in gradually deepening the sense of justice in teachers, but many still fail to hold in reverence at all times the sacred rights of the child. It should be more fully recognized that justice is intimately bound up

with all conduct and that its practice is a primary duty of every human being in dealing with others.

The Health of the Teacher.—The health of the teacher has an important influence upon the physical welfare of his pupils. This fact is not yet sufficiently appreciated by school authorities. There are teachers in many schools who are constant menaces to the health of their pupils. This is true especially of those who suffer from nervousness, headache, indigestion, dyspepsia, colds, and tuberculosis. A nervous, irritable teacher is a daily source of injury to sensitive children. He is usually excitable, intolerant, and arbitrary, especially as his condition becomes chronic. Children are very imitative and readily acquire the injurious physical habits of their teachers, particularly nervous habits, such as eye-blinking, facial twitching, stammering, and nail biting. Observation has shown that many nervous disorders are contracted by psychic contagion and rapidly spread by the influence of example. The physical disorders of teachers affect children through unfavorable influence, the direct transmission of disease, and ineffective teaching. An unhealthy teacher has an exceedingly depressing effect upon the health and the spirit of his pupils, as he is usually fatigued, irritable, and melancholy. Physically and mentally he is unfit to discharge his duties properly. In justice to school children, physically defective and unhealthy teachers should be debarred from teaching during the continuance of such defect or sickness. The entrance to the teaching profession should be more carefully guarded from the physical point of view. Teachers should be physically sound when they enter upon their work and should be required to submit frequently to physical examination by the school physician, otherwise the medical inspection of schools will fail to accomplish its purpose. The beneficial effects upon school children of good health and physical vigour in the teacher cannot be overestimated. Dr. Hoag, in his book, "The Health Index of Children," says, "From every teacher with abundant vitality and forceful

personality, there radiates an influence for good which far transcends mere mental capacity, however great that may be."

The Curriculum.—Recent investigations of the school curriculum in relation to the child's physical needs have led to many interesting and valuable discoveries. They show the need of comparatively short lessons, frequent periods of relaxation, and of more time and attention to physical exercise and health instruction. A study of the fatigue curve indicates the desirability of overtaking the most difficult work in the forenoons. It is quite evident that the study of fatigue, its cause and control, carried out in the psychological or pedagogical laboratory, will more and more guide the teacher in his school work as to the character of the time-table, the length of lessons, and the treatment of subject-matter. The subjects recently added to the curriculum indicate a growing recognition of the need of more self-activity, of systematic training of the senses, and of implanting habits of close observation and thoughtful discrimination. In the past the school child was passive rather than active. The re-constructed courses, however, are demanding the active co-operation and response of the pupils. The new subjects are activity subjects rather than knowledge subjects. They demand doing rather than knowing, and are, therefore, more in harmony with the health interests of growing children. The average curriculum of to-day is immeasurably superior to those of the past. It is designed to meet the present and the future needs of the child rather than to perpetuate the traditions of the past. The main purpose of the new subjects is to enrich the life of the child by creating additional avenues for the expression of his instincts and tendencies and by awakening his natural interests in every proper direction. In considering this topic, it should be borne in mind that the value of the curriculum depends largely upon the resourcefulness, breadth of view, and experience of the teacher. The course of study is enriched in the truest sense when it is vitalized by a teacher who has caught the spirit of his work, and who enters into it with a warmth of enthusiasm based on intelligence, scholarship, and vision,

and inspired by a sympathy for the child and an intimate knowledge of the laws of its physical and mental development. This means that the efficiency of the curriculum and its bearing upon the physical welfare of the child fluctuate with the type of teacher, for in the last analysis the real course of study comes to the pupil from the teacher.

Examinations.—The investigations in connection with the curriculum have brought the question of examinations under review, with the result that the promotion examinations in many of the progressive elementary schools have either been greatly reduced or abolished. Only a short time ago, the Department of Education of Ontario decided to make the Entrance Examination optional, and already several of the leading educational centres have done away with it. The growing opposition to school examinations is due to the many evils, hygienic and pedagogical, that seem to be inevitably connected with such tests. Some are strongly in favor of their abolition, while others who take a more moderate view are urging their reduction and modification in such a way as best to promote the interests of the pupils without sacrificing their health or interfering with their normal physical and mental development.

The chief objections to written examinations are that they usually cause overpressure and serious physical and mental strain during both the time of preparation and of writing, that they foster pernicious habits of study, encourage excessive memorizing and superficial teaching, and often result in permanent physical injury. In fact, there are cases on record to prove that fear of examinations has led children to commit suicide. There is strong reason to believe that the public would be appalled at the injurious effects of formal written examinations upon the health of school children, if reliable records were available. Written examinations are a test of the nervous energy and of the nervous resistance of a child but not necessarily a test of his knowledge or mental development, for he is surrounded by abnormal conditions which make it impossible for him to do himself justice. Nervousness, emotion-

al strain, fear of error, influence of the time limit, and the importance attached to the result, all combine to produce physical deterioration and mental confusion. Further, as a test of character and of moral development, written examinations are wholly inadequate.

The child study movement which has focused attention upon the child and his needs rather than upon the subject-matter is leading to a complete change of view in regard to the examination question. It is showing that the highly sensitive and easily disturbed nervous systems of growing school children should not be subjected to unnecessary strain and fatigue. Further, it is pointing out that a pupil's fitness for doing profitable work in a higher grade is best determined by the character of each day's work. This is the standard by which every person's earned promotion is determined in the adult world. Intelligent teachers are laying more and more stress on the character of the daily work and less and less on special tests, and are thus exhibiting a greater regard for the health of the child, and gaining a truer estimate of his capacities and powers, as well as inculcating in him a true conception of the proper standard by which progress should be measured. Competent teaching will ultimately make formal examinations unnecessary, for it is reasonable to believe that a teacher who is qualified to teach a class is also qualified to make the promotions without the direction of outside authority. There are many indications that the formal written examination, which has been a dominant factor in education for generations, will in the health interests of the child soon be abolished in the elementary schools, and that it will be greatly modified in the secondary schools.

Punishments.—The nature and the frequency of school punishments have a marked influence on the health and spirit of school children. The fear, worry, sense of humiliation, and wrong treatment associated with punishments have usually a depressing effect upon the health of pupils, and frequently result in irreparable injury. In the past almost every conceivable kind of punishment has been resorted to in the manage-

ment of schools, many of which were both inhuman and unnatural. Barbarous methods in school discipline are gradually disappearing, however, and school children are being treated with greater consideration, respect, and justice than heretofore. This is chiefly due to a more scientific conception of the nature of child life, a greater regard for the natural rights of children, and to a larger and truer view of the whole educational problem. Public opinion has also been a powerful factor in eliminating the practice of inflicting corporal punishment in schools. In the high-grade schools of to-day corporal punishment is rarely administered. The best authorities regard its use as justifiable if it is the only method of bringing the offender into an attitude in which he is susceptible to reforming influences. Resourceful, tactful teachers, with active sympathy for their pupils and right educational attitudes, have no occasion for its use. On the other hand, weak teachers usually make it their first resort, and thus forfeit the respect of their pupils and soon terminate their school-room usefulness. Severity is not necessary to reform the refractory pupil. In fact, severity in discipline inevitably fails to accomplish its purpose. The most effective way of dealing with those who disregard the rules of good discipline and commit offences is to reach them through the normal conditions of school life and work. Should a teacher find it necessary to inflict corporal punishment, it should be administered judiciously and privately, and with due regard for the child's physical condition. The fact that corporal punishment is absolutely forbidden by law in many schools in different countries shows how modern public sentiment regards the practice. Inasmuch as all punishments are repressive measures which have injurious physical and mental effects and which tend to weaken the bond of unity between pupil and teacher, even the milder forms such as reproof, detention, imposition, and fines should be replaced by constructive methods of discipline, or at least reduced to a minimum. Loud self-assertion, irritability, sarcasm, and rudeness, should give way to firmness, self-control, justice, and courtesy. The whole attitude

of the teacher in matters of discipline is reflected in the conduct and health of his pupils. In school discipline, the quiet and dignified self-control of the teacher who is gifted with the power of effective teaching is far superior to the combined influence of commands, rewards, and punishments, and has a marked beneficial effect upon the physical condition of the children as well.

Freedom.—Again, in the interests of the physical welfare of school children, adequate provision should be made for their individual initiative and freedom of activity. The school child is a very active being, a fact for which the schools of the future will have greater regard than those of the past. The natural activity of the child is the greatest feature in education. Moreover, it is the first of all essentials of healthy growth and development during school age. In his physical, mental, and moral interests the school child is entitled to such freedom of activity as is consistent with the demands of natural growth and development and with the rights of his fellows. There is still far too much repression in the schools, too much crushing out of initiative, and too little regard for the child's natural freedom and health. Instruction and discipline with their artificial methods and unnatural restrictions often rob the children of all that is best in their natures to make room for things of doubtful value. Originality and personal initiative are stamped out or made feeble, and incalculable stores of personal power are rendered unavailable by clumsy methods of repression. There is tremendous wastage of originality in schools which insist on stereotyped methods of doing things and which fail to find scope for their pupils' natural activities. There is marked interference with the child's physical development as well. Different children work, and should work, differently, and their natural methods may be superior to the conventional methods of the teacher. Undue restriction and repression mean diminished vitality, mental sluggishness, and unfavorable educational attitudes, whereas reasonable freedom of activity brings into play

originality and confidence, generates personal power and independence, and improves the physical tone and vigour of the system.

WORK AND PLAY

To surround the school child with a favorable environment is to fulfil one of the two great requirements of healthy physical development. The other essential factor is to be found in the activity of the child aroused by his response to hereditary impulsion and to external stimuli. Work and play are simply expressions of self-activity. In reality there is no antithesis between them. Dr. G. Stanley Hall says that the distinction between work and play is essentially in the degree of strength of the psycho-physical motivations, and should not be emphasized too early. The child naturally delights in activity and is not concerned as to whether it is called work or play. Play may be very properly regarded as the prelude to work, and both as primary essentials to growth and normal physical and mental development. Activity is the great fundamental factor in education. There can be neither health nor normal development without it. Nothing can be more conducive to good health than to be happily employed at one's work or busily engaged in play in a healthful environment. Brinton says, "The measure of value of work is the amount of play there is in it, and the measure of value of play is the amount of work there is in it." Man cannot succeed in his work in the highest sense unless it is permeated with the play spirit. In fact, the infusion of the play spirit into work tends to eliminate the drudgery, monotony, and grind which are so often associated with it. The school child should be happily employed on productive work, not mere busy-work. The amount of pleasure which a child takes in his work is a most valuable asset. Its absence means drudgery, depression, and monotony. When a child is engaged upon a piece of work which appeals to him as worth while, his whole personality responds in an invigorating and inspiring manner which lends tone and energy to both body and mind. For this reason school work should be kept closely

related to life, otherwise it soon loses the human touch which is essential in inspiring effort. It should not be forever associated with duty, silence, drudgery, punishments, rewards, and failure, but rather with privilege, health, happiness, success, and the acquisition of personal power. Work creates strength and vigor, develops good habits, and directs activity into useful channels. Throughout the grades the work should be real and vitalizing and no mere pretence of industry should ever be countenanced. Teachers should require concentrated attention upon the work in hand, together with serious purposeful effort. It is important to create in children a favorable attitude toward work, which should be entered upon with enthusiasm and pursued with genuine interest, for those who exhibit a lack of interest soon become fatigued, make mistakes, and develop restless, careless, habits, all of which have an unfavorable influence upon physical and mental development. The schools of the future will require greater efficiency in every kind of school work and in so doing will make a valuable contribution to both the physical and the mental needs of children.

Amount of Work.—The amount of work done by children in school has an important bearing upon their health. At first school children lack the power of sustained endurance and of prolonged, close application, but if the work is graduated, varied, and progressive in its nature and the periods of rest are judiciously distributed, this power is gradually developed. Excessive work should be avoided, but greater concentration should be required. In this connection the chief fault with many schools is not that children are overworked, but rather that careless and unhygienic habits of work are permitted and encouraged. The average school child would be healthier if he worked harder while engaged in his school duties, for lack of application not only results in establishing wrong habits and in creating an unfavorable attitude toward work, but has a deteriorating influence upon the health as well. As a rule the hardest workers are not only the most capable but also the healthiest, for devotion to one's work within

reasonable limits tends to promote health. In many schools, particularly rural schools, insufficient work is assigned, and as a result much valuable time is wasted and the pupils fail to reach a high standard of efficiency. On the other hand, overpressure dulls the energy, checks independence, suppresses initiative, interferes with health, and retards growth. It also causes anxiety, worry, and nervous tension, and reduces physical force and vitality. In directing school work, the teacher should bear in mind that the appropriate amount of work varies with individuals and that it should be apportioned according to their physical strength and mental capacity. Moreover, due attention should be paid to the child's need of relaxation. Education should aim at developing healthful habits of activity and of relaxation, for largely upon the hygienic distribution of the periods of rest and activity depends the efficiency of body and mind.

Play.—With children, play is serious, spontaneous, pleasurable, and natural. It calls forth all their powers, expresses their instinctive tendencies, and supplies a necessary factor in growth and development. Play is nature's most effective educational agency. It satisfies the child's strongest instincts, exercises both his body and his mind in the natural direction of their growth, and reveals his need of new experiences. Joseph Lee says, "The thing that most needs to be understood about play is that it is not a luxury but a necessity. It is not simply something that the child likes to have; it is something that he must have if he is ever to grow up. It is more than an essential part of his education; it is an essential part of the law of growth, of the process by which he becomes a man at all." Play assists in tissue growth, in eliminating waste products, in re-building worn-out cells, and in extending the powers of the various organs and functions of the body. It stimulates thinking, encourages intensity of effort, and develops greater mental resourcefulness. Moreover, it creates emotional and moral tone, awakens social tendencies and interests, and develops the child's executive powers. It is now generally recognized by educationists that play is not

mere pastime for children, but rather the natural expression of a fundamental racial instinct which throughout the evolution of mankind has proved of supreme value in determining physical and mental development. It is the medium through which the child fully reveals his true inner nature. Hence, the play of school children presents to the teacher the best opportunity of studying them at close range and of becoming acquainted with their real needs and characteristics. In fact, no teacher really knows a child until he has closely observed him in his play. School authorities are now giving greater attention to the problem of providing proper facilities and hygienic environments for play, and teachers are gradually getting a truer conception of its value as an educational agency and of their part in devising, organizing, and supervising school games. It is now more fully recognized by the public than heretofore that a proper playground in connection with every school building is a modern necessity and that there is urgent need of proper direction and supervision of school play.

ACCIDENTS

School children are exposed to the hazards of the playground, of the street, and of the school building. Many serious accidents arise out of school games, especially where there is lack of proper supervision. If left to themselves, children often choose hazardous games, challenge one another to attempt dangerous feats, and play too long, too roughly, and too violently. Further, groups of older boys often play dangerous games, with utter disregard for the safety of younger children not taking part in them but exposed to their hazard, with the result that serious accidents frequently occur. If statistics were issued annually, showing the number and the nature of injuries sustained by children on the school playgrounds of Ontario alone, there is reason to believe that the public would be both surprised and alarmed by the report. If the Department of Education required every teacher in the province to furnish in the annual report to the Minister

a complete list of accidents sustained by school children, together with a brief statement of the causes and effects of the serious injuries, this important problem in school life would be more likely to receive the attention it deserves, and both teachers and pupils would be more fully impressed with the need of safeguarding play and of making every effort to reduce school accidents to a minimum and to eliminate them if possible.

Again, time should be taken in school to instruct children as to proper conduct while going to and from school and as to street hazards. They should be taught that the roadway is a thoroughfare for wagons, street cars, automobiles, and other vehicles, and that it is not a playground for children. Such rules as stopping, looking, and listening before crossing streets, crossing at regular crossings instead of between intersections, looking for vehicles coming from the opposite direction when crossing behind any other vehicle, and waiting until street cars stop before getting on or off, are among those with which the school child should make an early acquaintance. He should also be taught that the throwing of stones or other missiles on the street is a frequent cause of accidents. Children in large cities are in special need of such instruction as will safeguard them on the streets. In May 1916, six children were killed in Toronto as a result of street accidents.

Fire, together with the usual panic associated with it, is the greatest hazard to which the school building exposes the child. To meet such emergency the best equipment is systematic fire drill. Fire drills cannot prevent fires, but should ensure the rapid and orderly exit of pupils and prevent panic. Pupils should be thoroughly familiarized with the fire alarm signals, so that no delay may be caused through confusion. The aisles and the exits should be kept free and unobstructed. It is usually advisable to have the children march out in twos, and to have monitors ready to open the doors. Teachers should always remain in the room until the last pupil has passed out, and in the case of an actual fire they should search the basement before leaving the building. It is important to teach children in the course of fire drills to be prepared to over-

come obstructions and to meet emergencies in the event of an actual fire. Fire drill should be practised frequently but irregularly in order to secure controlled response on the part of the pupils and to prevent their being taken unawares when a fire occurs. In many schools every regular dismissal constitutes a fire drill practice, the only difference consisting in the nature of the alarm. This plan, together with fire drill practice at irregular intervals, is very highly recommended. Not more than two minutes should be required in getting the pupils out of the largest school building. All school buildings should be provided with at least two exits with doors opening outward, with fire proof coal bins, with metal receptacles for waste paper and other refuse, and with chemical fire extinguishers. The doors between the furnace or boiler rooms and other basement rooms should be fire-proof, and stairways should never be constructed over the heating apparatus. The doors should never be locked during school sessions. If precautions such as these are taken, the hazard associated with fire in the school building will be greatly reduced.

COMMUNICABLE DISEASES

Probably no single factor in the elementary school career of children has such a direct bearing upon their health and is responsible for so much lost time as communicable diseases. Such diseases, especially when they become epidemic, often lead to the closing of the school for several days or weeks, as the case may be, thereby interfering with normal progress, involve the quarantining of all children exposed to the infection, and cause a rapid increase in the death rate. It is quite evident that the spread of the communicable diseases of childhood, including their relation to school attendance, constitutes a problem that needs careful consideration and study.

A communicable disease is one caused by a specific virus being transferred from one person to another. This transfer is usually the result of close association with an infected person. In this connection the prevailing opinion at present is that most communicable diseases are spread by contact infection.

If this opinion is correct, the control of such diseases depends primarily and mainly upon individual control. For this reason, children should be instructed early as to the cause of the spread of communicable diseases, for without the intelligent co-operation of each individual child, preventive measures cannot be effective. Children should be taught to avoid coming into contact with persons exposed to or suffering from tuberculosis, diphtheria, measles, scarlet fever, mumps, whooping cough, common colds, typhoid, cerebro-spinal meningitis, infantile paralysis, cutaneous affections, and other contagious diseases, as contact exposure is likely to result in the transfer of infection.

Until very recently parents often deliberately exposed their children to the so-called diseases of childhood in the belief that such diseases would occur in any event and the sooner the better. This practice was due to a total misconception of their nature. It is now known that such diseases are preventable, and that they occur only through carelessness, ignorance, or neglect on the part of some one. More is also known about their relative communicability, their methods of transmission, and the means of their prevention, as well as about the danger associated with them. They jeopardize the health of children, reduce their vitality, make them more susceptible to other ailments, and often result fatally or in serious complications and after-effects. Whooping cough, for example, often weakens the heart, and measles frequently causes defective vision and produces conditions favorable to pneumonia. Whooping cough and measles rank high as causes of death among children, particularly among those under the age of five years. It is said on good authority that from eighty to ninety per cent. of the fatal cases in measles and whooping cough occur in this period. Parents should, therefore, exercise special care over their children in respect to contagious diseases occurring during the pre-school age. It is possible to decrease materially the mortality rate by simply delaying the age incidence.

Isolation.—In the control of communicable diseases, isolation notwithstanding its obvious limitations is always worth while. It is the best known single method of checking their spread. In theory, the principle of isolation is ideal; in practice, its value varies with the communicability of the disease, the promptness with which it is put into effect, the modes by which the virus is transferred, the number of carriers, the missed cases, and other factors connected with the spread of the infection. In such a disease as measles where the virus is communicable three or four days before the disease can be positively diagnosed, isolation does not become operative soon enough. This, however, is not a limitation of the value of isolation, but rather an evidence of the need of ability to recognize such a disease in its beginning. Preventive medicine will yet undoubtedly discover scientific methods of recognizing communicable diseases in their initial stages and thus greatly extend the value of isolation. With improved methods of diagnosis and greater knowledge of the transmission of infection, isolation will become increasingly effective and will be recognized and adopted by the public as the most scientific means of controlling and preventing contagious diseases.

The common practice for generations has been to close the schools during serious epidemics, but difference of opinion now exists as to the wisdom of such action, many holding the view that it is better in the interests of both the child and the community to keep them open, if they are under proper medical supervision. There is really no value in closing the school, if the children are allowed to play with one another on the streets and elsewhere. In fact, the probability of spreading the infection is usually increased. If the schools are kept open, and the children are closely observed by the teacher and examined daily by the school nurse or physician, conditions for controlling the epidemic are far more favorable than they are with the schools closed and the children scattered. To close the school is in reality a clumsy, unscientific, and unsatisfactory method of dealing with the situation. It betrays ignorance and helplessness as well as inability on the part of those

charged with the responsibility of guarding the public health. It would appear the better plan to keep the schools open and to send all suspicious cases home for observation and to have all infected cases isolated. The important thing is the isolation of the infected person, not the closing of the school. It should be noted that epidemics are scarcely possible where an efficient system of medical inspection is in operation.

Parents, teachers, and children should co-operate with the health authorities in carrying out the regulations issued by municipal boards of health for the purpose of checking the spread of communicable diseases. Only through such co-operation and the application of scientific methods of control can the spread of infection and the consequent impairment of the health and the lives of thousands of school children be prevented. A very serious responsibility is undertaken when large numbers of children are massed together at a time in their lives when they are most susceptible to contagious diseases. Every possible precaution, therefore, should be taken to minimize the dangers incurred by such aggregation. It is particularly important that infected children should be kept in quarantine for the periods specified for each disease. The table on page 90 shows the period of quarantine and the date of return to school, as set forth in the Regulations of the Provincial Board of Health under Section 72 of The Public Health Act of the Province of Ontario.

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Disease	Quarantine required after last exposure to infection	Earliest date of return to school after attack
Smallpox	14 days	When all scabs have fallen off.
Chickenpox	14 "	When all scabs have fallen off.
Measles	16 "	Three weeks, if all desquamation and cough have ceased.
Scarlet Fever	10 "	Six weeks, if convalescence is complete, and no desquamation, albuminuria, sore throat, nasal or aural discharges remain.
Diphtheria	12 "	Three weeks, if convalescence is complete, and no sore throat, nasal or aural discharges remain; or if after 12 days two negative swabs with a twelve hour interval are shown to the satisfaction of the M.O.H.
Whooping Cough	14 "	Six weeks after the commencement of the whooping, if the characteristic spasmodic cough and whooping have ceased—earlier if all cough is gone.
Rotheln-German Measles.	16 "	Three weeks.
Mumps	18 "	Four weeks if all swelling has subsided.
Typhoid Fever		Eight weeks, if convalescence is complete.
Itch, Ringworm, and other skin diseases	}	As soon as local affections are cured.
Ophthalmia Neonatorum		
Trachoma		
Pediculosis		
Impetigo Contagiosa		

CHAPTER VII

IMPORTANT PROBLEMS FOR PARENTS AND TEACHERS

THEIR JOINT OBLIGATION

The physical condition of the school child is the joint concern of parent and teacher. Although the parent's responsibility is primary and extends over a much longer period than that of the teacher, the latter is under special obligation to do his part in caring for children during extremely important years of their lives. When the state asserted its right to compel children to attend school, it placed upon the teacher the responsibility of maintaining, guarding, and improving their health during such attendance. The teacher's responsibility commences at the moment the child enters school and continues in a gradually increasing manner until he leaves. The experiences of children during school life determine their physical well-being not only for the period through which they are passing but to a large extent for adult life as well. Parents and teachers should regard themselves as partners in the supremely important work of guiding the child safely through his school career, of helping him to develop physical and moral strength as well as mental power, and of establishing in him right habits of living. Each should recognize in a sympathetic manner the responsibilities and the problems of the other and should have due regard for the other's difficulties. Co-operative efforts should replace fault finding and criticism. At present most parents and teachers admit their responsibility for the care of the physical well-being of school children, but comparatively few fully appreciate the real significance of such responsibility and discharge their obligations in an adequate and intelligent manner. They should realize that their primary function so far as the school child is concerned is to secure and maintain his physical well-being, for upon this all other life values depend.

Both school and home environments should be hygienic and wholesome, fit for children in every respect. The methods of instructing and of disciplining children should have a bene-

ficial effect upon their health and physical development. The provisions and conditions for work, play, physical exercise, and recreation should serve their best interests. The equipment and furnishings should be kept clean and sanitary. The food should be pure and wholesome and properly prepared. The air in class and living rooms should be fresh, free from dust, of proper temperature and humidity, and kept in gentle motion. In a word, the safeguards thrown around children during school age should be ample to protect them from physical and moral harm and to lay a sure foundation for adult life.

To carry out these requirements in an intelligent and effective manner imposes serious responsibility upon parents and teachers, and indicates the vital need of their combining their efforts to form in school children habits of clean hygienic living, to develop the powers of self-direction and self-control, and to create a strong desire for the most perfect development of mind and body. It is essential that careful personal attention should be given to the habits of school children, and that high standards of living on the part of parents and teachers should be maintained, for children are very suggestible during school age and readily imitate the conduct of adults, which gradually standardizes their own. If the child is to be started upon a career of healthy physical and moral growth, home and school influences, including especially parental suggestions and impressions, must be wholesome and uplifting. The disregard of hygienic requirements in school or home wastes time, nullifies effort, impairs physical vitality, invites disease, prevents keen mental reaction, and lowers moral tone.

The responsibilities of parents and teachers in regard to the treatment of school children suffering from physical defects and nervous disorders and to the instruction given in personal hygiene and in sex-education are particularly serious and deserve greater emphasis.

THE PHYSICAL DEFECTS OF SCHOOL CHILDREN

It has been ascertained from the reports of health inspectors in Canada and United States that approximately sixty per cent. of the school population have physical defects serious

enough to interfere with their school progress. It must be obvious that parents and teachers are under serious obligation in respect to the detection and treatment of such defects. Where an efficient system of medical inspection is in operation, the teacher's responsibility is shared with the school physician and school nurse, and the parent's responsibility lies chiefly in applying the treatment recommended. The chief defect in the systems of school medical inspection at present is to be found in the neglect or refusal of parents to have the remediable physical defects of their children corrected or such physical impediments removed as are likely to retard their mental progress or impair their physical growth. The rapid extension of medical inspection with its incalculable benefits and the consequent enlightenment of the public as to its value should gradually remedy this condition, otherwise it would appear reasonable for the school to expect to have its legal control over the school child extended to include the right to have such defects remedied. Intellectual training without the physical ability to utilize it is a waste of the child's time and effort, and the building of a sound character without a sound physical foundation is all but impossible. Further, a child's capacity to learn depends very largely upon his physical condition and particularly upon the state of his sense organs. At present, however, it is not definitely known what kinds of physical defects cause the greatest retardation, what mental functions are most affected by various physical disabilities, or what degree of physical defect is necessary to cause mental impairment, but these difficult and complex problems will ultimately be solved by the same kinds of investigation and scrutiny as obtain in other fields of modern scientific inquiry. Enough has been demonstrated, nevertheless, to convince intelligent parents and teachers of the vital need of having physical defects and obstructions removed where possible. The removal of the physical handicaps which afflict school children invariably raises the standard of physical and mental efficiency.

Dental Caries.—Dr. Osler's statement to the effect that there is no single thing more important in the whole range of hygiene than the hygiene of the mouth is amply verified by the facts revealed by recent examinations of the mouths of school children in several large cities in Canada and United States. These examinations have disclosed the fact that a very high percentage suffer from diseased teeth. In some schools ninety-five per cent. of the mouths required hygienic attention or dental service in order to render them healthy and functionally efficient. The introduction of dental inspection, together with the establishment of dental clinics, has led to a marked improvement in these conditions, and is now receiving strong public support. A striking example of the excellent results of the dental treatment of school children is shown in the steady reduction in the number of Toronto pupils suffering from defective teeth. About three years ago, just previous to the organization of school clinics in Toronto, the children in two large schools were examined and ninety-five per cent. were found to be afflicted with dental defects. Subsequently, in 1915, examination of the children in eighty-six schools showed that the number with such defects had been reduced to sixty-five per cent. The 1916 examination, covering all the schools in the city, disclosed the fact that this percentage had been reduced to fifty-one.

Dental caries is more responsible for feeble constitutions, disease, maldevelopment, and mental sluggishness among school children than any other single ailment. Defective teeth are usually the primary cause of diseased tonsils, ear trouble, adenoids, and enlarged neck glands. They frequently supply harbors for the germs of infectious disease, pollute the mouth and breath, infect the food, and interfere seriously with the process of nutrition. Further, they are often the cause of indigestion, irritability, bad temper, mental inefficiency, and wrong conduct.

It is of paramount importance, therefore, that school children should be taught to take proper care of their teeth and mouths. Instruction in oral hygiene and the introduction

of dental clinics and dispensaries into the schools will enable them to realize in a measure the importance of these requirements. If the mouth is kept clean and free from inflammatory conditions, and the teeth well preserved, a necessary condition for the proper mastication of food with its consequent beneficial effect upon the health is secured. The cost of putting the teeth of school children in order and of keeping them in proper condition is a mere trifle compared with the advantages accruing from increased physical vigor and mental power, the time saved, and the improved individual and community health. To get children to keep their teeth and mouths clean constitutes a problem whose successful solution requires the combined efforts of parents, teachers, school nurses, and school physicians. It is imperative that early instruction and constant attention should be given this matter. The establishment of dental clinics in schools and the systematic instruction of school children in mouth hygiene will relieve the suffering pupil, combat the evils of retardation and non-attendance, improve his physical and mental health, and increase his efficiency in every respect. The practice of oral hygiene by every child would furnish an invaluable contribution to the improvement of public health. Children should be taught that, "Without good teeth there cannot be thorough mastication; without thorough mastication there cannot be perfect digestion; without perfect digestion there cannot be proper assimilation; without assimilation there cannot be nutrition; without nutrition there cannot be health."

Nose and Throat.—The noses and throats of school children should be examined frequently and all causes of obstruction to respiration removed if possible. Diseased tonsils, polypi, and adenoids should be treated promptly, thus preventing ear trouble and mastoid disease, and reducing the effects of common colds. Adenoids are the chronic enlargement of the lymphoid tissue behind the nasal air passages, which they obstruct. Their presence may be inferred from mouth breathing, snoring, deafness, chronic post-nasal catarrh, or recurring ear trouble. Long neglected

cases often cause contracted and undeveloped jaws, crowded irregular teeth, and deformity of the face and mouth, and are frequently accompanied by mental sluggishness, listlessness, and arrested development. Enlarged tonsils and enlarged neck glands are usually associated with adenoids, making a combination that requires prompt treatment by a competent surgeon, otherwise the child is almost certain to be seriously handicapped for life. There is not much danger connected with the removal of adenoids, if the operation is performed under anesthesia by a nose and throat specialist. Only one fatality occurred as the result of four thousand such operations on school children in New York City. The consensus of opinion among specialists at present in respect to the removal of tonsils favors such action only when the tonsils are diseased and interfere with the nutrition of the child, causing secondary disturbances affecting unfavorably his health and school progress. The mere enlargement of tonsils is not sufficient cause for their removal.

Again, diseased nose and throat conditions usually make the child more susceptible to colds, which are the frequent cause of much lost time and often the forerunners of catarrh, croup, bronchitis, pneumonia, and pulmonary tuberculosis. Most colds, especially those accompanied by increased temperature, are communicable, and are readily spread by contact infection, but if the mouth is kept closed and the nose and throat are kept in proper condition, common colds are the most preventable of all diseases. Parents and teachers should take every precaution to prevent school children from taking colds. The child should be properly fed and clothed, his skin should be kept in good condition by proper bathing, the house and school room air should be kept fresh and pure, and a high standard of physical vigour should be maintained. He should be taught to keep away from infected persons and to avoid conditions favorable to colds. If precautions such as these are taken and if the child is free from nasal obstructions and throat affections, his power of resistance will rapidly develop. It is now evident that many parents are gradually

realizing the nature of the dangers associated with common colds, as they are beginning to show infinitely greater concern in keeping their children free from them. It is very poor economy, and a very grave injustice to the child as well, for parents to neglect the proper treatment of colds, adenoids, or diseased tonsils.

The Eyes.—As defective vision is a serious handicap to educational progress, every child should have his eyes examined by a competent specialist before entering school, for the purpose of having all defects of vision corrected. If a child enters upon his school career with perfect vision, the probability is that his eyes will be able to withstand the strain and stress associated with school work, provided they are given reasonable care and attention, but with anomalies of refraction and other visual defects much pain and danger will be occasioned as well as gradually decreased acuity of vision. The study of numerous recent statistical surveys covering the physical examination of thousands of school children in various countries shows that at least twenty per cent. suffer from defective vision in some form. This is true of Toronto, where one school child out of every five has defective eyesight. The percentage is higher in New York, Chicago, and Montreal. Of four hundred thousand pupils examined recently in the schools of Massachusetts, eighty-one thousand were found with visual defects serious enough to require correction. This is ample proof that the eyes of school children need not only the care and attention of parents and teachers but also expert examination at frequent intervals by qualified physicians.

It is well known that the stress and the strain of school work fall very largely upon the eyes, which are used almost constantly in distinguishing objects at close range. Comparatively few teachers, however, seem to realize fully the dangers associated with excessive demands upon the eyes, and as a result headache, nervousness, irritability, blurred vision, eyestrain, inattention, and fatigue are common among school children. Defective vision arising out of the evil

effects of school work is usually associated with eye adjustments required in fixing and focusing objects and in accommodating the light. Whenever conditions for reading or other eye work are unfavorable, undue effort is made to secure better images, which involves greater demands upon the adjusting mechanisms, greater nicety in focusing and precision in fixing, and increased flow of blood, together with consequent strain and fatigue. In schools where no attention is given to the question, it has been found that myopia increases with school age, the average increase being from about three per cent. at six years of age to thirty per cent. at fifteen. In modern class rooms, however, with proper illumination, equipment, and seating, improved paper and print, scientific methods of work, and with due observance of eye hygiene, there is a marked decrease in the percentage of myopia and a steady improvement in vision. In 1913 Risley reported that an examination of nearly seven thousand eyes of children in modern schools under scientific direction demonstrated that, with errors of refraction corrected by glasses and with due regard for the principles of visual hygiene, the vision of school children can be not only conserved but improved as well.

Eye strain is usually caused by improper illumination, prolonged concentrated attention on fine work, errors of refraction, malnutrition, or faulty posture when reading. The early use of books, small inferior print and script, and moving pictures are also responsible for serious eye defects in school children. In most schools too much time is spent in writing and reading and too little in thinking. Teachers should modify school work in such a way as to relieve the eyes of undue tension, and should make special provision for those suffering from eye defects until such defects are removed or corrected. On gloomy days the amount of eye work should be very materially reduced, otherwise serious impairment of vision may result. At all times special attention should be given to the adjustment of window shades so that the light may be properly distributed. Snellen's test

chart is an invaluable aid in detecting defective vision, but should not be relied upon solely.

School children should be impressed with the urgent need of taking good care of their eyes. They should be taught to avoid facing a strong or flickering light or glare, to assume proper position when reading, to read only under favorable conditions as to illumination, to rest the eyes at frequent intervals, and to have them tested periodically by a competent oculist. It is of the utmost importance from the economic as well as from the individual point of view that defective vision should be corrected early, and that every possible precaution should be taken to prevent eyestrain in school children.

The Ears.—Recent statistics show that approximately fifteen per cent. of school children possess some defect of hearing in one or both ears. It is now well known that catarrhal conditions in the middle ear, resulting usually from throat and nose trouble, constitute the most frequent cause of deafness. As the result of systematic aural examination in thousands of adenoid cases, it has been discovered that nearly seventy-five per cent. involve the ear, producing deafness in a greater or less degree. The secret of preventing ear trouble in children, therefore, practically resolves itself to caring for their noses and throats. Deafness, of course, is occasionally due to defective development, interference with the auditory nerve, or diseases of the inner ear. All cases of defective hearing should receive prompt attention by a competent ear specialist if possible. Ear discharges should never be neglected as they are often of a highly infectious character and always render the patient liable to permanent deafness. Sometimes the infection spreads by way of the mastoid bone to the brain and produces fatal results.

Teachers and parents often charge school children with stupidity and disobedience and even regard them as mentally defective when the real trouble is deafness, which may be remedied if proper treatment is applied at the right time. Defective hearing places an individual under very serious

handicap, greatly limits his social value, and is very prejudicial to his mental growth, speech, and conduct. One of the first duties of parents in this respect, therefore, is to ascertain if the hearing of their children is normal or defective, and if defective to have the condition remedied if possible. Thousands of school children with defective hearing have suffered great injustice at the hands of both parents and teachers who misinterpreted the cause of their inattention, backwardness, and apparent stupidity.

Nervous Disorders.—School children suffering from nervous affections such as chorea, epilepsy, stuttering, and neurasthenia, should receive special attention, including medical treatment. Parents and teachers can usually detect symptoms of nervous diseases without difficulty. Irritability, sleeplessness, morbid ideas, loss of self-control, and undue sensitiveness and restlessness in a child previously exhibiting none of these conditions or tendencies, are usually suggestive symptoms of nervous trouble. Parents should do all in their power to build up the physical condition of such children, for a vigorous constitution is the best preventive against nervous disorders.

Although the actual causes of many of the nervous diseases are not yet definitely known, the chief predisposing causes include insufficient food, malnutrition, irregular habits, the lack of rest and sleep, undue excitement and fatigue, nervous shock, worry, unhygienic conditions at home or school, hereditary weakness, and unsympathetic treatment. An examination of these predisposing causes will show that much can be done by parents and teachers to prevent the spread of nervous diseases among school children. It is particularly important that children suffering from chorea should not be permitted to attend school until a cure is effected, for it tends to spread rapidly through the influence of psychic contagion. In fact, many nervous disorders are contracted by children of school age as the result of suggestion and imitation. In order to deal intelligently, therefore, with those who contract neuroses as a result of psychic contagion, parents

and teachers should be well informed as to the influence of suggestion upon health. Moreover, they should always regard nervous trouble of any kind in a child as serious, and leave nothing undone that may be the means of remedying the condition. In most cases medical advice and treatment are indispensable.

PERSONAL HYGIENE

To develop proper hygienic habits in children is the supreme purpose of health instruction in schools. Nothing can be of greater moment to the child than the early formation of right habits of living, for upon such habits his personal happiness and social efficiency will largely depend. Children should be taught that the highest functions of life can be performed adequately only in good health. They should treat their bodies sacredly, otherwise the highest levels of mental and moral life are unattainable. A sense of the body's high destiny emphasizes the value of personal purity. Although clean thoughts and clean conduct are more essential than clean bodies and clean clothes, the incentive for the formation of right physical habits should come first of all from a carefully inculcated respect for the body as the means, the medium, the instrument through which all the possibilities, purposes, and ideals of the personality find expression. This is the basis of personal hygiene and of personal purity, without which high standards of individual living cannot be established or social vices eradicated.

The desirability of striving for cleanliness of body and mind should be strongly impressed upon every school child. This can be best done through the influence of good example and by awakening through appropriate instruction a keen sense of self-respect. Parents and teachers should themselves present such standards and habits of hygienic living as give proper expression to the principles advocated, otherwise their teaching is ineffective. There is urgent need at present of a more general appreciation of the truth of this statement. The child is not likely to rise to a higher level of hygienic living than that of adults who influence him most, and unless

a hygienic conscience is developed, high grade living is scarcely possible.

Instruction Should be Definite.—School children need definite instruction in personal hygiene, especially on matters relating to cleanliness of the skin, care of the teeth, regularity in the action of the bowels, rest, sleep, food, clothing, exercise, and correct personal habits. The dangers associated with the use of certain articles in common with others should be pointed out. The common drinking cup should be replaced by the sanitary drinking fountain or by individual cups, and the common towel by individual towels. The unsanitary practice of exchanging books, papers, and slates should be abolished. Children should be taught, among other things, to avoid moistening the fingers with saliva when turning the pages of a book, to wash their hands before eating and after using the toilet, to keep their fingers away from the mouth and nose, to give their teeth proper attention, and to wash their hair frequently. They should wear simple, neat, and hygienic clothing, and well-fitting shoes. They should be taught to pay proper attention to their physical needs, and at every appropriate opportunity and by every practicable means, hygienic habits and the principles of healthful living should be inculcated. Parents and teachers should do all in their power to encourage the practice of personal hygiene, to cultivate habits for securing cleanliness and good health, and to create high standards in the minds of school children with reference to personal living. Every effort should be directed toward the fact that clean, hygienic, and wholesome living on the part of the child is essential to his highest personal success and maximum social value.

SEX-EDUCATION

The combined efforts of the home and the school cannot properly equip children for their highest individual welfare and maximum social value unless accurate and timely instruction is given in reference to sex. The close and vital connection of sex-education with the very foundation of life makes its recognition imperative. To ignore giving school children instruction

on this subject is to ignore one of the most vital needs of body and soul. Human life, together with its happiness and worth, is based upon a proper comprehension of all matters pertaining to physical health, growth, and development, and this necessarily includes sex-hygiene. Children hunger to know the laws of life and of reproduction and to penetrate the mystery of sex. The blind policy of withholding simple sex facts from children, which has heretofore been so generally adopted by parents, is nothing short of criminal. In the highest interests of the individual, of society, and of education in its broadest sense, instruction in reference to sex is absolutely indispensable.

The public conscience in civilized countries is gradually awakening to a recognition of the fact that the common practice of concealing sex facts from school children and of permitting them to get their knowledge of the subject from evil and untrustworthy sources is attended with most serious danger to the individual and society. Intelligent people who have given the question of sex-education proper consideration are now pretty well agreed that the need of instructing school children in the subject is beyond question. Scientific intelligence and authoritative information as to sex topics are infinitely superior to ignorant vulgarity and impurity. The child who is obliged to obtain information on this subject from corrupt and evil-minded sources usually feels that all of the mystery has not been revealed, and as a result continues the attempt to satisfy his curiosity, which often leads to marked mental and physical deterioration. In his book on "Civics and Health," Allen says, "Children now learn, whether in fashionable private schools or crowded slums, practically all that is lascivious and unwholesome about sex. For teachers to explain that which is wholesome and pure will disinfect the minds of most children and protect them against mis-education." The real choice which parents must make in respect to this question is not between ignorance and knowledge but between sources of knowledge. An open-minded, serious, and respectful attitude toward all problems relating to sex is much more likely to be developed when the source is pure.

Dr. G. Stanley Hall, a brilliant authority on this subject, thinks that the instruction should be chiefly personal, by fathers to sons and by mothers to daughters. He says, "This probably ought to be the most inspiring of all topics to teach, as to the truly pure in heart it is the most beautiful of all. In the twilight before the open fire, in the morning, in some hour of farewell, on a birthday, or any opportune confidential time, this most sacred topic could be rescued from evil, or be given abiding, good associations. The self-knowledge imparted that makes for health is perhaps almost the culminating function and duty of parenthood." Most thinkers will agree that parents should instruct their children in sex-hygiene, if they are competent to do so, and if not, that such instruction should come through the school and other social agencies. No one is better equipped for this important work than the school physician whose medical experience, technical knowledge, and training eminently fit him to present the subject in a manner that will leave a permanent impression on the lives of the young. It is a primary essential that all who undertake to instruct children in reference to sex should themselves be trained in all matters relating to the subject. The logical method is to instruct the parents and teachers first. Until they are trained in the subject and supplied with authoritative information, good results cannot be expected. The home atmosphere should be charged with the idea that no information or training essential to the child's health or physical needs should be withheld, but on the contrary that everything that contributes in any way to physical development should be imparted at the proper time. Parents should retain their place in the lives of their children until they reach maturity at least. This they can scarcely do if they fail to supply their needs in respect to sex education. It is a lamentable fact that the spiritual bond between parents and children is often severed owing to the inability or neglect of parents to furnish sex-education at the proper time. This is nothing short of a calamity for the youth who thus loses

to a large extent the training, guidance, and restraint of parental influence.

Early Instruction in the Subject Essential.—Statistics collected recently in various centres, indicate that over fifty per cent. of school children have information on sex matters before they reach the eleventh year and over ninety per cent. before the fourteenth. This shows the great need of early instruction in this subject. Preventive work in this matter is of infinitely greater value than corrective. The sex life of the child begins at birth, and experience has amply proved that instruction in the subject should never be delayed until adolescence. Children should be kept pure and healthy by giving them the needed information at the right time and by developing their powers of self-control and the desire to live clean lives. To establish in children the habit of thinking pure and clean thoughts is of the greatest significance. When such habits are combined with true reverence for the body and with self-control, together with ideals of right living, the child is excellently equipped in this respect for life's duties and responsibilities. In order to secure a firm foundation upon which to build a society of individuals, capable of developing maximum physical, mental, and moral strength, it is necessary to begin with the infant and to surround him with every wholesome influence as he passes through childhood and youth, giving at appropriate stages such instruction and enlightenment as to his physical needs and growth as are requisite to ensure his safe entry into manhood. Absorbing occupations, good nutrition, pure air, frequent bathing, regular exercise, sufficient rest and sleep, and a wholesome environment, are all conducive to sex health. Through the pressure of instinct, the early normal appearance of sex impulses and interests, and environmental influences, sex problems are forced into the consciousness of children, making it imperative to have their curiosity in this subject satisfied, and the situation may either be intelligently met by proper guidance at the crucial moment or neglected at the possible expense of physical impairment and moral degradation.

Parents and teachers should realize more fully that children are readily susceptible to good influences, right actions, and clean habits, and should not hesitate to give them at the proper time such sex facts as are essential to their highest physical and moral interests. Further, sex plays such a large part in the whole problem of health and of physical and mental growth and development that it is essential that children should have such knowledge of this phase of their lives as will make it possible for them to attain the largest measure of individual happiness and social worth. If they are not furnished at the proper time by competent, trustworthy authorities with a normal wholesome knowledge of sex, presented in such a manner as to invest it from the first with sacredness and dignity, they enter adolescence under a serious handicap. Parents should realize that the period of sexual vulnerability lies between the ages of fourteen and twenty, and should leave nothing undone that will tend to prepare their children in the most effective manner for the supremely important epoch of their lives. The early right instruction of the young in sex-education is incomparably the most important social reform now needed. In addition to its value to the individual, positive instruction in this subject by competent parents and teachers will tend to have a significant bearing upon the adoption in adult life of a single standard of morality for both sexes, which will raise the level of social life to a height at present generally regarded as unattainable.

Agencies Responsible for bringing the Subject into Prominence.—The conviction as to the need of instructing children in reference to sex has arisen through the influences of many agencies. The medical inspection of school children and the general health movement have brought the subject into prominence and have done much toward impressing the public with its importance. Other important sources of this conviction are the appalling revelations associated with the social evil, together with the physical and moral degradation that characterizes the perversion of sex, the activity of eugenicists who consider the subject from the biological and scientific side and maintain

that racial improvement is possible only through improved heredity, and the insistent demands of prominent educators who regard sex and reproduction as among the important functions and qualities whose impulses and instincts supply valuable means and material for personal development and educational work generally. These and other influences will gradually force the public conscience to demand that this subject shall be given its proper place in the development of the individual and the improvement of the race.

A Difficult Problem.—Sex instruction presents a problem of unusual difficulty for the school, but like most other problems it is capable of solution under proper treatment. Up to the present, the subject has received comparatively little attention. Methods of presenting it must be evolved, subject-matter approved, teachers trained, observations made, prejudices broken down, and experience gained before it can be definitely incorporated into the school curricula. The first absolute essential is that teachers should be instructed in the training schools in all matters of importance pertaining to sex-education. Most authorities agree that instruction in this topic can best begin as a natural part of a general course in biology and hygiene, and that no attempt should be made to isolate the subject. A training in biology offers the best foundation for the understanding of sex problems. Class instruction is practicable for all topics relating to normal sex health, although it is advisable to instruct boys and girls in separate classes. Sex-knowledge in itself is compatible with perfect refinement and true modesty. Individual instruction in sex matters should be reserved for special cases, particularly for those who cannot be reached effectively through class instruction. The facts in reference to sex should be presented in such a way as to awaken in children ideals of physical and moral cleanliness. As the physical, mental, temperamental, and spiritual differences between boys and girls are directly and causally related to sex, it would appear that teachers should be familiar with such sex facts as have a determining influence upon the development of the individual.

The problem is not an easy one. No problem that deals with human behaviour is. Perfect correlation rarely exists between knowledge and practice. In the appeal to such instincts, impulses, and ideals as those relating to perfect manhood and womanhood, purity, chivalry, honor, duty, and health lies the promise of the movement. The indifference of parents and teachers must be overcome, and public opinion must be awakened to a proper appreciation of the importance of the subject. It is reasonable to believe that the rapidly accumulating strength of the movement will ultimately overcome obstacles now in the way and that education in reference to sex will soon be regarded by civilized society as a vital and basic need of child life.

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CHAPTER VIII

PHYSICAL GROWTH AND DEVELOPMENT

Although the processes of growth and development are usually closely associated, and the terms often interchanged, there is a distinction between them. Growth applies to accommodation; development to adaptation. Growth is quantitative in character; development is qualitative. Anything that increases its size grows. Anything that improves its character develops. The cells composing the body both grow and develop. They increase their size and change their constitution. The increase in the size of a muscle is properly termed growth; the change in the character and connection of its cells represents its development. In some instances the development process incidently results in increasing the size of the organism; in every instance, it means a change in the character or quality of the part. Certain cells of the body grow for a time before they begin to develop, and development often continues after growth ceases. The processes, however, usually take place together.

The growth and development processes in human beings extend over a long period and are comparatively slow. Infancy is a period of plasticity, of adjustment, of fitting the individual to his environment. It is essentially a period of education in the broadest sense. Biologists have contributed valuable knowledge bearing upon the significance of the length of infancy in human beings compared with that of other forms of animal life. They have discovered that infancy in all forms of life is proportional in length to the complexity of the life that follows. Where life is simple and requires comparatively few adjustments, infancy is short. Where life is beset with difficulties and complexities requiring frequent and delicate adjustments, infancy is long. In the lower orders of animal life there is in reality no such thing as infancy in the ordinary sense. The young are able from birth to help themselves and to adjust themselves to their environment. Such animals lack nervous systems and are incapable of development or progress.

As the scale of animal life ascends, infancy lengthens, many of the higher animals being helpless for a considerable period. The human being lives the most difficult and the most complex life known, and has relatively the longest infancy. About one-third of a man's life is required for physical growth and development. Not many men attain their full height before the age of twenty-two or twenty-three or their maximum weight before thirty.

Growth in human beings is due to the increase in the size and in the number of the cells composing the body. The cells do not continue to grow indefinitely, but at a certain stage each divides into two daughter cells, each approximately half the size of the parent. The rate of growth is determined mainly by the frequency of cell division. It is the greatest at the beginning of life, and, with the exception of a few sudden accretions such as those occurring during adolescence, diminishes with increasing age. Prior to birth the average child grows to a length of about nineteen and a half inches. In the first year it grows about nine inches and increases about thirteen pounds in weight. In the second year its height increases about five inches and its weight about four and a half pounds. From this point on, the percentage in both height and weight is smaller and rather constant until adolescence is reached, when there is a sudden rise in both curves.

TABLES OF GROWTH

Numerous measurements of the growth of children have been tabulated by such authorities as Boas, Hall, Porter, Wissler, Key, Crampton, Bowditch, Thorndike, Whipple, The Anthropometrical Committee of the British Association, and others, who have performed invaluable service in this important field. These tabulations include children of various nationalities and social classes, thus reflecting the effect on growth of racial, social, economic, and climatic influences. The following measurements of the average growth of children, calculated by Dr. Franz Boas, Dr. William Townsend Porter, Bowditch, and Peckham, and tabulated by Dr. G. Stanley Hall and Dr. Porter are as authoritative as any:

TABLE 1.—FOR HEIGHT

Showing the average American height mathematically calculated by Dr. Franz Boas from the data of 45,151 boys and 43,298 girls in the cities of Boston, St. Louis, Milwaukee, Worcester, Toronto, and Oakland; also the absolute and the percentage annual increases of same.

(Tabulated by Dr. G. Stanley Hall.)

Approximate Average Age	Number of Observations	BOYS			Number of Observations	GIRLS		
		Average for each Year. Inches	Absolute Annual Increase. Inches	Percentage Annual Increase. Per Cent.		Average for each Year. Inches	Absolute Annual Increase. Inches	Percentage Annual Increase. Per Cent.
5	1535	41.7			1260	41.3		
6½	3975	43.9	2.2	5.3	3618	43.3	2.0	4.8
7½	5379	46.0	2.1	4.8	4913	45.7	2.4	5.5
8½	5633	48.8	2.8	6.1	5289	47.7	2.0	4.4
9	5531	50.0	1.2	2.5	5132	49.7	2.0	4.2
10½	5151	51.9	1.9	3.8	4827	51.7	2.0	4.0
11½	4759	53.6	1.7	3.3	4507	53.8	2.1	4.1
12½	4205	55.4	1.8	3.4	4187	56.1	2.3	4.3
13½	3573	57.5	2.1	3.8	3411	58.5	2.4	4.3
14½	2518	60.0	2.5	4.3	2537	60.4	1.9	3.2
15½	1481	62.9	2.9	4.8	1656	61.6	1.2	2.0
16½	753	64.9	2.0	3.2	1171	62.2	0.6	1.0
17½	429	66.5	1.6	2.5	790	62.7	0.5	0.8
18½	229	67.4	0.9	1.4				

TABLE 2.—FOR WEIGHT

Showing the average American weight, mathematically calculated from the data furnished by Bowditch, Porter, and Peckham of about 68,000 children in the cities of Boston, St. Louis, and Milwaukee; also absolute and percentage annual increases of same.

(Tabulated by Dr. G. Stanley Hall.)

Age	BOYS			GIRLS		
	Average for each Age. Pounds	Absolute Annual Increase. Pounds	Annual Increase. Per Cent.	Average for each Age. Pounds	Absolute Annual Increase. Pounds	Annual Increase. Per Cent.
6½	45.2	.....	.....	43.4	.....	.....
7½	49.5	4.3	9.5	47.7	4.3	9.9
8½	54.5	5.0	10.1	52.5	4.8	10.0
9½	59.6	5.1	9.3	57.4	4.9	9.3
10½	65.4	5.8	9.7	62.9	5.5	9.6
11½	70.7	5.3	8.1	69.5	6.6	10.5
12½	76.9	6.2	8.7	78.7	9.2	13.2
13½	84.8	7.9	10.3	88.7	10.0	12.7
14½	95.2	10.4	12.3	98.3	9.6	11.9
15½	107.4	12.2	12.8	106.7	8.4	8.5
16½	121.0	13.6	12.7	112.3	5.6	5.2
17½	.....	.....	.....	115.4	3.1	2.8

TABLE 3.—FOR GIRTH OF CHEST

Showing the average girth of chest midway between expiration and inspiration for each age selected from elaborate tables made by William Townsend Porter on about 30,000 St. Louis children; also the absolute annual increase and the percentage annual increase. ("Obtained by adding the girth of chest at full inspiration to the girth of chest at full expiration, and dividing by 2.")

Approximate Average Age	Number of Observations	BOYS			Number of Observations	GIRLS		
		Averages for each Year in Inches	Absolute Annual Increase in Inches	Percentage Annual Increase. Per Cent.		Averages for each Year in Inches	Absolute Annual Increase in Inches	Percentage Annual Increase. Per Cent.
6	677	23.24	.....	.....	741	22.97	.....	.....
7	1708	23.87	.63	2.7	1631	23.41	.44	1.9
8	2095	24.48	.61	2.6	2040	23.94	.53	2.3
9	2120	25.16	.68	2.8	1966	24.61	.67	2.8
10	1997	25.80	.64	2.6	1893	24.81	.20	.8
11	1732	26.47	.67	2.5	1654	25.92	1.11	4.5
12	1565	27.07	.60	2.3	1624	26.89	.97	3.8
13	1228	27.80	.73	2.7	1313	28.07	1.18	4.3
14	925	28.85	1.05	3.8	1020	28.79	.72	4.0
15	498	30.14	1.27	4.5	659	30.23	1.44	3.6
16	205	31.19	10.4	3.5	397	31.04	.81	2.7
17	80	32.04	.85	2.7	206	31.65	.61	2.0
18	31	33.27	1.23	3.8	162	31.67	.02	0.1

A study of these tables ought to prove both interesting and valuable to parents and teachers. The physiological growth of children is a matter of great educational importance and will undoubtedly receive greater attention as education becomes more scientific. It is a comparatively simple matter to measure approximately the height and weight of children and to keep individual records. Special care, however, in making the measurements and in interpreting and recording the results is essential, if errors are to be avoided. Parents usually exhibit a great deal of interest in the growth of their children, but not many are fully aware of the close connection which exists between physical growth and health, nor do they sufficiently appreciate the bearing of growth on educational progress. When these relations are better understood by parents and teachers and when growth statistics are kept in both home and school, much valuable information about the physical history of children will be available.

DISCOVERIES FROM GROWTH STATISTICS

From studies of growth statistics, important discoveries have been made. Among those noted by Goddard, Boas, Porter, Whipple, Hall, Bowditch, and others, are the following:

1. A close correlation exists between bodily and mental traits. (Goddard).
2. Children of well-to-do parents are usually taller and heavier than those of poorer parents. (Bowditch).
3. The mortality of children is lower among the well-to-do classes than among the poorer classes. (Porter).
4. Maturity in height and weight is reached earlier in girls than in boys. (Boas).
5. There is a period of slower growth in height and weight in boys at eleven years of age and a similar, though less marked, retardation in girls at nine years of age. (Whipple).
6. During the period from eleven to fourteen, girls are taller and heavier than boys of the same age. (Boas, Whipple, Bowditch, Hall).

7. In determining absolute growth, race seems to be more important than social or environmental conditions. (Meumann).
8. Children of the non-laboring classes are, as a group, taller and heavier than children of the laboring classes. (Bowditch).
9. First born are slightly taller and heavier than later-born children. (Boas).
10. Urban life decreases stature from five years upward. (Peckham).
11. Feeble-minded are shorter and lighter than normal children, especially at the upper ages, save that moron girls are taller than normal girls from the age of seven to nine. Further, the lower the mental grade the greater the diversion from the normal rate of growth. (Goddard).
12. Truants and incorrigibles are usually shorter and lighter than normal boys, except at the age of ten. (Smedley).
13. Children with abnormalities are below normal children in height and weight. (MacDonald).
14. A general correlation exists between weight and height. (Boas, Porter, and others).
15. Feeble-minded children show greater variability in height and weight than normal children. (Goddard).
16. There are marked individual differences in the growth and development of children. (Boas, Porter, Hall, Crampton, and others).
17. Growth is the most advantageous when it is the most timely. (Hall).

FACTORS DETERMINING GROWTH AND DEVELOPMENT

The chief factors determining the physical growth and development of children are race or heredity, age, sex, nutrition, and health. Other factors are exercise, climate, order of birth, and environmental influences generally.

Race or heredity seems to be the main factor in determining the approximate ultimate size of human beings. Children of certain races mature earlier or attain a greater stature than

those of others. The English, for example, are taller than the Japanese. The Polynesians of Samoa are the tallest people in the world, their average height being nearly five feet, ten inches. The Bushmen of South Africa are the shortest, their average height being only four feet, four and three-quarter inches. Children tend to resemble their parents in both physical and mental traits. According to Galton's Law of Ancestral Inheritance, a child derives one-half of his native equipment from his parents, one-quarter from his grandparents, one-eighth from his great grandparents, and so on in arithmetical progression. Heredity determines the physical traits a child shall possess and also their limitations. Environment modifies the growth and development of these traits. Heredity seems to prescribe not only the ultimate size of each individual but also the way in which growth is distributed over the years in which it occurs.

As the tables of growth indicate, the rate of increase in height and weight diminishes with increasing age. The acceleration at the age of adolescence, due mainly to sexual development, is the only exception to this rule. Girls enter the adolescent period from one to three years earlier than boys, and pass through it more quickly, reaching maturity in both height and weight several years earlier than boys. The influence of sex is also evidenced in the growth and development of various parts of the body, especially of the skeleton and muscles.

Children in good health grow and develop normally. To maintain a high standard of health, they must be given adequate supplies of nutritive food and pure air. Sufficient exercise and rest must be obtained, and hygienic conditions for work, play, and sleep provided. Imperfect nutrition, poor ventilation, fatigue, insufficient rest, prolonged sickness, disease, undue excitement, overpressure, excessive exercise, and unhygienic environments, all tend to obstruct or interrupt growth and development, whereas nutritive food, proper air supply, moderate exercise, and hygienic surroundings stimulate both processes. The efforts of parents and teachers, therefore, should be directed toward the prevention of sickness, disease,

overpressure, and wrong habits in school children, and toward the securing of favourable hygienic conditions for their physical growth and development.

There is ample evidence to indicate that climate affects growth. Races living in the Torrid and in the Arctic Zones are smaller than those living in the Temperate Zones. People in warm countries mature more quickly than those in cold countries. In children, the most rapid growth in height takes place in spring and early summer, and the most rapid gain in weight during the fall and winter. This may be due in part to the influence of temperature.

With the inner forces which determine physical growth and development, parents and teachers cannot do much so far as the school children of the present generation are concerned. For them heredity is fixed, but their environment is, for the most part, controllable. Growth is very sensitive to external influences. Proper attention, therefore, to all environmental factors which influence and modify inner growth tendencies is essential. Herein consists the responsibility of parents and teachers, who should combine their efforts to bring into the child's daily life the practice of hygienic living, including such activities as will offset the effect of deformative and retarding influences. Only thus can the child attain the growth to which heredity entitles him.

GROWTH AN INDEX TO HEALTH

The rate of growth in height and weight in school children is an important index to their health. It affords a criterion of the rate of development and also evidence as to whether there are serious nutritional disturbances, such as to affect directly or indirectly school work. A deviation from the normal growth rate is often the first indication of an abnormal physical condition, which may mean susceptibility to disease. Due allowance, of course, must be made for individual differences. Although these may be measured by an approximate variability of 2.5 years, the normal annual increase remains fairly constant for each child, except at adolescence. Dr. G. Stanley Hall

says that height is the most valuable single measurement that can be taken of a child. "It is relatively constant," he says, "Not liable to much fluctuation, the truest expression of the energy of growth, and the best index of health." Increase in weight ranks second in value as a single measurement.

The measurements of chest, waist, and arms, together with those of vital capacity serve to give a more accurate statement of a child's fund of vital energy than is possible from mere observation. Moreover, they suggest lines of necessary corrective treatment and indicate certain physical limitations which children possess and their liability to fatigue in the pursuance of various kinds of work. Physical measurements alone, however, are inadequate. They should be supported by close observation and study. An adequate conception of a child's physical condition is possible only when accurate quantitative measurements are supplemented by close observations and an exact knowledge of its physical history.

Harmony and proportion are also very desirable expressions of vital energy. When the body grows and develops harmoniously, every part is exactly adapted to perfect co-operation with every other part. The well-proportioned child is usually healthy and well-equipped physically, whereas the tall, slender child, for example, is rarely able to withstand heavy and prolonged stress and strain, although he may have sufficient vitality to meet the ordinary demands of childhood and youth if special care is taken. All authorities agree in declaring that children whose bodies grow and develop harmoniously not only enjoy the best health but are the best equipped physically. Further, slow and disproportionate physical growth and development are usually accompanied by slow and unsatisfactory mental development. Hence, arises the importance of removing retarding influences and of surrounding school children with such conditions and stimuli as will tend to promote normal growth and development.

PERIODS OF GROWTH AND DEVELOPMENT

During life all the organs of the body undergo important physiological changes and exhibit different characteristics at

different ages. These changes are more marked during the period of growth than in later life. There are three stages of growth in school children, which present rather clearly defined characteristics: the transition, from six to eight; the formative, from eight to twelve; and the adolescent, from twelve to eighteen. These periods are not sharply divided, but represent different levels of physical growth and development, each characterized by peculiar tendencies and activities, and demanding different methods of treatment. It should be borne in mind that, although the rate of growth is not uniform, a spurt usually being followed by a retardation, the transition from one period to the next is not abrupt. Physical growth and development are continuous processes and changes come about for the most part through infinitely minute gradations rather than by sudden leaps. A scientific knowledge of the real significance of these periods is not yet fully attained. Recent studies, however, particularly of adolescence, by such authorities as Dr. Marro and Dr. G. Stanley Hall, are especially illuminating and of the greatest importance for education.

The Transition Period.—The transition period is marked by relatively rapid physical growth and development, an incoordination of the accessory muscles and finer nerve connections, and a relatively high susceptibility to disease and fatigue. It is a period of nervous disintegration and of readaptation, of steady growth, and of intense desire for physical activity. A child at the age of six or seven is predominantly motor, impulsive, and restless, and is very susceptible to contagious diseases and to the influences of unhygienic surroundings. At this time the permanent teeth appear, and the child begins to get control of the accessory muscles. During this stage, growth requirements and bodily adjustments tend to exhaust the energy and vitality of the child, leaving but little surplus for emergencies. The child's health is not affected unfavorably, however, if due attention is given to nutrition, rest, outdoor exercise, and hygienic living.

The Formative Period.—Dr. G. Stanley Hall's excellent description of the formative period is as follows: "The years

from about eight to twelve constitute a unique period of human life. The acute stage of teething is passing, the brain has acquired nearly its adult size and weight, health is almost at its best. Activity is greater and more varied than ever before or than it will ever be again, and there is peculiar endurance, vitality, and resistance of fatigue. Perception is very acute, and there is great immunity to exposure, danger and accident, as well as to temptation. Never again will there be such susceptibility to drill and discipline, such plasticity to habituation, or such ready adjustment to new conditions. It is the age of external and mechanical training." In this stage the child enters upon a plateau where he stores up energy and vitality prior to his entry into adolescence in which nature's most searching physical examination takes place. He is practically immune to disease and recovers very rapidly from fatigue. Growth is relatively slow, and surplus energy is available for purposes other than the formation of new tissues. During this period there is relative balance between the growth of the fundamental and accessory muscles, and the organs of the body function well together. It is the best time to lay the foundations for mechanical drill, automatic adjustments, and right habits. It is a period of comparatively simple adjustment and of relative physical and mental stability. The health of the child at this stage is nearly perfect, if he lives hygienically.

Adolescence.—The physical and the physiological changes which occur during the pubertal or early adolescent period, which usually extends from the age of eleven or twelve to seventeen or eighteen, are very numerous and extremely important. During this critical epoch the individual actually experiences physical regeneration, which renders his organic and functional integrity liable to be seriously compromised. Dr. G. Stanley Hall, who is probably the greatest authority on the subject, says, "Adolescence is a new birth, for the higher and more completely human traits are now born and important functions previously non-existent arise." The forces and tendencies previously operative break up and recombine. Sex development and rapid growth are the outstanding physical character-

istics of the period. Sex impulses and interests appear very early in life but do not become marked until adolescence is reached when they emerge into prominence and occupy the dominant and central place in the development of the individual, underlying and explaining the rapid physical growth and development characteristic of the period. The child whose growth has hitherto been comparatively slow suddenly seems to shoot up. The heart, lungs, arteries, bones, and muscles increase rapidly in size. The senses become more acute, and their functions are modified. The nervous system undergoes reorganization, and new physical and mental powers arise.

The problems of adjustment presenting themselves at this stage make serious demands upon the physical energies and the mental resourcefulness of the individual. In fact, ready adjustment is now often a physical impossibility. Maladjustment is more noticeable at this period than at any other. The characteristic awkwardness and clumsiness of adolescent boys are probably due to lack of correlation in the growth of the bones, muscles, and tendons, and to the imperfect connections between the various brain centres.

Nearly two-thirds of the period is marked by functional deficiency and physical instability. Growth and development lack harmony and proportion. Adolescence is a period of physiological transformations, of nervous disintegration, and of physical and mental disturbance. It is a period of physical stress, conflict, unrest, and uncertainty. It is the focal point of life, the time of supreme testing, when the greatest struggle takes place between the rival qualities in heredity. Individual differences and hereditary weaknesses reveal themselves to a greater extent than heretofore. The hidden forces come to the surface, exhibit their strength, and often precipitate severe physical conflicts. A reserve of vital force is essential to enable the youth to survive this crisis unimpaired in body and mind. Children who have been normal and healthy prior to the age of puberty and who have accumulated a reserve of vital energy, as a rule, pass safely and triumphantly through adolescence.

Gradually the transformation takes place, and the individual emerges a new being, more or less conscious of his own individuality and in control of his own experiences. When the new birth is completed, harmony in development again obtains, nervous and mental disturbances subside, and new passions, new interests, and new ideals arise. The whole psychic life of the youth attains a higher level. He discovers himself and assumes the direction and control of his own life. In entering upon this supremely important task, the individual is in very special need of wise, unobtrusive, effective instruction and counsel.

Due consideration should be given to the fact that pubertal acceleration commences a year or two earlier in girls than in boys. From eleven to fourteen, girls are taller and heavier than boys of the same age, and are usually at least a year in advance mentally as well. Girls pass through adolescence more quickly than boys, experience more profound physical and physiological changes, and are more liable to functional disturbances. They are also more susceptible to nervous disorders and anaemia. Hence, special attention is essential to ensure their safe entry into womanhood. The changes during adolescence differentiate the male from the female mind, and educational procedure should be modified to suit these variations.

During adolescence the whole personality undergoes a transformation which makes unparalleled demands upon vital energy. The individual experiences a new birth mentally and morally as well as physically. He is extremely sensitive and impressionable and far more responsive to hereditary and environmental influences than heretofore. The rapid growth and development result in accumulating waste tissue which tends to depress the nervous system and to lower the tone and vital energy of the body, and often seem also to interfere with and arrest functional perfection and to weaken, temporarily at least, the individual's power of resistance. There is an increased susceptibility to adult diseases and a diminution of excess energy. Chlorosis and nervous troubles in girls and respiratory and digestive disturbances in boys are common at

this period. Tubercular tendencies also usually reveal themselves at adolescence. It is an age, therefore, when hygienic living is imperative. Overpressure, worry, strain, and undue fatigue should be avoided. Moderate physical exercise, nutritious food, outdoor living, sufficient rest and sleep, freedom, active interests, and wholesome companionship are essential to the health of the adolescent. Absorption in interesting work is especially valuable at this time. The interests of health and growth are of paramount importance. Every effort should be made to maintain a high level of physical health, vigor, and efficiency during this crucial period, for upon these depend the great issues of life.

An intimate acquaintance with the leading physical characteristics of these three important epochs should prove invaluable to parents and teachers. Such knowledge would tend to place the instruction and guidance of children upon a scientific basis.

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CHAPTER IX

THE BEARING OF HEREDITY ON THE PHYSICAL WELFARE OF THE SCHOOL CHILD

IMPORTANCE OF HEREDITY

From the biological point of view a human being is the product of heredity and environment. Through the influence and interaction of these factors body and mind grow and develop from germ cells. The complete germinal equipment present at the inception of an individual's life constitutes his heredity. The sum of stimuli which tend to develop inner traits, tendencies, and capacities is his environment. The intrinsic or hereditary factors are in the main the guiding and directing factors and are present in the organization of the germ cells, whereas the extrinsic or environmental factors furnish the conditions in which development takes place and exercise chiefly a stimulating, inhibiting, or modifying influence. Heredity supplies the determining forces in the development of a human being. Environment modifies them and supplies the conditions for their growth. Heredity, for example, determines to a large extent the nature of a child's physical constitution, his rate of growth, and ultimate size, but such inheritance is subject to the influence of food, exercise, and other environmental agencies.

Fifty years ago the great problem in biology was the origin of the species; to-day it is the origin of the individual. In other words, heredity is now the central problem in biology. Heredity furnishes instincts, tendencies, characteristics, temperament, constitution, impulses, and capacities. It sets the limits beyond which the individual cannot develop, and decrees whether he shall be short or tall, strong or delicate, normal or defective. In fact, a man's destiny is largely determined by his ancestors. Heredity, however, is inexorably conditioned by environment. It must find a suitable environment, otherwise it will fail to gain proper expression. This is a truth which cannot be emphasized too strongly, especially as it is a truth

which many people fail to appreciate. On it rests the chief hope of human progress.

With a knowledge of inherited traits, it is always possible by providing a suitable environment early in life to check tendencies that are harmful or to direct them along right lines. Nurture, in other words, can be and should be used to direct the course of nature. The controlling power of environment over heredity is not yet fully appreciated. If it were, the early proper treatment of physical and mental defectives, for example, would receive something like adequate attention. Society still permits a large percentage of its population to remain in environments which favor the development of the worst hereditary tendencies, and which actually hurry children to a destiny that might be averted. Through proper environmental influences, children with inherited weaknesses steadily improve physically, mentally, and morally. Only a suitable environment can bring out the best gifts that inheritance has bestowed upon children. The child has marvellous capacity for re-acting to environmental influences. He owes his possibilities to nature but his realization of them to nurture.

In estimating the comparative strength of heredity and environment in the life of a human being, many authorities, including leading biologists, hold that nature is stronger than nurture, and that a child's physical development, and to some extent his mental and moral development, is more dependent upon his forbears than upon all the environmental influences that can be brought to bear upon it, powerful as these often are. They insist that it plays the major role from the beginning of an individual life to its close. Other authorities, however, hold that environment has the advantage and that it exerts a greater influence over the growth and destiny of the individual. A few who support this view argue that heredity is merely accumulated or stored environment. Probably it is nearer the truth to regard heredity and environment as complementary factors, as two phases of one life principle, neither of which exists for the individual without the other. In any event, ample evidence of the vital importance of both factors is now

available. Hitherto the emphasis has been placed upon the environmental influences, and the hereditary factor has been largely neglected by those in charge of the education of children, but to-day the tendency is in the other direction, and in the leading educational centres at least vigorous efforts are being put forth to ascertain early a knowledge of the germinal equipment of the individual child and of its bearing upon his physical, mental, and moral growth and development. The question as to the relative significance of heredity and environment, although very interesting, is not really important. The important thing for parents and teachers at least is to realize that both factors should be duly recognized in every phase of education, otherwise the problem of training and educating children can neither be adequately understood nor properly solved.

The physical constitution of a child depends largely upon his ancestors. Through physical heredity certain distinguishing characters of structure and function are transmitted both from and through parents to their children. According to the physical law of heredity formulated by Sir Francis Galton, one-half of a child's inheritance is contributed by his parents, one-quarter by his grandparents, one-eighth by his great grandparents, and so on back to the first human beings. When Oliver Wendell Holmes declared that children should have the right to select their grandparents, he emphasized in a striking manner the great importance of heredity in determining the destiny of a human being. The responsibility for a child's health, growth, and development rests heavily not only upon those who provide his environment but also upon his ancestors.

Proper regard for the bearing of heredity upon the physical welfare of children will not lessen the responsibility of parents and teachers to provide suitable environments. On the contrary, the more they know about the germinal equipment of children the better prepared they will be to provide appropriate environments and the more intelligently and scientifically will they approach the whole problem of child culture. The more children are studied and the broader the conception of education, the more important does heredity appear. Individual

differences in physical constitution, mental power, and moral stamina are due mainly to heredity. It should be noted, however, that heredity supplies potentialities, not actualities. These potentialities determine the limits of educational influences. Education cannot create new tendencies, new capacities, or new powers. It can educate only what heredity furnishes.

The best protection that any individual can have against disease of body or mind is good heredity. Some children have pulsing through them the red blood of generation after generation of sturdy, vigorous manhood and womanhood. Theirs is a rich inheritance physically and mentally. Others are the victims of an unfavourable heredity. Their ancestors have lived on the lowest level in subjection, poverty, and distress, and have transmitted undesirable traits and tendencies. Children with such inheritance usually have their resistance to disease, sickness, and evil living further weakened by insufficient food, unhygienic surroundings, and unfavourable social and economic conditions. Children representing marked differences in inheritance are to be found in every class room. Teachers should ever bear in mind that children enter upon their existences with marked differences in their germinal equipment, and with widely different possibilities. These individual differences should be recognized and respected in every phase of education. Educational procedure should be determined largely by the individual needs, differences, and capacities of children. These are the true guiding factors in their training and education. They can be understood only when each individual child is carefully studied and investigated. An intelligent conception of the nature of the child's hereditary equipment elevates and dignifies the whole teaching process. With such knowledge the teacher becomes an artist, a teacher in the truest and highest sense.

Up to the present an adequate share of thought and investigation has not been given to the study of the inborn qualities of children, and without a knowledge of these qualities their individual needs can never be fully appreciated or understood.

Not that too much attention has been given to environmental agencies, but that too little has been given to hereditary tendencies is the chief criticism merited by educational procedure both in the past and present. To strive for a wholesome environment for children is of supreme moment. Far greater effort than heretofore put forth should be made in this direction. But it is at least equally important that parents and teachers should study the laws of heredity and apply the knowledge thus gained in directing and regulating the lives of the children committed to their charge. To deal intelligently and satisfactorily with any problem it is essential that the whole situation with all its bearings should be brought under examination. Otherwise the problem cannot be truly solved. The physical education of a child, his mental development, or his moral growth can never be truly directed unless both the hereditary and the environmental factors are given due consideration. Further study of heredity, which is now just in its initial stages, will undoubtedly result in discoveries of supreme importance for education. Sufficient is already known of its simple laws to be of infinite value to parents and teachers in their care and guidance of the school child.

EUGENICS

The science of eugenics is now attracting considerable attention among civilized nations. It is concerned with the problem of improving the human race through the application of the laws of heredity. Sir Francis Galton defined eugenics as, "The science that deals with all influences that improve the inborn qualities of a race." Davenport says, "It is the science of the improvement of the human race by better breeding." Eugenics is based upon heredity, for permanent racial improvement depends on the transmission of good hereditary traits. Eugenists believe that children have as much right to be well born as they have to be well educated. With this end in view they try to impress the individual with a due sense of his responsibility for racial welfare and to inculcate the doctrine that only an efficient and improved parenthood

can guarantee a superior type of childhood. The eugenicist has unbounded faith in the efficacy of good heredity.

The results of good and of bad heredity are evident in every community, but its influence is rarely traced far enough to impress parents generally with a due sense of its vital importance. But a study, for example, of the history of the known descendants of Johnathan Edwards and of such families as those known by the names of Jukes and Kallikak gives a fairly adequate idea of the bearing of heredity on the lives of future generations, and impresses every thoughtful reader in a forceful manner with the supreme importance both to the individual and the race of pure, normal ancestry.

Johnathan Edwards was well born. His was a noble ancestry. His known descendants have won both honour and distinction in nearly every department of public service and social progress. Their names are among the greatest of America's educators, business and professional men, students, inventors, and moral leaders. In the year 1900 the known descendants of Johnathan Edwards numbered 1,394. Of these, 295 were college graduates; 65 college professors; 60 prominent authors; 60 physicians; over 100 clergymen, missionaries, or theological professors; 13 college presidents; 30 judges; 100 lawyers; and many principals of schools. In addition one was Vice-President of the United States, and eight others held public offices of importance. States, cities, towns, educational institutions, banks, industrial enterprises, and railroads have all profited incalculably by the influences of their lives.

The Jukes furnish striking evidence of the results of low grade ancestry. "From one lazy vagabond, nicknamed Jukes, born in 1720, whose two sons married five degenerate sisters, six generations numbering about 1,200 persons of every grade of idleness, viciousness, lewdness, pauperism, disease, idiocy, insanity, and criminality, were traced. Of the total seven generations 300 died in infancy, 310 were professional paupers, 440 were physically wrecked by their own diseased wickedness, more than half the women fell into prostitution, 130 were convicted criminals, 60 were thieves, 7 were murder-

ers, only 20 learned a trade, 10 of these in a state prison; and all at a state cost of \$1,250,000." (Dugdale, "The Jukes").

The Kallikak family whose history has been so thoroughly studied by Dr. Goddard reveals "the double edge of the eugenic sword." In a brief description of this case Arthur Holmes says, "Somewhere back in Revolutionary times, a young man of normal mentality became the father of a child by a feeble-minded girl. From that unfortunate union came 480 known descendants, of whom only 46 were known to be normal. The same young Colonial ancestor of this blackened line later married a normal woman. From the latter pair came 496 known descendants. In all that line no illegitimates, no criminals, no epileptics, and no feeble-minded were found; while the generations are ornamented with respectable doctors, lawyers, judges, educators, business men, and land owners." In commenting on the history of the Kallikaks, Holmes says, "It stands as the clearest case of hereditary effect so far studied. It shows admirably and terribly the potentialities for good or for evil residing in one human being and illustrates how these potentialities can be turned to the right or the wrong side by mating."

Heredity was not wholly responsible, however, for the results in the cases just outlined. Environment played its part. No one recognizes this fact more clearly than the eugenicist. Eugenics gives due weight to environment, but holds fast to the doctrine that, "Nature is stronger than nurture." It maintains, for example, that a mentally defective child cannot be transformed by environmental agencies into a useful and capable citizen. The most that can be done is to alleviate his lot. In his work on Heredity, Professor Thompson places probably an approximately true estimate on the relative value of nurture when he says, "A boy may be truly enough a chip off the old block, but how far he shows himself thus depends upon his nurture. To provide then a good nurture for our children is one of the most obvious duties, the hopefulness of the task resting on the fact that, unlike the beasts that perish, man has a lasting eternal heritage,

a heritage of ideas and ideals, embodied in prose and verse, in statue and painting, in cathedral and university, in tradition and convention, and above all in society itself."

The eugenist movement impresses on all classes the duties, the privileges, and the responsibilities of parenthood and endeavors to inculcate a loftier conception of the potentialities of human beings and to supply the race with nobler aspirations. It encourages the survival and the propagation of the fittest in all classes of society and seeks by various methods to prevent the unfit from propagating their kind. It aims to check degenerating tendencies, to supply more individuals of superior ability, and above all to increase the average ability of the masses and to raise the standard of productive efficiency. Its supreme aim is to improve the human race by improving the standard of parenthood. It recognizes that racial improvement depends upon individual improvement, and insists that the best way to improve the individual is to provide him with a good ancestry.

The science of eugenics rests on the theory that every child has an inalienable right to be well born. This is a high ideal and worthy of all admiration. But insuperable difficulties lie in the way of its attainment. As in working toward other high ideals, only a measure of success can be hoped for. The ideal itself is unattainable. In this case the magnitude of the problem can scarcely be estimated. Its solution would involve nothing less than a social revolution of world-wide proportions, that would of necessity extend over many generations. The improvement of the race from the eugenic point of view, or any other for that matter, is necessarily a slow process, but every effort in that direction is praiseworthy. For an individual to fail to work for the improvement of the race is to neglect one of his highest duties. To create a favorable public opinion and to stir the public conscience to the extent of compelling governments to enact and enforce such legislation as required to establish eugenic principles are serious problems. Furthermore, the deeply imbedded racial instincts and emotional forces tend to oppose and

frustrate their adoption and yield very slowly to the appeal of reason. Although these and other almost insuperable difficulties lie in the way of the effective application of the principles of eugenics, a very great deal can be done in every generation toward accomplishing the eugenical ideal. The percentage of well-born children can be gradually increased and the percentage of defectives gradually diminished. To live in sympathetic accord with the fundamental aims of the eugenic movement is in itself a distinct contribution to racial improvement. In no other way can so much be done for the permanent physical and mental welfare of the school children of succeeding generations.

DEFECTIVE CHILDREN

The welfare of the defective school child presents a special problem. Whether the defect is remediable or permanent, special responsibility rests upon both parents and teachers. The introduction of medical inspection into schools is assisting very materially in solving the problem so far as remediable physical defects are concerned. What is most needed now in this respect is that parents should be more disposed to have the suggestions and the recommendations of competent school physicians carried promptly into effect. Where physical impediments can be removed and where abnormal physical functions can be corrected by medical treatment, parents are ill-advised to defer action. Malnutrition, throat and nasal obstructions, impaired vision or hearing, and defective teeth, for example, as a rule yield readily to medical or surgical treatment.

Children who are the victims of defects transmitted by heredity are receiving infinitely more care and attention at present than heretofore. Child study and school medical inspection are largely responsible for bringing these children to the attention of school and state authorities. In many schools in the leading educational centres a mental diagnosis of every child exhibiting abnormal tendencies is made by psychological experts in order that all such children may be

properly classified and treated. This practice is spreading rapidly, and even where the child expert, who is destined to become the most valuable school official in the service of society, is not yet employed, great emphasis is being placed upon the treatment of backward, defective, and delinquent children. It is now recognized that all children who deviate from the normal in either direction deserve special consideration and attention. It is only recently, however, that gifted children have received any special care and that the causes of retardation have been scientifically investigated.

The educational treatment of exceptional children is now being met in some measure by special classes, special schools, more flexible systems of grading and promotion, and by modified courses of study. Moreover, there is a tendency to discover mental defects in their incipient stages with a view to the early application of corrective methods. There is also a tendency to establish separate institutions for the feeble-minded. Many classes of mental defectives are unable to compete successfully in the struggle for existence, and others are quite unable to take proper care of themselves. All such should receive special protection and treatment by the state. Special institutional training is desirable for all children belonging to such classes of mental defectives. The classification, however, should be made, if possible, by child experts, who have been given sufficient time and opportunity to make definite measurements of the child's mental and physical condition.

Recent surveys of the school populations of several large cities in Europe and America indicate that the number of feeble-minded children ranges from one to three per cent. of the total enrolment, and that an additional eight or ten per cent. are backward. The physical welfare and the educational treatment of these children constitute a special problem for the state, and create a great demand not only for special classes and custodial institutions but also for teachers trained to work intelligently and effectively with mentally deficient and backward pupils. The function of special and ungraded

classes is to furnish such expert training to the potentially normal child as will enable him to be returned as quickly as possible to the regular class. In order that the teacher may give the proper care and attention to each child, the number of backward pupils in a class should not exceed ten or twelve. The permanently deficient and feeble-minded children who have been classified as such by competent child experts should be placed in special schools or institutions to be cared for at the expense of the state.

During the past few years, several normal schools and the psychological and pedagogical departments of a few state universities in Europe and in the United States have provided special courses for psychological experts and for teachers of backward and feeble-minded children. Two institutions, devoted exclusively to this work, were opened in the United States during the year 1915. This is an indication that the state is beginning to realize that the treatment of exceptional children constitutes one of the greatest problems in modern civilization. The time is undoubtedly fast approaching when every large city will have its observational classes and its psychological clinic for the scientific study of the mental and physical conditions of defective children. Moreover, in the near future there will likely be in every civilized country at least one educational institution equipped with proper appliances, expert psychologists, competent physicians, and children of every type in every stage of educational development. Teachers will be able to do their work more intelligently when they can draw upon the accumulated experiences of those who have made a scientific investigation of the various mental processes of children of every type.

It is clear that mentally deficient children present a problem quite different from that of merely backward children. The latter are susceptible to improvement and perhaps restoration to normal brightness under special teaching and proper care. Their backwardness may be due only to physical weakness induced by lack of nourishment, accident, faulty home conditions, remediable physical defects, or other

temporary or correctible causes. But those who have inherited mental weakness are lacking in mental and moral power. Only a small percentage of these are improvable. The greatest problem for the school in this respect is to take proper care of those who appear to be physically perfect but are really feeble-minded. There is no great difficulty in caring for the low grade imbeciles and idiots, for these can be easily segregated and prevented from propagating another generation like themselves. The high grade mental defectives, known as morons, present the most serious problem for both parents and teachers. Every school child who is retarded two or more years without evident reason should be suspected of being mentally defective to some extent.

The psychological clinics held during recent years have attracted the favourable attention of the educational world and have made many notable contributions to the scientific methods of dealing with defective children. It is only through the knowledge gained from such clinics that parents and teachers can hope to deal in an intelligent and effective way with the backward child. The psychological clinic marks a distinct advance in the modern attempt to solve the problems connected with the proper guidance and training of mental and moral defectives.

Public opinion in civilized countries is awakening to the needs of the mentally and physically defective, and is compelling the state to assume its responsibilities in caring for those who need its special protection. Legislation for the purpose of gathering into special institutions all confirmed mental defectives has already been passed by several progressive governments and is being considered by others. There is every probability that state registration of mentally defective children will become the policy of the future, and that custodial institutions for all who are not improvable will be maintained at the expense of the state. To those who are improvable and capable of benefiting by guidance and instruction is due the most intelligent and sympathetic direction that well-informed parents and teachers can bestow.

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CHAPTER X

THE RELATION OF PHYSICAL EDUCATION TO MORAL DEVELOPMENT

Modern educational theory rightly ascribes a large place to the body in the development of a well-rounded and effective personality. It recognizes the interdependence and the organic unity of mind and body and emphasizes the need of cultivating them together in order that both may attain the highest degree of excellence. The re-discovery of the human body and its relation to mentality is one of the most significant features of modern education. It demonstrates conclusively that high-grade mental efficiency and superior moral quality are dependent upon physical integrity. It shows that mental life is not a thing apart, and that physical, mental, and moral education are essentially and vitally connected, each being indispensable to the perfection of the others and to the highest welfare of the entire personality.

In preceding chapters, the intimate and vital connection existing between the physical and the intellectual life of the child, and the fundamental importance of a firm physical basis for mental life, have been emphasized. Consideration has been given to the fact that mental processes and states are in some way correlated with the functioning of the nervous system and that, "Not a feeling can arise, not a thought pass, without a set of concurring bodily processes." It has been seen that physical education is an integral and fundamental factor in the educational process and that the royal road to the highest intellectual development is through the early physiological training of the senses and the rational care of the body.

Important as physical education is in itself, however, and in its influence upon intellectual growth and emotional life, it is vastly more important when its effect upon morality is taken into consideration. To appreciate truly the full significance of physical education, its bearing upon the de-

velopment of the entire personality must be duly recognized. Inasmuch as the moral experiences of an individual are the most vital, the value of caring for the physical welfare of the school child culminates and finds its highest sanction in its bearing upon his moral development. Such care of the body as secures to the individual maximum health, freshness of vigor, and pleasure in effort, tends to stimulate his thinking, chasten his purposes, strengthen his will, and improve his conduct. If properly directed, physical education produces freedom, courage, keen mental reaction, self-respect, self-initiative, and self-control, and becomes a means to the highest moral development of the individual and society.

As mental life rests upon a physical basis, the relation of bodily conditions to conduct and character is intimate and vital. Even simple and temporary physical disturbances or ailments often cause marked perversion of the moral sense, characterized by irritability of temper, moroseness, depression, or loss of self-control, while chronic organic disease not infrequently leads to crime. The physical status of an individual is always reflected in his mental life and plays an important part in determining his desires, motives, choices, decisions, actions, and moral attitudes. It penetrates his moral life and accounts to no small extent for the nature of his conduct and character.

The continual and profound influence of physical conditions upon moral life is not sufficiently appreciated by parents and teachers. A clear consciousness of the fact that moral deformity is a physical reality, accompanied by and dependent upon physical conditions, would tend to revolutionize the treatment of the child in matters of discipline. Inattention, restlessness, disorder, disobedience, stubbornness, or other improper conduct can usually be traced to unhygienic environments, malnutrition, fatigue, ill-health, or bodily discomforts of some kind. Truancy, lying, stealing, and other serious offences and faults of children are also frequently due primarily to physical causes. In dealing with the offences and wrong conduct of children, therefore, parents and teachers should

look for the physical cause first, and remove it if possible. To attempt to discipline children with disregard of the physical causes underlying their conduct is to commit against them a grave injustice. Further, the discovery and the removal of the physical causes of unfavorable mental states and attitudes on the part of teachers and parents would result in distinct advantage to the children in their charge. In the past, too little emphasis has been placed on the close connection existing between the bodily conditions and the physical development of an individual and his moral tendencies and experiences.

The fact that morality rests upon a physical basis is strikingly demonstrated in the case of criminals or mental defectives. Criminals of the lowest type, those who seem devoid of the sense to discriminate between right and wrong, possess marked physical and mental defects. Their bodies are ill-formed, deficient in vitality, and often affected by inherited disease. Their features are usually irregular, coarse, and repulsive, and their nervous systems exhibit profound structural peculiarities and defects. Mentally they are sluggish, dull, irritable, and morbid. The criminal records of all countries show that crimes are usually committed by persons suffering from physical degeneracy in some form.

When moral deformity is due to temporary disturbances of the bodily organs or functions, or to remediable physical defects, appropriate physical treatment is the first step in bringing about moral improvement. The mere removal of a single physical defect often revolutionizes the life of a child. The removal of adenoids or diseased tonsils, for example, often restores dull, backward children to normal mentality. The causes of degenerate tendencies should be removed as early as possible, as the physically defective child tends to become morally perverse and criminal. Recent examinations of feeble-minded, backward, and mentally subnormal children have revealed the facts that the causes of mental, moral, and educational arrest are largely physical,

and that as a rule the moral defective is a mental and physical defective as well.

To develop in each child an effective personality, strong in moral initiative and in desire and determination to respect the basal laws of life and to live on a high ethical level, is the aim of moral education. This aim cannot be accomplished by separating moral culture from other aspects of education. Physical, mental, and moral education are reciprocally related, and it is only when the unity of the whole educational process is fully recognized that the child's development is properly and scientifically directed. Every factor in education has some reaction upon character. Every phase of school or life experience counts for good or evil. Hence, arises the supreme importance of directing and organizing the educational process in such a manner as to promote the highest moral development of school children. In the last analysis, the value of all culture and training, mental as well as physical, must be measured by its bearing upon character and the significant purposes of life. Moral education is the integrating centre and the crown of all education. It should permeate the entire educational process from beginning to end, for without it all true education is impossible.

The relation of the physical well-being of an individual to his mental and moral life is vital and basic. If the body is healthy and strong, well-developed, and efficient, the individual is more likely to appreciate all that is highest and best in human life and to order his conduct accordingly. He who truly respects his body will never defile his soul. Men will become greater intellectually and purer morally when they take better care of their bodies. Parents and teachers should impress this great truth upon the child as early as possible. A true respect for the laws of health and physical righteousness provides the best possible basis for the highest mental and moral development. Every bodily defect or disturbance is a handicap to mental and moral growth. Sluggish organic functioning, physical depression, disease, and dissipation are serious obstacles to a high standard of ethical living, ren-

dering such practically impossible in the vast majority of cases. In the improvement of the physical condition of the individual is to be found the first step in the natural and logical method of developing his character and moral sense.

In the language of a leading modern educationist, the ultimate product of education "Is a man of quick perception, broad sympathies, and wide affinities; responsive, but independent; self-reliant, but deferential; loving truth and candor, but also moderation and proportion; courageous, but gentle; not finished but perfecting." This high type of manhood can be produced only by directing wisely all the agencies and influences that have a bearing upon the physical, mental, and moral welfare of school children.

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