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CURRENT EDUCATIONAL TOPICS

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LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, September 9, 1912.

SIR: Probably the most important factor in the education of children is the establishment of their physical health, without which all learning and training must have less value for the individual and for society than they would have with it. Implicitly in the act creating the Bureau of Education and explicitly in recent acts of Congress, investigations in regard to the health of children, the publication of the results of these investigations, and giving such information as will help teachers and school officers in solving the problems of school hygiene and sanitation are made functions of the bureau. The three papers transmitted herewith, written by F. B. Dresslar, Ph. D., specialist in school hygiene and sanitation in this bureau; Thomas D. Wood, M. D., professor of physical education in Columbia University; and Charles E. North, M. D., of New York City, in a very effective way call the attention of teachers, school officers, and parents to the importance of the health of children, and offer many valuable practical suggestions as to the means of preserving it. I am sure they can not fail to be very helpful in suggestions and guidance. I therefore recommend that the three papers be published as a bulletin of this bureau.

Very respectfully,

P. P. CLAXTON,
Commissioner.

The SECRETARY OF THE INTERIOR.

CURRENT EDUCATIONAL TOPICS.

I. THE DUTY OF THE STATE IN THE MEDICAL INSPECTION OF SCHOOLS; RESULTS WHICH THE PUBLIC MAY RIGHTFULLY EXPECT.[1]

F. B. Dresslar.

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There are two main topics in the subject assigned me, viz, the right and duty of the State to institute medical inspection, and the results we have a right to expect from such inspection. I wish to discuss these two topics briefly and in the order named.

First. What right has the State to undertake medical inspection?

The State's vital interest is always the interest of the people; not the interest of the individual alone, but the interest of the individual living and working in harmony and cooperation with other individuals.

Questions of health and vitality are questions which concern the individual at every point. He can reach neither the measure of his own possible success nor the acme of usefulness in society if hindered by disease or handicapped by a defective or enfeebled body. The health and vigor of each individual included in a social group directly or indirectly affect all.

The children must go to school; the laws compel the parents to send them. But how will you guard the child who comes from the clean home and teach the child from the careless home unless the school authorities know the conditions? Even to maintain the dignity of our public schools, to say nothing of the benefit to the children and society, it is incumbent on us to make these schools both a worthy and safe place for children to associate with each other, to learn self-respect, love of justice, fair play, and those fundamental laws of health which are so often neglected.

It is the duty of the State to safeguard its own interests when localities within its borders neglect them. The health of a community is not of local interest merely, but it directly and indirectly affects the general public weal. If a community in a State is inclined

[1] Paper read before the National Education Association, Chicago, Ill., July 11, 1912.

to pollute a stream of water which serves other communities, there is no longer any question of the right of the State to prevent the pollution. If a community through ignorance or carelessness neglects the health of its children while in attendance on schools to which they are compelled to go, the State has not only the right but is in duty bound to protect them as well as to help them. We have long since concluded that the State must, for the sake of its own progress and safety, educate all the children, and only seven States are now without some form of compulsory school attendance laws. We know that physical welfare and mental progress are inseparably related. Furthermore, we know that the public test of the value of any education lies in the added power of helpfulness thus created. The life's work of any individual—and I apply here the larger meaning to "life's work"—is measured by what he can do and by what he is willing to do. I see no real meaning in all our educational striving save as it issues in better and larger service and influence. If an individual is handicapped through physical defect or disease, he is thereby limited in his usefulness. If the State insists on proper mental development, it has an equal right to insist on proper physical development. Indeed, an illiterate individual may be a less serious menace to society than a diseased one who has had the ordinary schooling. If the State has the right to demand mental fitness, it has an equal right to demand physical fitness. If it has the right to prevent the contagion of ignorance, it has an equal right to prevent the contagion of disease and bodily neglect.

If medical inspection of school children is a useful means for conserving, protecting, and developing the health of our children, then it is unqualifiedly the right and duty of the State to foster and develop medical inspection. The chief asset of any State is physical stamina, guided by wholesome, moral ideals and broad-minded intellectual power.

Individual liberty is a fundamental conception in our Government, but individual liberty is bound up with opportunity. That individual liberty which would limit itself is a spurious kind of liberty. Any individual who refuses to enlarge his field of freedom by limiting his personal opportunity is deliberately denying himself the highest type of freedom. If, therefore, it is clear that medical inspection of school children has aided in protecting children and society from disease and the baneful results of defective development, the right to medical inspection is clearly established. I am not afraid of that form of socialistic endeavor which helps all and harms none.

Granted, now, that the State has a right to look after matters pertaining to the health of school children, the next question to arise is this: Has medical inspection as now organized proved useful?

In order to determine with some degree of assurance whether such forms of medical inspection as we have now have been useful in conserving the health and promoting the physical well-being of school children it is necessary to set forth briefly some of the general results attained.

It has been demonstrated again and again, both in this country and foreign lands, that careful inspection of school children has helped to prevent epidemics of contagious diseases. Many cities have gone little further in medical inspection than to make this the chief aim of the work, and this service alone has been worth more than it costs. But since we have learned that even well children may be "carriers" of disease germs, it has become necessary to institute more careful examinations even of well children, in order to remove such "carriers" from contact with other children more susceptible to disease. For example, Dr. Curtis Bland, in a recent report on an epidemic of diphtheria in the town of Greensburg, Ind., says: "Out of a total of 872 cultures taken (from grade and high-school pupils, Sept. 30–Oct. 6, 1911) 288, or 33 per cent, came back positive. * * * All parts of the town were found to be about equally infested with carriers."

Out of 400 "carriers" found in that town of 6,000 people only 4 developed clinical symptoms of the disease. Plainly, under such conditions, the only way to break up an epidemic is to search out the "carriers" among the well people, isolate them, and treat them. He rightly concludes that to fight an epidemic of diphtheria the carriers must be discovered and isolated. To this it might be added that, if an epidemic of diphtheria is to be prevented, carriers must be found before they endanger others. This would be accomplished by adequate medical inspection.

Medical inspection has served the purpose of exposing to us in a glaring way the fact that school conditions are responsible for the progressive development of many defects. A great mass of evidence has been collected showing conclusively that school conditions and school demands tend to develop myopia, scoliosis, anemia, retardation in physical growth and all the ills in its train.

It is true that statistics can be found that will prove or disprove almost anything, and that great caution is needed in arriving at sweeping conclusions. But when careful statistics and common sense tally, as they do in these particulars, the conclusions expressed are warranted. Overcrowding, bad ventilation, unhygienic school desks, poor lighting, a superabundance of writing and book work, together with lack of freedom and opportunity for out-of-door games, or wholesome physical exercise, have furnished unnatural conditions for normal development, and it is unreasonable to expect better results until these conditions are ameliorated.

Medical inspection has made it possible to secure better attendance and fewer interruptions by reason of the consequent decrease in the amount of illness amongst the children. The work of the school nurse, in conjunction with the health officer, has done much to correct defects, interest the home in matters of sanitation, and greatly add to the school life of many children. Schools have been enabled to continue their work even in the presence of an epidemic of contagion, when, through careful inspection, carriers have been detected and isolated. Often, from this point alone, medical inspection has saved more than it cost.

Best of all, where medical inspection has been in the hands of wise and carefully trained men, and where it has been supervised and handled from an educational point of view, it has been an educational agent of great moment. It has served not only to correct faulty school conditions and practices, but likewise to correct unhygienic and unwholesome home conditions. Especially is this true where, through the agency of school nurses, the most effective follow-up work has been done. It has helped to clean up the home, to stimulate parents to give more attention to the food, the clothing, sleeping rooms, and general home sanitation. This phase of the work is just beginning, but its future development will be a powerful agency in home sanitation.

There has been a marvelous increase in the last five years in the number of cities undertaking medical inspection. In many places enthusiasm has outrun good judgment, or at least the work has been undertaken with little understanding of its true purposes, and doctors with no sort of adequate training have been selected to do the work.

Perhaps no title has had so much superstitious power over the people as the title of doctor.

It will do comparatively little good to examine hastily thousands of children and tabulate the defects in impressive columns, unless intelligent steps are taken to prevent such defects, and to correct those already found. And here lies the chief weakness of the work in this country. The findings of untrained and overzealous inspectors are criticized by family physicians who are jealous of what they consider their rights. Opinions clash, and professional jealousy always runs high, especially where scant knowledge is involved, or where financial interests are at stake. Because of these difficulties, Dr. Cabot, of Massachusetts, has claimed that better results in small towns are obtained by the use of trained nurses alone, than have been obtained in large cities where doctors of medicine have been selected to examine the children.

But in many cities there is developing a broad-minded and intelligent policy regarding the purposes of medical inspection.

By the courtesy of Dr. Gallivan, the chief of the division of child hygiene of the Boston Board of Health, I am able to present the following from a report of the work for the 5 months ending February 1 of the present year:

Medical inspection of schools begins at the kindergarten class and ends with the high schools. Of equal importance are the three objects which medical inspection has in view:

1. The detection of communicable diseases and the exclusion from school of every pupil so afflicted.

2. The protection of every pupil in the schools from contagion unrecognized by parent or teacher.

3. The detection of such defects which, if untreated, would result in permanent injury to the pupil.

For the work of school inspection in Boston, 82 physicians are employed under the direction of the board of health. These physicians visit both the public and parochial schools daily. During the five months mentioned, in addition to general inspection, physical examinations were made of 82,224 of the 123,091 children then in school. Of those examined, they found 28,721 free from defect, while 53,503 were found defective, many in more than one way.

The school committee employs nurses to follow out as far as possible the directions of the school inspectors. The nurses visit the homes, consult with parents concerning the treatment the children should have, and if need be, accompany them to physicians, hospitals, or clinics.

But the work of the division of hygiene goes much further:

It is concerned with the physical welfare of every child in Boston from the time of conception up to the age of 16 years.

The work of the division is classified into three subdivisions as follows:

1. Prenatal and post-natal work.
2. Medical inspection of schools.
3. Physical examination of licensed minors.

I have no time to go into further details, but it is evident that here we have a clearly conceived duty regarding the health of the community, far wider than mere medical inspection. Many other cities in the country have, in no uncertain terms, recognized the same duty to the children as well as to the general welfare, and there is no doubt of the fact that we are in the beginning of a comprehensive movement for conserving the physical stamina and preserving the health of our people. But we have scarcely begun. As usual with all beginnings for better things, we are now chiefly engaged in locking barn doors after the horses have been stolen.

We now come to the second main topic, What results may the public rightfully expect of medical inspection of school children?

The public has a right to expect from medical inspection largely what it intelligently demands of it, and according to the sort of support it gives to it. If the public does not know what medical inspection involves in the way of skill, organization, and support, it is likely to get corresponding haphazard results. Some cities are getting excellent results; some are accomplishing comparatively little, simply because some insist on real inspection and examinations by qualified inspectors, while others leave things to chance, and the right chance rarely comes.

Before the public can rightfully expect the best results, it must insist that those who go into the schools to look after the health and normal development of children must be appointed to do this by reason of special fitness. Generally speaking, this has not been the prevailing practice in America, and of course medical inspection has not done its full service under such conditions. Professional jealousy and personal politics have played conspicuous parts in appointments.

We are in need of more health inspectors, those knowing more about education, more about the normal growth and development of children, and especially more about physical education and general hygiene. Our best medical schools should offer courses preparatory to this work. We need more doctors of public health than mere doctors of medicine. Meanwhile, before we can get them, the public must be educated to ask for them and to pay for their services when secured.

The term "medical inspection" is an unfortunate one for designating what should be the chief work of the health officer for schools. School children would need little medicine and less medical advice if we had more sanitarians and doctors of public health to teach them and their parents how to be clean and how to care for their health in every way.

Our system of paying doctors to do something for us when we get sick ought to be largely discarded for the Chinese system of paying them to keep us from getting sick. Our medical inspectors are now largely on the hunt for defects, and they sometimes get so enamored with beautiful cases of diseases that they can not passionately love a case of perfect health and perfect development. The normal with many of them is the abnormal. In proof of this statement, I wish to call attention to the great variations in reports from medical inspectors in different parts of the country, in the same cities and regarding the same children.

In New York City, for example, it was found that two inspectors examining comparable children in the same school reported results differing by 100 per cent. It was also found that some inspectors found few instances of many defects, while others found many instances of practically every defect listed.

It has become clearly evident to those who are critically examining the results of medical inspection that men and women who undertake to supervise the health department of schools must have special training for this work. Neither the narrow specialist nor the general practitioner is necessarily competent to do this work in a satisfactory manner.

The most significant, ultimate good of medical inspection, I believe, will arise from the increased knowledge by the people as a whole concerning the personal care of health. Great numbers of our people are yet in gross ignorance and superstition concerning matters of health and disease. Obituaries are printed in the newspapers of all parts of our country, reading much as follows: "It has pleased an all-wise and divine Providence to take from our midst a youth of great promise," etc. By reading a little further you will see that that divine Providence was a case of typhoid fever, a disease induced by filth. Such obituaries are not only criminally false, they are ungodly, impious, and wicked. They should state that by reason of carelessness, ignorance, and filth a promising life has been sacrificed, to the great displeasure of an all-wise Deity.

There are thousands of people in this country who will not see that vaccination does and will prevent smallpox. They are willing to set all sorts of personal theories and motives against the facts. They do not really know the difference between proof and belief. There are great numbers of intelligent people who have no useful conception of the relation of bacteria to diseases. They are ready, indeed, to assert vigorously that all this talk about germs is just a fad. It does no good simply to decry these conditions. The people must be educated more systematically, persistently, and purposefully in sanitary matters.

Our chief duty lies in removing the causes which contribute to physical unsoundness and disease. As long as we herd our children in schools where they must breathe impure air, bend over insanitary school desks, work at books when they need physical exercise, just so long shall we be paying for our own errors. Medical inspection will not and can not save the children of our great cities from degeneration and disease, unless through this agency we are led to see more clearly the results of unhygienic living.

If medical inspection can make clear our defects and at the same time teach the people the absolute requisites for wholesome living, then a new education will actually begin.

I maintain, therefore, that the chief objects of so-called medical inspection must include the following points:

1. It ought to serve as an efficient means of preventing the spread of contagious diseases, particularly those to which school children are peculiarly susceptible. This will necessitate a careful examina-

tion of all children, especially at the beginning of the school terms, in order both to exclude children who are suffering from contagious or parasitic diseases and those "carriers" who are a menace to others, even though they themselves show no decided effects of the diseases they are capable of disseminating.

2. Medical inspection ought to emphasize in a decided way the especial significance of hygienic conditions in schools. It seems more than foolish to shut up our well children in unventilated and improperly lighted schoolrooms, furnish them no playgrounds, compel them to live a life not in accord with the laws of physical development, and then when they become anemic, nearsighted, and defective make a great stir about special classes for defectives and spend in building special schools money better spent in keeping children well. We must learn that it is far more important to furnish conditions which promote the health and development of well children than it is to make special efforts to care for those who are sick or defective, especially where these defects have been largely induced through neglect.

3. Health officers must know more about education, more about the hygiene of teaching, more about the normal demands of child life; they must possess more ability to work with teachers and the people for the general welfare of the community. A large majority of physicians, those who would not hesitate to undertake the work of supervising the health interests centered in our public schools, are wholly unfit for the place because they know next to nothing of the ideals and methods of modern education, and they are ignorant of their own ignorance. The best results can not obtain under such conditions.

4. We need health officers whose chief delight is in finding and developing beautiful cases of physical perfection rather than in finding some obscure and rare disease.

We need doctors of health, who will be more delighted in exhibiting a large list of healthy, well-developed children than a long list of those who are physically defective and diseased. To be sure they must be able to see defects and diagnose correctly, but their chief emphasis should be in preventive measures. Schoolmen are pretty thoroughly tired of the mere finding of defects; they need more help in preventing them.

We need a combination of the Athenian worship of physical perfection, the enthusiasm and skill of the modern bacteriologist, and the spirit of the teacher whose face is turned toward better things. We need health officers whose philosophy is based on the gospel of physical vigor, on the sanctity of personal purity and the godliness of clean living.

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II. HEALTH PROBLEMS IN EDUCATION.[1]

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The most important of all our national resources is the health of the people. The most valuable asset in this capital of national vitality is the health of the children.

Public education is the logical, the strategic, and the responsible agency of the Nation, of each State, and each community for the conservation and enhancement of the health of the children.

To become an effective instrument for the protection and promotion of child health, it is essential that the school should not only be a sanitary and healthful place for children, but that various agencies in public education should be so organized that each pupil may be given the best possible opportunity to escape disease, and far more

[1] Paper read at the National Council of Education, St. Louis, Mo., February 26, 1912.

to attain in each individual the reasonable best in growth, in development of biologic, intellectual, moral, social, and economic power.

What may the child be allowed to accept in exchange for any actual or vital part of his health? How shall public education account for its stewardship if through ignorance, neglect, or unwisdom any child fails of any essential health value directly or indirectly necessary to insure the future well-being which the school might have secured for the individual?

It can not be taken for granted that school children are healthy. The majority of them are not as healthy as they should or may be.

There are in the schools of the United States to-day approximately 20,000,000 pupils. Extensive observation of child health for 20 years and careful study of statistics and estimation of all conditions lead to the following conclusions:

From 300,000 to 400,000 (1½ to 2 per cent) of these pupils have organic heart disease.

Probably 1,000,000 at least (5 per cent) have now, or have had, tubercular disease of the lungs.

About 1,000,000 (5 per cent) have spinal curvature, flat-foot, or some other moderate deformity serious enough to interfere to some degree with health.

Over 1,000,000 (5 per cent) have defective hearing.

About 5,000,000 (25 per cent) have defective vision.

About 5,000,000 (25 per cent) are suffering from malnutrition, in many cases due in part at least to one or more of the other defects enumerated.

Over 6,000,000 (30 per cent) have enlarged tonsils, adenoids, or enlarged cervical glands which need attention.

Over 10,000,000 (50 per cent, in some schools as high as 98 per cent) have defective teeth, which are potentially, if not actually, detrimental to health.

Several millions of the children possess each two or more of the handicapping defects.

About 15,000,000 (75 per cent) of the school children in this country need attention to-day for physical defects which are partially or completely remediable.

Pupils need, and are unconsciously calling for, adequate care. Parents are demanding with rapidly increasing conviction and emphasis the service which public education can alone or most advantageously give in relation to child health. Teachers are consciously inadequate to this task of health care, but they are awakening to their responsibility in relation to it.

Physicians are, as a rule, too much occupied with the study and treatment of disease; they have too little time for and too little in-

clination toward the field of preventive medicine, toward the field of child hygiene.

While the human creature has, in part, a different destiny and higher capacities from those of other animals and all other living things, many conditions of his life are precisely or closely like those of the lower and higher forms of animate beings. Yet the human plant, the human flower, and fruit receive less adequate care, relatively, of the fundamental, biological, life and health conditions than any other life species of particular value to mankind. Of the values and attainments dependent upon physical and health care, the human being realizes less, relatively, than any other organic species cultivated by man.

Quite apart from the benefits of eugenics we have little idea as yet of the possibilities of humanity conditioned upon a rational, complete, and constructive hygiene.

If it were possible to estimate accurately the gain to the race and to the Nation in one generation by practicable care of child health, in preventable mortality and morbidity, in escape from helplessness and hopelessness, in improvement of physical, intellectual, and moral worth, of economic and industrial efficiency, of social and civic power, of human satisfaction and happiness, the country would be startled by one of the most stupendous facts in human history and energized into a telling educational reform. In fact, it seems altogether probable that we are to-day in the beginning of this constructive health epoch.

The country is coming rapidly to recognition of the importance of this broader humanistic responsibility of education. Spasmodic, nobly intentioned efforts are being made all over this country to improve the foundations of education, to correct physical weakness in child life.

We have a variety of laws in a number of States providing for elements of supervision and care of child health. Some of these laws are permissive. Some are mandatory. Some are aimed largely at the correction of disease and defects. One or two are wisely and progressively constructive in plan, providing for a care of child health and development which will, if realized, do much to make human education a genuinely successful process.

In about one hundred cities in our country there are about one hundred types of organization for medical inspection and health care of school children. None of the city systems which has been described in print seems wholly satisfactory as a model, although a few localities, both urban and rural, are making efforts in the field of educational hygiene which may well serve as instructive examples.

The Wiesbaden system of medical inspection in Germany stands out as a pioneer model which perhaps is still unsurpassed in the

admirable composition of elements and in the remarkable spirit which has made that city organization so worthily influential as an example in Germany as well as in other countries, including our own.

Noteworthy features in the Wiesbaden system are:

1. The means for securing the cooperation and sympathy of parents and teachers.

2. The completeness of the examination of each pupil.

3. The frequency and regularity of the examination, coming at vital stages of the child's school life.

4. The filing of the health report, a school record, used for reference in connection with the school work of the child.

5. The scientific and educational interest of the doctors, which insures thorough examinations and wins cooperation of teacher and parent.

6. The popular nature of the movement, which has developed among the people and has not been imposed by a central government.

7. The movement is an integral part of the school system and is treated primarily as an educational problem.

Some of the practical, direct, and indirect results of the Wiesbaden system may be stated thus:

1. Children of subnormal type are profitably delayed in entering school.

2. Individual children are made happier and more efficient.

3. Teachers are relieved by special individual adjustment of the weaker children.

To the movement can be traced:

(a) The formation of special classes for defectives requiring modified treatment.

(b) Installation of school baths.

(c) Provision of free meals for school children.

(d) Establishment of free clinics and dispensaries for treatment of child ailments.

(e) Organization of outdoor schools for weaker children.

The system is defended on economic grounds as an effective means of preserving and improving social and national efficiency. The spirit in which the personal supervision of the child's health in school should be conducted is well expressed in the following statement, written in characterization of the Wiesbaden organization:

> **The new education is indeed more personal, but it is more reverent and gentle than the old. Rudeness will wreck all. The human body is not vile. It is the instrument of instruments. The first condition of success is not that the doctor has degrees; it is that he should not offend one of these little ones. The behavior of children—that is not a thing to judge in the first place. To judge is easy, it has been done for ages; to understand is the new task begun very late. Hasty judgment precludes the possibility of complete understanding.**

To classify according to health is comparatively easy; it may be done by the three-card system. To classify ability and weakness is not so easy. Each child presents his own problems.

There is a lack to-day of clearly established principles and ideals relating to the health responsibility and health problems of education. There is a lack of reasonable uniformity of standards with reference to scope of work to be done, with reference to relative importance of different aspects of the health field, with reference to division of practical service in the health field between teachers, principals, school nurses, school doctors, teachers of hygiene and physical education, and other special teachers and school officers. There is a lack of desirable uniformity of standards regarding localization of responsibility and authority for health supervision of school children, of forms of cooperation of educational and health boards, of details of cooperation between school and social or philanthropic organizations. There is a lack of clear definition and realization of possible cooperation between school and home affecting the health and general welfare of the child. This last is most important, inasmuch as this educational supervision of child health, if properly carried out, proves to be a natural and effective bond between home and school, providing a basis for vital elements of sympathetic cooperative effort, affecting as well the mental and moral well-being of the child. There is a lack in this country of the inspiration and guidance of a national pronouncement on this subject which shall give assistance somewhat commensurate with certain very effective provisions of the English Education Act, passed by Parliament in 1907. Concerning this the following is said:

> This new legislation aims * * * at the physical improvement and, as a natural corrollary, the mental and moral improvement of coming generations. It is founded on a recognition of the close connection which exists between the physical and mental conditions of the children and the whole process of education. It recognizes the importance of a satisfactory environment, physical and educational, and, by bringing into greater prominence the effect of evironment upon the personality of the individual child, seeks to secure ultimately for every child, normal or defective, conditions of life compatible with that full and effective development of its organic functions, its special senses, and its mental powers which constitute a true education.

This memorandum also states that the work of medical inspection can not be properly accomplished unless—

> the teacher, the school nurse (where such exists), and the parents or guardians of the child cooperate heartily with the school medical officer.

What may the National Education Association do through the National Council of Education to further the interests of this health cause?

It seems desirable that, after careful study of the field, cogent recommendations should be formulated which may furnish definite

guidance to States, cities, and rural districts concerning the best practical measures, methods, and forms of organization for the accomplishment of work under all the varying conditions in the health field.

We need new types of educators, physicians, nurses, and parents with more comprehensive and thorough training to provide the requisite care and supervision of childhood with full regard to the preservation and enhancement of health in relation to the even more important faculties and values to be developed in the lives of the young.

Fathers and mothers need to become wise in knowledge of child nature and more skilled in the art of parent craft, which may help the child to realize the best of his possibilities on a sound and cultivated biologic basis.

Superintendents and principals of schools must see clearly through and around this health field, if they are to have true estimation of relative values and are to be able to meet their varied obligations in relation to parents, teachers, and pupils, as well as to board of education and other official bodies which determine the sanction and financial support which are necessary for the practical conduct of the work.

Physicians require for this field of educational hygiene not only medical training and skill, but an understanding of educational principles and methods. The school doctor needs keen insight and sound judgment to enable him to thoroughly understand the child and to help in making the school a healthful place, and at the same time to help in adjusting the individual to the educational process.

There is need of more convincing demonstration of the value of various measures and methods employed for the promotion of child health, so that sufficient money may be appropriated by those who control the public funds.

Educational hygiene includes much more than health examinations for contagious disease and chronic physical defects, although such examinations make the basis for all effective care and adjustment.

Other factors of essential importance in the health field are the following:

(*a*) Maintenance of sanitary, healthful school environment with clean schoolhouses; abundant light, good air, etc.

(*b*) Hygienic instruction and school management, with particular attention to the influence of the teacher upon nervous and mental health of pupils.

(*c*) Effective teaching of health and hygiene to all pupils.

(*d*) Rational supervision and direction of play, games, athletics, and all healthful and satisfying forms of physical education.

Special features in the schools, or closely related to the schools, which have direct bearing on health include the following: (*a*) Homes of the pupils; (*b*) playgrounds and gymnasiums; (*c*) dental clinics and other medical clinics for children; (*d*) classes for defectives and cripples; (*e*) open-air schools.

Improvement in school hygiene involves prominently these factors:

1. Recognition of the extraordinary value of work of school nurses and the employment of nurses in the schools.

2. More comprehensive and thorough training in school hygiene in all normal schools and other institutions for professional education of teachers.

3. Better technical training for school physicians, school nurses, teachers of hygiene and physical education, and other special officers in this field.

4. Requirement that teachers in general shall possess knowledge and skill in various phases of school hygiene and certification of health specialists of different types.

III. SANITATION IN RURAL COMMUNITIES.[1]

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The work of sanitation.—The work of sanitation is to prevent the transference of infection from one individual to another individual. There is much mystery in the popular mind as to the meaning of the term "infection"; the words "bacteria" and "germs" have come into popular use, but convey only vague ideas to many of us. It is common knowledge that the living things about us can be divided into the plant kingdom and the animal kingdom. Scientists have decided that bacteria belong to the plant kingdom.

As one walks out into the fields and views the trees, flowers, and the grass, these things do not arouse any alarm. The vegetables in the garden and the flowers growing in the ground are looked upon as entirely harmless, and many of them as most useful to mankind. It is true, however, that here and there a very few may be poisonous. The poison ivy, a few mushrooms, one species of sumac, and possibly a very few other plants are known to be poisonous, but these poisonous plants are very few and very rare. It is remarkable also what a great difference there is in the size of plants. From the giant trees the descent is by degrees to the mosses and to the molds, which are now known to be tiny plants. The microscope reveals a new plant world. The mosses and molds immediately become giants, and

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through the microscope we see numerous smaller plants. The smallest of all are the bacteria. Some of these are so tiny that through the most powerful microscope they appear only as a minute speck or dot. There are hundreds and perhaps thousands of varieties of these tiny microscopic plants called bacteria. Among them, just as among the large plants of which we have spoken, there are very few which are poisonous. Thus tuberculosis and typhoid and diphtheria are each caused by a small poisonous plant. The other diseases called infectious are caused by other varieties of these small poisonous plants; but the great majority of bacteria are entirely harmless and some of them, in fact, seem quite useful and necessary to the welfare of human beings.

The giant trees are historically among the youngest of plants. The most ancient of all plants the scientists tell us are the bacteria. They are the ancestors of all other forms of vegetable life, and the numerous plants and trees which we now see are the direct descendants of ancient bacteria. When plants alone were living on earth, before animals were created, there was no tuberculosis or typhoid or diphtheria, but after animals and men appeared some of the tiny plants accidentally took up their residence in the noses and throats and intestines of men. It was a startling event when these plants learned how to live and grow inside of animals, for when they did so infectious diseases began.

At present there are many men, women, and children in whom these plants have taken up their residence. In fact, having once learned how to grow in animals many of them have entirely lost their power of growing anywhere else, and can not live at all without the warmth and nourishment which they receive in living persons.

Tuberculosis is caused by the tubercle bacillus—a tiny plant which centuries ago took up its residence in human beings and animals, and it has become acclimated so that now it can be grown only with the greatest difficulty outside of the body, and only when the body conditions have been imitated in the laboratory. Out of doors this tiny plant will not grow at all, but soon dies. The same thing is true of the typhoid bacillus, of the diphtheria bacillus, and of the other kinds of bacteria causing infectious diseases. They will live when in men and animals, and under special laboratory conditions, but soon die when exposed to out-of-door conditions.

The existence of these plants is continued from generation to generation only because certain men and animals in whom they live pass them on to other men and other animals by a transference which may be direct or indirect. Thus we have with us people who are carriers of the tubercle bacillus, and people who are carriers of the typhoid bacillus, and people who are carriers of diphtheria bacillus, both children and adults, and these persons, through ignorance and

carelessness, transfer the bacteria which they are carrying to others who have been free from them, and in this way the infectious diseases are continued from year to year and from generation to generation.

The practicing sanitarian has numerous illustrations of this fact. In one of my own recent investigations I was called to the Adirondack Mountains to inquire into the cause of an outbreak of typhoid fever in a summer colony of some of the wealthiest people of New York City. During two months 27 cases of typhoid fever had broken out in the camp. The cause was mysterious. All ordinary sources of the disease were investigated without result. It was only after 6 weeks of study that the discovery was made that one of the guides employed at the camp was the carrier of typhoid bacteria. This man was over 70 years of age and appeared to be in perfect health. He had no recollection of ever having typhoid fever, yet his system was so badly infected with these plants that he was discharging them in enormous numbers every day. He was the undoubted cause of not only 27 cases and 3 deaths which had occurred in the last outbreak, but of 8 cases which had occurred at the same camp in previous years. It is assumed that there are now 18,000 persons in the United States, apparently in perfect condition physically, who carry typhoid bacteria in their bodies and who are the cause of the annual outbreaks of typhoid fever from which this country suffers.

It is an old superstition that certain houses are haunted with tuberculosis. It has been said that in country districts members of certain families who have lived in the same house for generations had tuberculosis, while people in other families were free from the disease. We now know that it is not the house itself which must be feared, but the people who live in it. While it is true that the bacteria of tuberculosis may remain alive for a certain length of time after they are discharged on the ground or on the floor of a house, yet their life is comparatively short, and they are quickly killed by sunlight and by external conditions. Bacteria are to be feared most in a fresh condition, and when the transfer takes place from person to person it is, as a rule, by direct contact or by contact with something which has very recently received infection. In the case of tuberculosis, the use of spoons, drinking cups, and handkerchiefs is a common means of transfer, or the direct breathing of air which has been recently polluted by the coughing or sneezing of infected persons. In a similar manner the transference of other infectious diseases takes place.

The work of sanitation consists in preventing this transference. Sanitation aims to protect the child and the adult who are free from infectious diseases against the transfer of bacteria from children and adults who are carriers of bacteria. Sanitary science has prompted a study of all of the channels, both direct and indirect,

through which such transfers take place, and of the best means for their prevention.

Conditions in rural communities.—Of the population of the United States, 66 per cent live in rural communities and 34 per cent live in large cities. About 1,500,000 people die each year in the United States, and about 3,000,000 are sick but do not die. About 630,000 people die each year in the United States from infectious diseases. This literally means that this number of persons are poisoned to death by the growth of bacteria. Their deaths would not have occurred if the bacteria had not taken up their residence in them. The death rate in rural districts is slightly less than the death rate in cities, for in country districts out of each 100,000 persons 1,400 die each year, while in cities out of an equal number 1,650 die each year. Out of a rural population of about 60,000,000 about 400,000 persons are killed by infectious diseases.

Theoretically, life in the country is more natural and healthful than city life. Air is better; food is fresher; there is less noise, smaller tax on the nervous system, and other conditions which warrant the statement that country life is healthier. Man is, in fact, an outdoor animal, and city life in a broad sense is artificial life, but the dwellers in rural districts fail, through their own ignorance and carelessness, to obtain the full benefit of their natural surroundings. Studies of the water supply of farms, both in Canada and in the United States, show that 60 per cent of the wells are polluted with house and barnyard drainage. The milk supplied, while fresh, too often has its source in tuberculous cows and is produced under insanitary conditions. Disposal of human and animal waste products is commonly primitive, and these products are, as a rule, exposed to flies in a manner that makes easy the transfer of bacteria to the house and to the food of its occupants. Sleeping with closed windows is common, and house air in the country is often worse than house air in the city. Cellars are damp and improperly drained. The common drinking cup or dipper is a regular institution, and so is the roller towel. Hot water is scarce, and consequently the dish-washing process suffers. As a consequence of these things, even in the country there is an abundance of infectious diseases.

In rural districts, in each 100,000 inhabitants, bacteria of tuberculosis kill each year 136; bacteria of intestinal inflammations, including infant diarrhea and all other forms of intestinal diseases, not including typhoid, kill 97; bacteria causing bronchitis and influenza kill 90; bacteria of pneumonia, 83; the typhoid bacillus kills 24; and the diphtheria bacillus kills 17; the bacteria of whooping cough kill 12; bacteria of scarlet fever (undiscovered) kill 8; bacteria of measles (undiscovered) kill 8; and there are other infectious diseases of lesser importance.

The conditions in rural communities differ from those in cities most markedly in respect to sanitary precaution. The concentration of dwellings and of people in cities has compelled attention to public-health matters, so that money and organizations are employed and rules and regulations enforced which have as their object the protection of the inhabitants against transfer of infection through water, milk, waste products, etc. On the other hand, in country districts the population is so scattered that there is less community of interest. In agricultural districts each farm is almost an independent social unit, and has its own water supply, milk supply, and sewerage system. Its sanitary conditions are whatever the proprietor chooses to make them. Public-health supervision over sanitary matters is, at best, but slight, and in the greater part of the country it is entirely lacking. Rural districts do not lend themselves to the influence of public-health authorities as urban conditions do, and consequently there has been a much greater reduction in the death rate in cities during the past few decades than in rural communities. It seems obvious that, since the most prominent characteristic of rural life is the independent position of the farmer, more is to be gained by direct appeal to his own intelligence than by official supervision. In other words, the key to the improvement of sanitary conditions in the country lies in public education.

The country school-teacher as a public-health educator.—The intellectual authority, as well as the social leader, in rural districts is, or should be, the country school-teacher. No element of society is in a position to wield greater influence than teachers in matters which pertain to social welfare. The movement toward better conditions of life has been carried to such a point that it has penetrated the educational systems in our cities, and is rapidly gaining an important place in public-school work. Beginning with personal hygiene and medical inspection, public-health work in city schools will soon reach a point where the art of clean living will be taught; a child will learn the value of self-care in the matter of contracting infectious diseases. In rural schools, however, the movement has not gathered such headway. The teaching of physiology in the village school may satisfy the curiosity of children as to their internal organs, but it does not in any way protect them against bovine tuberculosis, from contaminated milk, or against typhoid from impure water. The rising generation has a right to be instructed in the first principles of sanitary science. This knowledge is even more important than the knowledge of physiology.

It might seem at first thought that the subject of public health is too difficult to be taught in the district school, but there is no subject that lends itself so readily to popular interest and to the interest

of children. Such a simple matter as washing the hands may be made a matter of the greatest interest when studied with reference to bacteria. A demonstration of bacteria by the use of glass plates and simple culture media is extremely simple, and it arouses the greatest interest in youthful minds. The microscope is always an instrument which excites curiosity and it can be used to illustrate many sanitary lessons. Personal cleanliness, purity of food and of drinks, the nature of disease, and the methods of transference are all things which can be expressed in the simplest terms and made clear to the understanding of children. The subject of water and its sources, its evaporation by the sun, its precipitation as rain, and its courses through the earth can easily be made of interest. Milk, its value as a food, the fact that it is highly appreciated by bacteria, and that it is therefore necessary to protect it against them—these things are not too difficult for the child to understand. It is not hard to explain cold in the head and sore throat caused by the growth of bacteria on the surface of the mucous membranes, and the danger to others of these bacteria when discharged in coughing and sneezing.

But such work as this demands preliminary training. If the country school-teacher is to be armed with the knowledge of sanitary science, she must find it in the normal school and teachers' college. The normal schools and teachers' colleges should have regular courses in public-health work. We are dealing here, not with a merely academic subject, but with something vital in importance, something which means the lengthening of life and the reduction of the death rate to the people among whom the teacher is to practice her profession.

As a movement, interest in public-health matters has gathered tremendous force in the past 10 years. In the majority of cities it is now thought necessary to appoint to the position of public-health officer a man who knows something of medicine and of sanitation. Three of our great universities offer degrees for those specializing in public-health work. Philanthropists, social workers, and engineers have already undertaken extensive enterprises in this field of work. Among educators, however, but little has been done. * * *

Results.—The possibilities of such work are not vague, but have actually been set down in figures by students of vital statistics. In the report of the National Conservation Commission, made by a committee of 100, it is stated that the average length of life of the inhabitants of the United States is now 45 years (100 years ago the average length of life in Europe was less than one-half of this). It is estimated that if sanitation were enforced the span of life would be prolonged by about 15 years, so that the average length of life would be 60 years. It is estimated that 75 per cent of deaths from

tuberculosis, 45 per cent of lobar pneumonia, 50 per cent of broncho-pneumonia, 85 per cent of typhoid fever, 60 per cent of deaths from infantile diarrhea, and 70 per cent of deaths from meningitis would be prevented simply by insistence by the public on pure milk and pure water and pure air. In rural communities annually 400,000 people die and about 2,000,000 persons are seriously ill from infectious diseases. If only one-half of these deaths and cases of sickness can be eliminated, it means that an immense field of useful work lies at the hand of the country school-teacher who will become a public-health educator, and will instruct the children and the mothers and fathers how to prevent the transference of poisonous bacteria from those who carry them to those who do not.