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Hygiene of the School-room;
with Special Reference to the Diseases of
the Eyes, Ears, Nose, and Throat.

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Special Reference to Diseases of the Eyes,
Ears, Nose and Throat:

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Hygiene of the School-room, with Special
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Good education is that which gives to the body and soul all the perfection of which they are capable.

*Plato.

The education of the child should consist of the organization of acquired habits of action and tendencies to behavior which shall fit him for the world in a social and physical sense. The subject of social effect is often dwelt upon with great length and detail, which too often the physical well-being of the child is overlooked. Of how much value is a giant mind in a dwarfed body? Often mental disease is caused by impaired physical strength. If this lessening of physical activities is the result of efforts being entirely concentrated on the cultivation of the mind at the expense of the body, the process is at fault.

For its own protection the state must bear as definite relation to the health of its children as it does to their education. The single organ through which these must be administered is the public school. School should be so conducted that it is without injury to the health of school children; for our republic

wants not only those citizens who are intelligent, but those who have a background of vitality and power, without which education, science, philosophy, and art are valueless.

As has been stated, it is of the greatest importance that education become a protection to the child in a physical as well as in a moral way. Much emphasis is laid on the moral training of the child, and there is no danger of its importance being over-emphasized; but often there is a sacrifice made in his physical wellfare. The parents, teachers, school-officials, and the state, in general, should become more impressed with the fact that better health in school children of today will insure a stronger citizenship, mentally and morally, for the future.

The subject of school hygiene will be viewed from the standpoint of the young teacher, who is too often ignorant of her responsibility in regard to the health of the children who are under her direct control for practically forty hours each week. This time includes those waking hours that are most impressionable, and the attention both given and received in school will have much influence in the division of the remainder of the time. This being true, it is essential that the teacher possess the highest of moral and intel-

lectual attainments, vigorous moral stamina, physical qualifications, and mental superiority. Thus armed, the teacher is able to analyze and guard the physical condition of her pupils from a psychological and scientific standpoint.

One of the greatest obstacles to the progress of successful public school education is the physical condition of many children as they come in daily contact with the teacher. A home system must not consider that the school can be held responsible for the health of the child. Such a proposition would be absurd, but the Board of Education and its teachers can do much towards making surroundings wholesome and helpful for the child, part of each day, even if the home and the Board of Health does not offer such conditions for the remainder of the time.

From the standpoint of the things a teacher should know, in order to make the best correlation between instruction and the child, the hygiene of the school-room will be considered with special reference to the diseases of the eyes, ears, nose and throat; emphasis being laid upon atmosphere, including heating, ventilation and temperature; light, both in regard to eyes and as a disinfectant; drinking water, stress being laid upon source and method of distribution; and

miscellaneous sanitation problems; including care of room, general rules pertaining to eyesight, personal hygiene of the child, and contagious diseases.

An effort will be made to show that mental inability is often due to physical defects quite possible to be remedied, when taken in time and if properly treated. The arguments here used are based upon the best scientific experimental work published. The books written by Prof. Bagley of the University of Illinois, Prof. Shaw of the New York Institute, and Dr. Chapin of the Rhode Island Board of Health are among the most valuable books dealing with the subject of school hygiene.

Air.

Ventilation - Heating - Temperature

In planning a school building often the attention is given too exclusively to the exterior, the interior being cut up into school rooms whose size, shape and arrangement are dependent upon the size and shape of the building. If the hygiene requirements of a school-room are first clearly and fully understood and then firmly held in mind, the building is much more likely to be considered as the grouping of the number of school-rooms required, with halls and other auxiliaries; and is, therefore, much more likely to be so planned as to give each unit or school-room what the laws of health demand for the pupils who are to occupy it.

The size of the room should be determined by adequacy of the ventilation lighting and heating system also by the needs of the child, eyes, ears and other physical requirements receiving consideration. It is possible for a man to live three weeks without food, three days without water, but only three minutes without air. This simple statement of a well-known fact should make it clear that air, fresh, pure air, is the most important element in the world for the sustaining of life. For proper air space there should be two hundred cubic feet to each child and fifteen square feet

of floor space. The capacity of the room should be limited to forty-eight pupils, else an increased size of room would tend to make the teacher's words inaudible and the light admitted too inadequate.

Ventilation is a topic that has caused an incredible expenditure of thought and money. It is a well established fact that children in a well ventilated room can execute mental and physical work without the feeling of fatigue, that is experienced by those who work in vitiated air. This depression is due to several different causes. Undoubtedly the air that has become heavily laden with organic matter is deleterious. Psychologists indicate such an effect by the term "crowd poison". Such conditions are conducive to growths (The affections will be explained in a later paragraph) Often a cold or an attack of tonsillitis will be the direct result of breathing this contaminated air.

As pointed out by Dr. Billings expired air is saturated with moisture, and is breathed out at a temperature very nearly as high as that of the body. The air in the room where many persons sit rises in temperature and there is a rapid increase in the amount of moisture. The rise in temperature together with the excessive increase of water vapor interferes with the evaporation of moisture from the surfaces of the body,

a rise of internal temperature follows, chemical changes taking place in the tissues are disturbed and deranged, and the accompanying feeling is one of depression and discomfort. The skin as an organ of secretion eliminates substances that undergo decomposition, the products of which vitiate the air, similar to the contamination occasioned by the respiration of those persons having a disordered digestion or uncared-for teeth. Then in a poorly ventilated room the air is often dust laden, and to these particles bacteria cling. Dr. Chapin cites instances of diphtheria germs being spread in this way. Acute nasal catarrh (cold in the head) may be caused by the inhalation of these dust particles. Care should be exercised that crayon dust is not unnecessarily disturbed. Gases may be given off by the heating apparatus or by the gas jets, that will prove injurious unless sufficiently diluted with fresh air.

The Massachusetts law requires thirty cubic feet of pure air per pupil every minute. Then in a room of the size required for forty-eight pupils the air must change at least every eight minutes. The means of ventilation may be natural or mechanical. The natural ventilation is brought about by the moving of air due to the difference in specific gravity between

heated and cool air. The simplest method that might be employed is the placing of a board under the lower window sash, thus there is no draught yet there is a constant supply of fresh air entering the room. In ventilating there should be no draught. If the fresh air opening is too small, and is located near the head and shoulders of pupils, there is danger of a cold settling in the eyes or ears. A cold in the eyes makes them watery and inflamed, and if strained when in this condition is apt to render them permanently weakened. While if it is the ears that are effected, often pain results, and perhaps a gathering; this often precedes a spell of deafness, either temporary or permanent.

In large buildings, sometimes, the heated fresh air is introduced by means of pipes, and the vitiated air passes out through other pipes. This method is often unsatisfactory, however, for the ventilation is interfered with by high winds, and often proves too expensive. The pressure fan is the best mechanical device for ventilating purposes, for by this method fresh air is forced into the room, and through suction the vitiated air is withdrawn. Both the outlet and inlet should be so arranged as not to interfere with those sitting near. The supply should come from as high above ground as possible, and never from a cellar or contam-

inated direction. By experiments it has been shown that ventilation is most thorough in the pressure fan method if the inlet is about nine feet above the floor, and the outlet one foot from the floor, both being on the same side of the room. For each there should be several openings evenly distributed.

Usually the temperature of school-rooms is too high. Sixty-eight degrees is the proper temperature for a school-room and never should the thermometer register more than seventy degrees of heat. A relative humidity of not less than fifty per cent is also necessary for health; though by actual test the school-room often registers only twenty-five percent. This lack of moisture in the air often results in colds and throat ailments. Air will absorb moisture until it becomes saturated. This moisture is taken from anything that will yield moisture. Thus if air has not a proper amount of moisture it takes it from wood, glue, the skin the lining of the nasal passages, mouth, throat and lungs. Excellent medical authorities declare that heated dry air makes the skin rough and dry; it aggravates throat and catarrhal difficulties, and may even in some instances be the developing cause of such disorders.

These reasons alone would be sufficient evidence to discredit the use of the hot air heating sys-

tem. There is much to be said both in favor and disfavor of either the steam heat or hot water systems. The steam heat is less liable to be dearranged, and the expense for installation is not so great; but the hot water system requires less fuel for operation and because the heat is more easily regulated, it is the most agreeable and hygienic of heating systems.

Perhaps the nose and throat are more liable to suffer from improper heating or ventilation methods than any other part of the body. Although adenoids and enlarged tonsils are usually "congenital" the main contributing cause to their development is poor ventilation. Between the throat and posterior portion of the nose there is a cavity called the vault of the pharynx. The peculiar glandular type of tissue in this locality is, in childhood, very prone to excessive formation. If, in a typical case, an examining finger is introduced back of the soft palate. Instead of finding smooth walls and empty space, there is discovered a mass of soft, spongy tissue. The little victim of a pronounced case of enlarged tonsils or adenoids will breathe through the mouth. The observing teacher can tell the characteristic appearance of the countenance that indicate the cause. The thick upper lip, flattened nose, and heavy eyes give the child a stupid look. In time, he

grows stupid, too; because no one has cared or known enough to give him sufficient breathing space where nature intended it should be.

In a town of eight thousand inhabitants, eighty school children were given free medical examination. These were chosen from among those number that were unable to keep up with the educational standard. Over eighty per cent had adenoids or enlarged tonsils or both. Children with adenoids take cold easily; sometimes there is an extension of the trouble to the ears, owing to the close relationship existing between nose, throat, and ear. Serious deafness and suppurative conditions - "gatherings in the head" as they are called - may rise from a neglected nasal trouble.

Good health and proper development demand adequate breathing space. Nature has arranged channels for the inhalation of air, well planned for the purpose with a warm moist lining to modify the temperature. and tiny protecting, hair-like processes to entangle enemies that might do untold damage if allowed beyond that part of the respiratory tract occupied by the nose. A child with adenoids has these normal channels blocked, and a greater effort must be made to overcome the resistance. When the effort demanded is too great, the avenue of least resistance is naturally chosen, and to obtain

relief from its oppression, the child becomes a mouth breather with all the accompanying disadvantages and subsequent danger. Often the ill effects are so insidiously developed that they do not attract sufficient notice to gain proper attention until permanent damage is done. Undoubtedly many adults afflicted with lazy lungs, insufficient chest capacity, chronic catarrhal inflammation and deafness are suffering the evil results of neglected nose and throat complications of childhood. Parents are often too much occupied to notice this gradual defect in their child or else they are ignorant of the cause. Hence a timely and kindly suggestion to them on the part of the teacher is usually appreciated; and, if heeded, may be the means of instilling new life in the child. Of course, parents should realize that an operation in every case would be a rash extreme, electrical and medical cures may often be effected. These methods should at least be tried before operation is resorted to.

There is little danger of over emphasizing the importance of fresh air. One need but enter from the out door into a crowded room to notice the condition of the air. The stifling odor indicates the absence of oxygen and the presence of poisonous gases. However, a person, in as constant attendance in a room as a teach-

er, cannot rely wholly upon their own senses to report a needed change of atmosphere. A rise in temperature is often the result of the vitiation of air due to a cause explained in a former paragraph. By frequently observing the thermometer and keeping all openings regulated according to a previously thought out plan, the teacher should have reason to feel that she is allowing her pupils and herself the required amount of fresh pure air. It is also a mistake if the teacher does not create a love in her pupils for fresh air. If the necessity for pure air as an essential of life is emphasized, the impression thus made will never leave the pupils even if they are under the particular teacher's influence for only one year. Such impressions will accomplish an untold amount of good. Not only will the pupils enjoy the wholesome surroundings of the school-room, but will demand it in their surroundings elsewhere.

Light.

Proper lighting is one of the most important factors in school hygiene, Those who have studied this topic uniformly agree that the amount of transparent glass surface admitting light should equal one fourth to one sixth of the floor space. If there is too small an amount of wall space, factory-ribbed glass or prismatic glass can be used. This will gather direct light from the sky above and deflect and diffuse it in the room with astonishing results.

The desks should be so arranged that the light falls over the left shoulder of the pupils. If the light is in front their eyes will be injured, if behind, the teacher's eyes will be weakened, and the pupils will be working in half shadows, light entering from the right side leaves the pen point in the shadow, hence the child sits in an unnatural position, so as to bring his work into the light, This constant twisting of the body is liable to result in spinal curvature.

Actual measurements show that the upper fourth of the window furnishes one third of the light coming through the whole window. Hence they should extend as near the ceiling as possible. Windows should be set with the least possible space between them, for bands of light in alternation with the shadows are injurious

to the eye. The window shades should be of the same color as the walls, though several shades darker. The best wall color is green for it seems restful to the eye, and the contrast between light reflected from green and ordinary diffused daylight is less for the eye than the contrast between light reflected from any other color and daylight.

No teacher should continue giving instruction daily, without knowing whether there are children with defects of vision. If the teacher is ignorant of the defect, the pupil may be sitting where the light is inadequate, or the tasks imposed may be so strenuous that a rapid deterioration of his vision may ensue. There are tests so simple that no teacher is excusable for not being aware of a prominent defect. Children who are short-sighted should be placed near the front of the room where it will be the least taxing to see what is placed on the black board. Children are often taken to task for mistakes and regarded as dull, when the cause is frequently lack of visual power. Defects of either short or long sight should be reported to the parents in order that an oculist may be consulted.

There are many problems of furnishing and equipment that bear a distinct relation to the eyes, but these will be discussed in a later chapter. It is

not necessary to go into a longer discussion here in regard to light. The simple facts, however, should be borne in mind; ordinary diffused daylight is best; there must be adequate lighting space; and the light must come over the left shoulder.

Water Supply.

Source

Distribution

Especially in city schools the teachers is little concerned with the source of the water supply. However, she should be aware of surrounding conditions. In the small school, it is a problem which often must be considered.

Ground water is apt to be the purest provided there is no polluted matter near its source. Surface water may be used if not drawn from polluted districts or from rivers and streams into which sewage may find its way. Spring water is often contaminated by surface drainage. If the water is questionable much can be done towards making it pure by filtration. However, if used thoughtlessly, the filter is liable to become a lodging and breeding place for infectious organisms. If a pump supplies the school water, the well should be emptied at the end of each vacation.

The problem that most concerns the teacher is the distribution of the water. As regards the public drinking cup - it must be abolished. It is estimated that there are twenty thousand epithelial cells on a drinking-cup that had been used in a school for nine days. By actual test diphtheria germs have been found

on public cups.* In this way mouth excretions are constantly exchanged, and if a child is infested with pathogenic germs, the chances are these germs will be lurking in the saliva. Diphtheria is only one of the many diseases which may be communicated in this way. Decaying teeth harbor germs that may be carried to the rim of the cup, and in this way another pupil may be the victim for an attack of sore mouth or tonsillitis.

The drinking fountain now offers the best method of distribution of water for a school in a sanitary way. They are so constructed that a small steady stream about three inches in height issues from the orifice of an upright nozzle. The child drinks by placing his mouth at the top of the fountain-like stream. Some contend that this teaches the child to drink without first inspecting the water. Perhaps this is true, but few children have this commendable habit to lose. The charge seems insufficient to warrant the disuse of the drinking fountain.

Under no conditions in the small school, should water be kept in a pail. The water should be placed in a tank or keg and drawn from a faucet into individual cups. The cups should not be kept in the dust-exposed desk nor on a hook. One ingenious teacher in a country

*Dr. Chapin.

school required each pupil to bring from home a square colored cotton cloth, which each then made into a bag. In these, individual cups were placed and hung near the faucet in a row. These receptacles and cups were washed often, and owing to the various patterns, there was no confusion made as to ownership. If children are taught in a simple way the reasons for these precautions, they usually comprehend and are willing to cooperate with the teacher. Thus her tasks are somewhat lightened and the great point gained is that they will learn to be careful when they become responsible for conditions.

In regard to drinking water, for the school, it is necessary to bear in mind always several factors in order, that spread of disease may be avoided. The source should be unquestionably free from contaminated surroundings; there should be no chance for exposure to dust either before or during distribution; and the drinking cups must be strictly individual if a fountain is not used. If cups are used these should be kept in a clean condition. By carefully following these rules of hygiene there will be no occasion for the outbreak of an epidemic, that is so often started by the contamination or faulty distribution of the water supply.

Sanitation.

There are many phases of sanitation that enter into the problem of school hygiene. These topics could be dealt with in great detail, but for the purpose which this article is to serve, often a few sentences will be a sufficient guide to the teacher.

There are general rules in regard to the daily care of the room, that are of much importance. A scrupulously clean building reacts in its effect on the community and engenders ~~ingenders~~ in the end a higher appreciation of the value and wholesomeness of cleanliness. The room should be cleaned in daylight if possible; hence the teacher should not linger after school hours long enough to interfere with the janitors' work. After opening windows, the floor should be sprinkled with wet saw dust and swept with a damp broom. Crayon trough should be swept out, and a fresh supply of erasers distributed that had been beaten the previous day. With windows still open desks and ledges should be dusted. Before school the following morning, they should again be gone over with a damp cloth.

In addition to the daily cleaning, periodical cleaning will be necessary. Once a week the blackboards should be washed. In the fall during the holidays, and

at the Easter recess the floors should be scrubbed with hot water and soap, and the painted walls and other wood work washed. If these plans, along with the daily cleaning are strictly adhered to, it is not necessary to have oiled floors, for they are objected to as unsightly, slippery, soils skirts, and conveys the general impression of filth. Desks, seats, and chairs should be cleaned several times each year by rubbing with a cloth moistened in kerosene. Such systematic cleaning with plenty of strong sunlight as a disinfectant would serve to eradicate even quite resistable pathogenic organisms.

In connection with the care of the room it is well to mention the evils of the public towel, this should go the way of the common drinking-cup. Small individual towels seem to be the only way out of the difficulty, If basins are used, these should be cleansed daily, but if possible running water should be used for ablution purposes.

Well-constructed closets or latrines, thoroughly cleaned every week, well-ventilated, and well lighted are essential to satisfactory and permissible conditions, Opinions differ as to locations, but by referring to writers upon school architecture the best ideas may be obtained. Near every system of latrines there should

be a sufficient number of wast bowls supplied with soap and towels; so that after visits pupils may beget the habit of thoroughly washing the hands; they should be encouraged in some way by those in authority to do this.

There are numerous details that bear relation to the eyes; the importance of these should not be overlooked. There should be plenty of blackboard space, for its use gives the child an opportunity for relaxation. Avoid all colors except a jet black or green. Use a good quality crayon. The dust from colored crayon may inflame the membrane of nose and throat so should be used sparingly. The writing on the board should be large enough to be seen from all parts of the room. Round vertical letters are the most legible. The use of slates are unhygienic, besides they produce eye strain. In script writing only a good grade of black ink should be used. The desk should be properly adjusted, so the child may sit with feet firmly on the floor with the lower leg vertical. The ideal desk is adjustable as to the height of top from the floor and the distance of the top from the back of the seat. The slope of the top should be ten degrees. Bad postures in writing seriously effect the eyesight. With the proper desk requirements the

pupils should sit erect while writing.

In reading, the book should not be held closer than twelve inches to the eyes. For the first year the size of the type should not be less than two and sixtenths m.m. with the spacing four and five tenths m.m wide. The size of the type varies as the child progresses. Not until the fifth year should the type reach the minimum size which is one and six tenths m.m. Fine sewing should be condemned, also the searching for places on fine maps. Both are exceedingly injurious to the young unaccustomed eyes.

To ascertain defects in hearing there are simple tests which the teacher may make. Of course, it is understood that each ear is to be tested separately. By a test made of several thousand children in the Chicago schools, the conclusions show that one sixth of all pupils were so defective in hearing as to interfere seriously with their progress in the oral parts of teaching. One sixth were so defective in one ear or the other as to require a desk at the proper side of the teacher. Careful investigation point to the broad fact that about twenty per cent of school children possess some defect of hearing, either of one or both ears. It will be seen that the child of average ability who has some undetected defect of hearing will frequently be done an injustice,

and rated as dull or inattentive, not through any fault of his own but because of a lack of knowledge on the part of the teacher as to the true cause.

Regarding personal cleanliness in the pupils, the teacher must use great tact yet insist vigorously upon it, both from the standpoint of the law and for the sake of common decency. Private admonitions to pupils are generally effective for this purpose; if not, a courteous request to parents will usually bring results. For very obstinate cases there is no recourse save to the school lavatory. Some schools provide shower baths, but these prove too expensive in maintenance for ordinary use. The teacher can do much to promote good habits of neatness and taste in matters of dress by personal example, appearance of school-room, and by instruction. It is found that, if a child is clean, he is more responsive to law and order, and he exerts a positive moral influence upon his parents and home.

One of the most common, modes of infection is by direct contact* hence the importance of clean hands and finger nails. Pus forming bacteria live on the skin and if undisturbed on the hands are ready to infect places susceptible. The eyes especially are liable to suffer. The nostrils often harbor pathogenic

*Dr. Chapin

organisms that are soon distributed elsewhere for inoculation unless precautions are taken. Children should be taught that the nose should never be touched except with a handkerchief. They should also know the evil results of moistening a pencil point with the lips; exchanging bites of apple; holding money, pins, and string with the mouth; and putting fingers in the mouth. To any child above the third grade, the simpler facts of pathology and the relation of microorganisms to disease can be made clear; hence with all the instruction on the subject of physiology and hygiene in the elementary schools, there should be some room for impressing these truths. Safe guards against infectious diseases of those special organs under discussion would be very similar to those in any other infectious disease. Under certain conditions the school becomes a medium for the spread of infections and contagious diseases, because it assembles children from so many different homes and brings them into close contact. As medical inspection has been introduced into so few schools, the teacher must be relied upon to detect symptoms which may be supposed to be those of a communicable disease. Rather than run the risk of having a child infect a whole community, it is better that he should be excluded through mistake. Wise parents will not consider this an injustice on the part of the teacher even if the exclusion proved unnecessary.

Conclusion.

As may be seen from this rather cursory review of the problems arising in the consideration of school hygiene and sanitation, a teacher should be well-informed with regard to the following facts which are essential to the proper performance of the duties of the teacher; thorough ventilation; proper and even temperature; adequate light, with desks arranged accordingly; abolition of the public drinking cup; and other sanitary measures in regard to care of the room, personal hygiene of the child and sources and modes of infection.

Volumes might be written regarding school hygiene without exhausting details. However, for a general sketch of conditions as actually met by a beginning teacher it is to be hoped that this compilation of facts and ideas has been sufficient to arouse that sincere interest which the teacher should feel in those who are intrusted to her care for so much of their time.

Most teachers have a keen interest in the mental progress of their pupils, but many teachers do not assume the sympathetic attitude and good judgment necessary for the correlation of the mental progress to the physical ability. The considerate teacher not only wins the confidence of her pupils but, also, the good

will of the community in which she serves. It is a commendable fact in favor of the profession that the teacher is a person of wide public spirit and conscientious scruples. Nevertheless, there are some who err through ignorance. This we cannot grant as an excuse, for much depends on our American teachers. As has been emphasized, she has the power to aid the child in forming certain desirable habits and inhabiting undesirable ones. To man, of all animals, has been granted the longest period of development during which he is plastic and capable of being moulded. Even if man attain his full span of three score and ten years, a full third of it must be devoted to the development and preparation of the other two thirds. Who can know the whole importance of those first plastic years! The impressions and habits of those first years can seldom be wholly eradicated. The fundamental principles implanted in the child during those first years will form the basis of his character hereafter.

There must not be that discrepancy between the physical and mental growth in the child that will result in an over balance of certain faculties. For the teacher to realize this and to act accordingly will mean a higher grade of citizenship, for on the youth of today the future welfare of the nation depends, The school

of high ideals will set good standard for the home;
thus the most important of all American institutions,
the home, will be reached by the noblest of American
institutions, the school.

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