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THE RURAL SCHOOL AND HOOKWORM DISEASE

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WASHINGTON, D. C.



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LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, June 23, 1914.

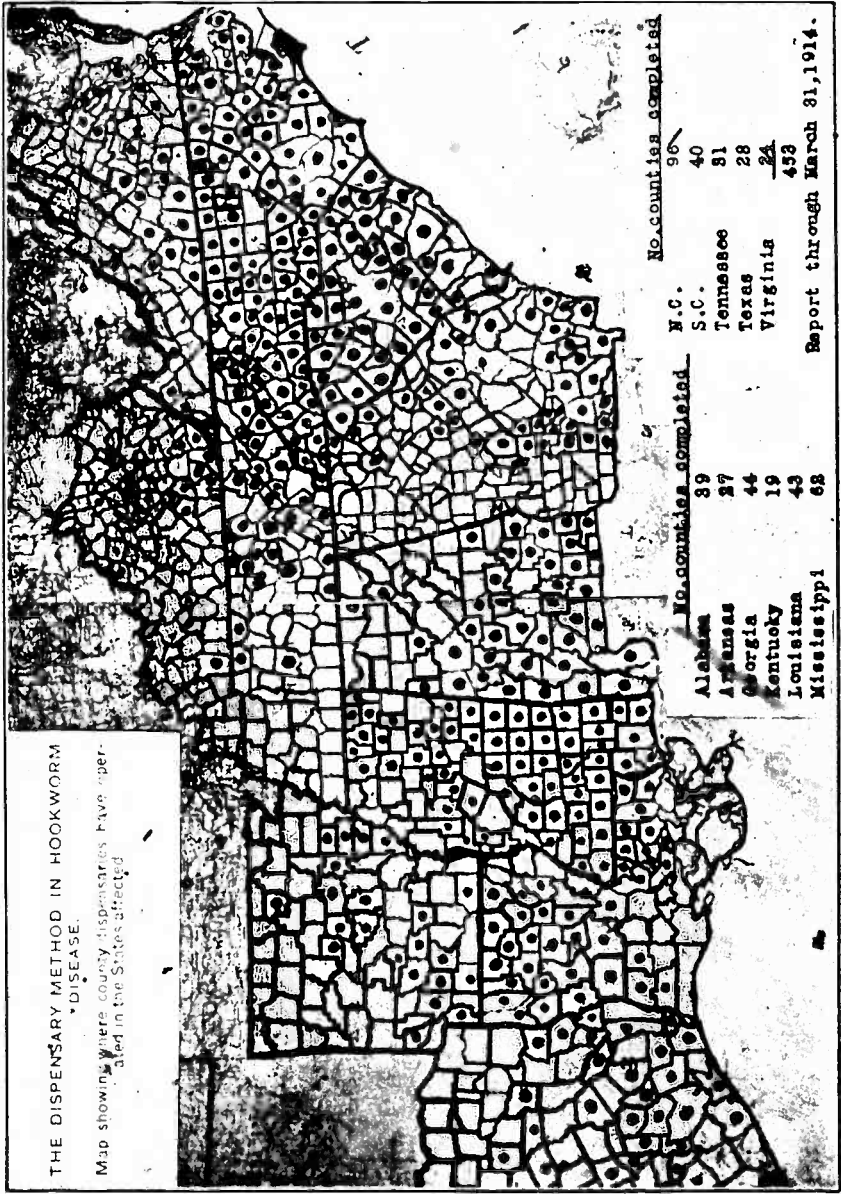
SIR: Physical health for individual and country is very largely a matter of education, and instruction in the principles of health and in the means of preventing sickness should be given to children in schools of all grades, both public and private. Without some general understanding of the causes of diseases, and the means of preventing them, there can never be in any community, large or small, such hearty, persistent, and intelligent cooperation as is necessary to guard the public health. In the Southern States one of the most common forms of disease, especially among children, is hookworm disease. The campaign for its eradication conducted by the Rockefeller Sanitary Commission for the Eradication of Hookworm Disease is one of the most remarkable health campaigns ever waged in this country. It has shown conclusively the important part which the schools may bear in any campaign against this and other communicable diseases, especially against the soil and water pollution diseases. For this reason I have asked Dr. John A. Ferrell, M. D., assistant director general of the International Health Commission, who has had an important part in the campaign against hookworm in the South, to prepare the manuscript transmitted herewith. I recommend that the manuscript be published under the title *The rural school and hookworm disease*, and that it be distributed among school officers and teachers in the States and Territories and possessions of the United States in which this disease is most prevalent.

Respectfully submitted.

F. P. CLAXTON,
Commissioner.

The SECRETARY OF THE INTERIOR.

THE DISPENSARY METHOD IN HOOKWORM DISEASE.
Map showing where county dispensaries have operated in the States affected.



THE RURAL SCHOOL AND HOOKWORM DISEASE.

I. IMPORTANCE OF THE PROBLEM.

Good health is of basic importance in education. We now know that it is of fundamental consequence, in any effective system of schooling, that the child be received into the school a normal, healthy animal; and that his training and environment be so regulated that he may remain healthy and normal. With better health and consequent greater efficiency, we shall be able to secure with comparative ease the additional elements necessary to the highest standards in our educational system.

In the development of education in the United States, and particularly in the Southern States, where the preponderance of rural population has retarded community control of sanitation, realization of the health basis of education has been slow. Education in the South has advanced rapidly since the Civil War, and more recently the rural schools have had their share in progress. Better laws have been enacted; taxes have been levied more generously; standards for teachers have been gradually raised; adequate school buildings have been erected in increased numbers; school terms have been lengthened; better supervision of schools has been provided; and the public schools have reached the point where they find equal favor with all ranks of citizens. Yet in this development the emphasis has persistently been on the school and the teacher, rather than on the children to be educated. Only recently have educators turned their attention to the physical condition of the average school child, and in the South they have done so largely because of the discovery of the enormously important part played by hookworm and allied diseases in educational progress or lack of progress. Hookworm disease is, in a sense, a special problem; but it is a special problem of such magnitude, affecting so large a section of our country, as to be a problem of grave national concern.

Hookworm disease is one of the most prevalent, most insidiously harmful, and most completely preventable diseases known to man. It causes human suffering and economic waste altogether out of proportion to its apparent death rate. Many ills that have been attributed to mental and moral weakness of whole bodies of people are now definitely known to be due to this infection, and curable with its cure. Its eradication is one of the most important and pressing problems

before the people of the southern half of the United States and of other semitropical and tropical lands. Moreover, the progress which has been made in recent years completely demonstrates at once the vast benefit, both in terms of human happiness and industrial efficiency, attendant on the stamping out of the disease; and also the complete adequacy, in stamping it out, of perfectly simple precautions prescribed by the most primary rules of health and even of common decency. There is probably no other disease which is so well understood in every detail, and which can be so satisfactorily explained to a layman. Nor is there any other widely prevalent disease against which the lay community can so readily and surely protect itself by simple precautions. Its conquest virtually resolves itself into a problem of popular education against soil pollution. The largest possible public must be brought to know in detail the history of hookworm disease, the distribution and life cycle of the parasite causing it; its symptoms, method of cure, and, most important of all, means of absolute prevention.

In combating hookworm disease it has been found that the rural school is the greatest medium for the spread of the infection and the most important protective agency against it. In some schools investigated the infection has been found to be 100 per cent—the teacher and every pupil a victim of the disease. Records of the survey show an average infection among rural children of school age for whole counties running as high as 70 to 90 per cent, while in some sections of Virginia, Kentucky, North Carolina, Tennessee, Arkansas, and other States the disease is less widespread, and 10 per cent or less of the school population was found to be infected with hookworms. The general average for all the children examined to date is 40 per cent of infection.

It is seldom realized to what extent the school in rural districts aids in spreading the infection. Suppose we take a certain school district in which, by chance, no infection exists. The son and daughter of Mr. Smith visit Mr. Jones, who lives in a district where there is much hookworm disease. While there fruits or strawberries are picked off the ground by the Smiths and eaten; and perhaps in going barefooted "ground itch," the beginning of skin infection, is contracted. The visit over, the Smiths return home. Having no sanitary privy on their premises, the soil around their home is soon polluted, so that one by one the whole family becomes infected in varying degrees of severity. Fall comes and the neighborhood school opens. The Smith children may by this time be a little pale and puny from the disease, but they start to school.

The school may be in a progressive community; the house may be painted and furnished with patent desks, and perhaps it has secured a creditable library. Good heaters have been provided; the light

comes from the rear and over the left shoulders of the pupils; perhaps there is a driven well to supply water, but there will be no bubbling drinking fountain. Worst of all, no privy has been provided. The pupils, not having a privy at home, do not think of having one at school, especially since the woods and undergrowth are near the schoolhouse. The Smith children do not know they are infected; they use the common hiding grounds with the other children. Soon the whole school grounds are so heavily polluted that on damp days every pupil who goes around barefooted will contract "ground itch"; and, moreover, those who play ball, marbles, mumble-the-peg, etc., get their hands infected. Facilities for washing the hands are not available, so at lunch time they handle their food with soiled hands which are likely to be contaminated.

In this way the pupils at school become infected with the school as an exchange. In a comparatively short time the premises around the homes of all the school children are polluted, and we have the change which anemia produces coming over the community. Progress of the children in school is retarded; the daily attendance is poor; the health of the community is below normal; the crops are not so well cultivated; there is a general backward tendency. The houses are not so well provided for or kept; the whole community is sick and doesn't know it; the economic loss is tremendous.

Failure or delay in establishing control of infection spread by such filthy habits is criminal, once the facts are understood. The appalling situation is that the people are ignorant of the facts. Teaching them is a duty of every informed citizen, board of health, and physician; yet these agencies are not sufficient to reach the people as a whole.

It is through the rural school, whence the infection has come, that the remedy must also come. The measures necessary for permanent control of hookworm disease are health supervision, health instruction, and perfect sanitation. The rural school can aid in health supervision; it can supplement and drive home health instruction; and above all it can teach good health and clean living by being itself a model of sanitation for the community. No matter how energetic a National or State campaign for eradication may be; no matter how many cases of hookworm disease are for the time being cured by thymol; unless the school and the community maintain a constant vigilance in behalf of positive measures for good health, permanent control of hookworm or any other disease transmitted by soil pollution will be impossible.

In the words of Dr. Roy K. Flannagan, of the Virginia Department of Health:

Until a systematic, thoroughgoing rural health organization is an accomplished fact in Virginia and throughout the South, the money expended for schools and teachers

in these sections will continue as now to be 25 per cent wasted. A bloodless brain can not properly respond to intellectual stimuli, and the money spent in attempting to cram knowledge into the heads of children whose blood is impoverished is doing only three-fourths duty. Bad as the old schoolhouses are, poor as their equipment is, the great need in the rural districts of Virginia is not more schools nor better, nor even better teachers, great as these needs are, but better school children; children with rosy cheeks and bright eyes, instead of pale faces and vacant stares; children with rounded, plump arms and legs, instead of thin and bloodless ones; children whose brains are fed by a rich, red flow of healthy blood, instead of a watery stream poisoned by a leechlike, filth-borne parasite.

Hookworm disease, like typhoid fever, is due to careless disposal of human excreta. Once schools and dwellings in country districts are provided with sanitary privies of one type or another, there will be little danger from hookworm.

A study of the hookworm problem has shown not only the need for sanitary privies, but the need for more adequate sanitary supervision by competent medical officers. There should be in every county or community unit a capable superintendent of health, devoting his whole time to public health work.

Frequent and systematic instruction by the public schools in the elements of personal and community hygiene is necessary for permanent control of disease. When the citizens of a community are taught from early childhood the necessity for the care of health, they will need no urging to provide expert health supervision and sanitary privies in every community.

The campaign against hookworm disease is a campaign of education; and it is right that it should be waged in the public schools.

II. THE HOOKWORM AND HOOKWORM DISEASE.

A simple description of hookworm disease was given by Ambassador Walter H. Page,¹ who wrote in 1912:

The hookworm is an intestinal parasite—a worm about one-third of an inch long when it is grown. When of microscopic size, it enters the body most often through the skin, generally through the skin of the feet, because the feet come in contact with it in polluted soil. The female worms in the body give forth an incredible number of eggs, which hatch when deposited on the soil, and while yet invisible to the eye enter the feet. Thence they make a long journey through the body till they reach the small intestines, to which they cling and give forth a poison which produces the disease, and lay more eggs, and thus repeat the endless round of their parasitical life. As many as 4,500 worms have been expelled from a single person; they have been known to live in a person for 10 years; and they are so prolific that a large part of the inhabited soil of the earth between 36 degrees north latitude and 30 degrees south is polluted with them. The pollution occurs, of course, because of the insanitary disposition of human excrement.

Its cure, except in extreme cases, is made by a dose or doses of thymol, following and followed by Epsom salts. The thymol expels the worms. The prevention of the disease

¹World's Work, September, 1912.

will be brought about by the universal use of sanitary privies. Its effect is to make its victims anemic—in plain English, worthless, more or less. In many cases it is, of course, fatal, and it prepares the victim for any other disease that he may be exposed to, notably typhoid fever.¹

Infection by intestinal parasites is by no means confined to the South. It is world-wide in its distribution. It is most prevalent in the tropical and semitropical countries, where it is a problem of great magnitude. Of the total population of the globe—about 1,600,000,000 people, in round numbers—about 940,000,000 live in countries where hookworm disease is prevalent. In the microscopic examinations of the stools of persons, six types of intestinal parasites have been found in sufficient frequency to render each one worthy of consideration, but the campaign in the South has been directed primarily against the hookworm, because it is the most important, and by far the most prevalent, of the group.

Hookworm disease is not new. It is only newly understood. The symptoms of the disease were described in the records of the Egyptian Empire, but their cause was not known. The hookworm itself was discovered in 1838 by Dr. Angelo Dubini, an Italian, who while making an autopsy found the small white worm with its head buried in the membrane of the small intestine; but that this worm had anything to do with anemia was not suggested. When, however, in 1877, Grassi, another Italian physician, identified the eggs of this worm in the feces of anemic patients, it was suspected that the parasite was the cause of the disease. About the same time Dr. Colomiatti, studying an obscure disease which had caused the death of many workmen on the St. Gothard Tunnel, discovered in the intestine of one of the tunnel victims more than 1,500 hookworms.

This parasite, known as the Old World hookworm and named *Ankylostoma duodenale*, was carefully studied, its responsibility for certain types of anemia in southern Europe demonstrated, and successful treatment for the disease developed. The prevalence of hookworm disease in the New World was not, however, recognized till much later. On November 24, 1899, Maj. Bailey K. Ashford, of the United States Army Medical Corps, while treating anemia, supposedly due to starvation caused by the hurricane in Porto Rico, identified the hookworm as the real cause of the widespread disease. He, however, supposed the parasite found by him to be the Old World type. In 1902 Dr. C. W. Stiles, of the United States Public Health Service, having found the same disease in the Southern States, identified its cause as a different species of worm, now known as the New World type, or *Necator Americana*. It was then discovered that the worm found in Porto Rico was of this species. Subsequent

¹ Any of the State boards of health in the South will send free on request a pamphlet giving a full treatise on hookworm disease.

discovery of this same worm as the cause of anemia among the victims of the African low lands suggests that the so-called New World type was brought to Porto Rico and the Southern States by the slave trade. It also prevails in India, and has been spread in Jamaica, Trinidad, and British Guiana by the Hindu coolies brought there as laborers.

EXTENT AND EFFECT.

In the United States the disease is found throughout the States south of the Potomac and Ohio Rivers; in Arkansas, Missouri, Oklahoma, and Texas, and also in California. Its prevalence and severity vary widely within a State and even in a county, in some localities less than 1 per cent of the people being infected, and in others more than 90 per cent. Generally speaking, the heaviest infection is found on the light, sandy soil of the coastal plains; the lightest infection on the stiff, clay soil of the Piedmont region, and an intermediate infection among the foothills and mountains. It is peculiarly a disease of the agricultural districts, which goes far to explain the long puzzling lack of physical and intellectual vigor to be noted among large classes of people in what ought to be one of the healthiest and most prosperous sections of the country. Examination of more than 496,000 school children during the five years 1910-1914 in 488 counties of the 11 Southern States has shown 40 per cent of them infected. Of more than 892,000 persons of all ages taken at random in this same territory, 34 per cent were found to be suffering from this disease, and in a vast majority of cases were completely cured.

For generations hookworm disease has been insidiously spreading unrecognized and unchecked over those countries of the globe that have a mild climate. Its victims, numbering many millions, have through centuries been hosts to the small blood-sucking intestinal parasites which cause the disease. Their strength has been sapped; their vitality lowered; their physical and intellectual growth stunted. They have been a fertile field for the germs of other diseases. They have been mastered in war, commerce, and industry by the more hearty people in the colder latitudes to the north. The social and economic importance of the disease is therefore almost beyond comprehension. The infection is in most instances so insidiously acquired by the unsuspecting victim that he and the members of his family, who are probably likewise infected, do not know just when the effects of the disease began to manifest themselves. In the course of a few summers a once healthy family has become pale and puny; a once industrious family has become languid and backward in its work; a once prosperous family has fallen into debt; a once proud family, owning valuable property, has been reduced by an easily curable and easily preventable disease to tenancy and to poverty.

The children, once bright and well advanced in their school classes, begin to lose their zeal and their mental alertness when gradually robbed of their vitality. They fall behind in the struggle with their healthier classmates; and, finally, discouraged and perhaps abused, give up school work in despair.

School and college records show that infected students, even though not apparently ill, average lower in their studies than those found free from infection. In one woman's college the average standing of 56 girls found infected was 77.75 per cent, whereas 56 girls taken at random from those in the institution found free from infection averaged 89.28 per cent. Similarly, in an academy a group of 25 infected men and boys averaged 64 per cent, and a noninfected group beside them averaged 86 per cent. Teachers in all parts of the South report marked improvement in zeal and intelligence, as well as in weight and physical appearance, of children immediately on being freed from the parasites.

TREATMENT.

The treatment of hookworm disease is a simple matter. Epsom salts and thymol are the drugs used. The object desired is to clean the mucous and food particles from the intestinal tract, so that the worms will be exposed to the action of the thymol. This is accomplished by the administration at night of a dose of epsom salts. Ordinarily Saturday night is preferred, as it will then cause no loss of time. In treating school children and the children of parents who work out by the day, the parents will be at home on Sundays. Sunday morning, at 6 a. m., one-half of the total dose of thymol in capsules is given; at 8 o'clock the other half is given, and at 10 a. m. a second dose of epsom salts is taken. Having cleaned away the mucous from around the worms, the thymol acts directly on them as a poison. While poisoned, the second dose of salts sweeps them out of the bowels before enough thymol may be absorbed by the patient to cause undesirable symptoms.

Alcohol and oils are solvents for thymol, and it is exceedingly dangerous for either of these to be taken by the patient. Gravy, butter, milk, etc., must not be taken on days when thymol is given. Patent medicines contain alcohol, and must be forbidden. The plan followed has been to forbid any food or drink, except water, on the morning when the thymol is taken. Moreover, as many hookworm subjects have dilated stomachs, which do not readily empty themselves, and as it is important that the thymol should reach the small intestine at once, the patient is urged to lie on the right side for at least a half hour after taking each dose of thymol. The apparent age, not the actual age, is considered when deciding the size of the dose. The thymol is powdered and given in capsules. If sugar of milk is added

grain for grain with the thymol, the results are more satisfactory. The following are the doses:

Dose of thymol.

Ages.	Grains.	Grams.	6 a. m.	8 a. m.
1 to 5 years.....	7½	½	½ dose.....	½ dose.
5 to 10 years.....	15	1	½ dose.....	½ dose.
10 to 15 years.....	30	2	½ dose.....	½ dose.
15 to 20 years.....	45	3	½ dose.....	½ dose.
20 to 60 years.....	60	4	½ dose.....	½ dose.
60 and upwards.....	45	3	½ dose.....	½ dose.

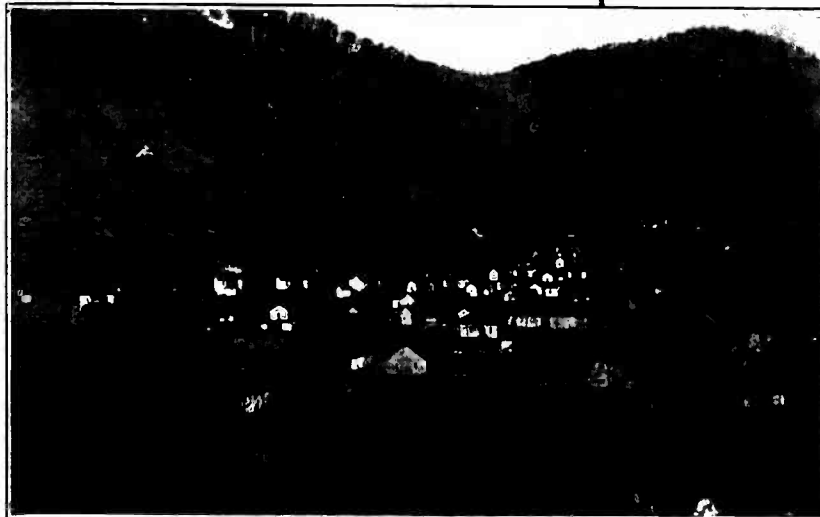
A dose of epsom salts at 10 a. m. should follow the thymol.

Male fern, beta-naphthol, and other remedies have also been used in treating hookworm disease, but it is generally agreed that thymol is thoroughly satisfactory for the purpose.

THE ROCKEFELLER SANITARY COMMISSION.

In the fall of 1909 it was announced that Mr. John D. Rockefeller had given a million dollars to be used in an effort to control hookworm disease. In January, 1910, a commission composed of educators, doctors, and business men of national reputation was formed, and the following officers elected: Mr. F. T. Gates, of New York City, chairman; Dr. Wickliffe Rose, administrative secretary; Dr. Charles W. Stiles, scientific secretary. Offices were opened in Washington by the administrative secretary. The work of this commission, which is known as the Rockefeller Sanitary Commission, has involved three definite tasks: (1) To determine the geographical distribution of the infection and to make a reliable estimate of the degree of infection for each infected area; (2) to cure the present sufferers; and (3) to remove the source of infection by putting a stop to soil pollution.

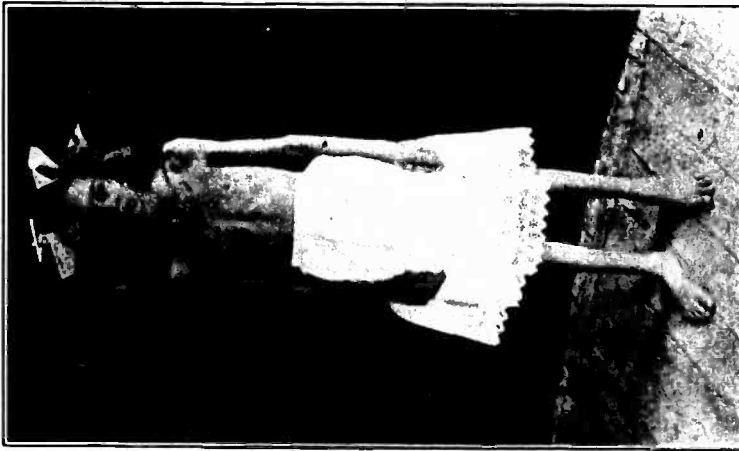
The State was adopted as the unit of organization and of work. It was regarded as fundamental, in the interest both of economy and efficiency, that the work be done as far as possible through existing agencies. Each State had its own system of public health, its own system of organized medicine, its own organized public press, its own system of public schools. These four fundamentals and a host of other agencies were ready for use in educating the people. These institutions were rooted in the life and traditions of the people; to enlist these agencies in the accomplishment of the task was to insure the permanency of the work from the beginning. The eradication of this disease, moreover, was a work which no outside agency



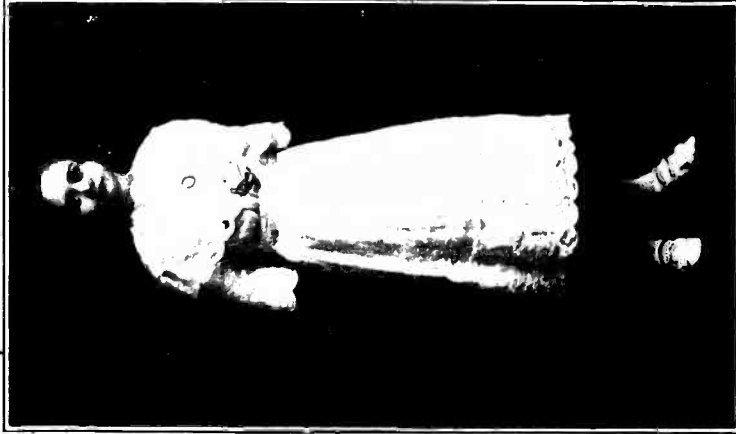
A. KENTUCKY CAMP WHERE 64 PER CENT HOOKWORM INFECTION PREVAILED.
The people have been cured and the camp put in sanitary condition.



B. DISPENSARY DAY AT A TENNESSEE SCHOOLHOUSE.

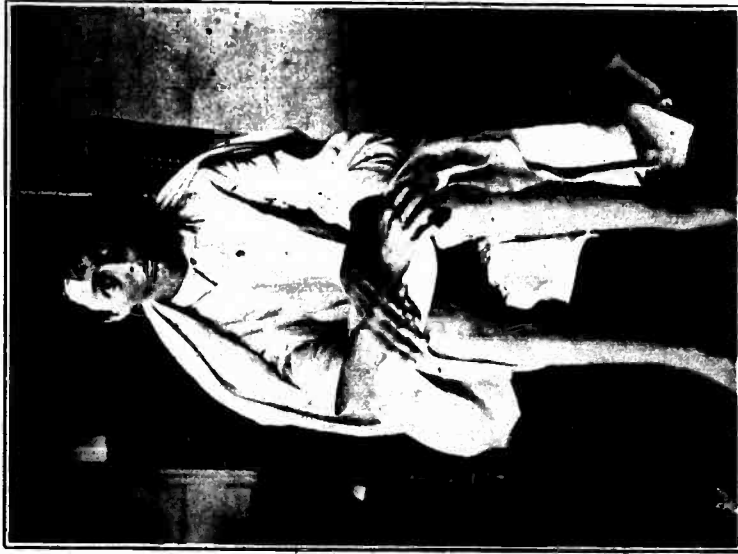


1. A 16-YEAR OLD VICTIM OF HOOKWORM DISEASE.



2. THE SAME GIRL AFTER TREATMENT FOR HOOKWORMS.

BUREAU OF EDUCATION



A. BOY SUFFERING FROM HOOKWORM DISEASE

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B. SAME BOY AFTER TREATMENT.

working independently could do for the people if it would, and one which no outside agency should do if it could. It was recognized that an outside agency can be helpful only in so far as it aids the States in organizing and bringing into activity their own forces. In this spirit the commission responded to invitations from State boards of health to cooperate in organizing the work in those States in which widespread infection had been demonstrated.

In the 11 States thus inviting cooperation a State director of sanitation was appointed by the joint action of the State public-health authorities and the Rockefeller Sanitary Commission. The State director is a State official, an officer of the State department of health, clothed with all the powers and responsibilities belonging to such position. He is the organizing and directing head of the whole work for the eradication of hookworm disease in his State and is responsible for the efficiency of the service. His work is done under the general supervision of the State department of health; he reports quarterly to the State department and to the commission.

Under the direct supervision of each State director of sanitation is a force of field directors of sanitation. These field inspectors are nominated by the State director and confirmed by the joint action of the State department of health and the commission. These inspectors constitute an ambulant service and devote their whole time to work in the field. It is these field directors who determine the geographical distribution and degree of infection, who determine the sanitary conditions responsible for the presence and spread of the disease. They enlist the cooperation of the physicians in curing the sufferers, provide for the treatment of the indigent, inspect schools, instruct the teachers, enlist the press, and, by lectures, demonstrations, and personal conference, teach the people the importance of getting all infected persons cured and how to prevent the spread of the disease by putting a stop to soil pollution.

As a definite diagnosis of hookworm disease requires a microscopic examination of the patient's stool, each State has a force of trained microscopists whose whole time is given to the examination of specimens received. This microscopic force is stationed at the State laboratory and in the field, in the latter case working with the field director.

The most effective teaching, whether of physicians, of editors, of school officials and teachers, or of the people, is by demonstration. The chief agency in this demonstration teaching has been the county dispensary for the free examination and treatment of the people. For this dispensary the county board of supervisors makes a small appropriation. The work is done by the field staff of the State board of health. The dispensary in a county runs usually from 6 to 8 weeks.

The following is a brief summary of the work done up to June 30, 1914:

Total number of persons microscopically examined.....	1,061,352
Total number of persons treated.....	599,486
Total number of counties making appropriations for county dispensaries ..	496
Total number of counties in which the infection survey has been completed.	488
Total number of counties in which the sanitary survey has been completed.	564

The work has required the services of 55 physicians, 40 microscopists, and 9 stenographers. It has been paid for in part by the county and State authorities, but in the main by the Rockefeller Sanitary Commission, which through the year will have spent about \$303,211.79. The work was undertaken nearly five years ago, after the gift of \$1,000,000 had been made by Mr. Rockefeller for the purpose.

To summarize briefly, the aim of the work has been—

1. To demonstrate to the people in each of the 11 States where work has been undertaken that hookworm disease is a reality; that it is a serious handicap; and that it is curable and preventable.
2. To make an infection survey that will give a reliable estimate of the degree of infection for each county in the State.
3. To make a sanitary survey which shall show for each county in the State the conditions of soil pollution which are responsible for the presence and spread of the infection.
4. To conduct an intensive educational campaign in every county where the infection is present; to teach the people by means of the printed page, by lectures, by exhibits, by demonstration, the importance to the community of getting every person examined and the infected treated; how the examination is made; how the disease is treated; how the infection is spread; and how it can be prevented.
5. To teach the practicing physicians of the State how to diagnose the disease and how to treat it; to teach them the importance of making examination for intestinal parasites a regular part of routine examination of all patients.
6. To get every medical school in the State to make provision for definite instruction in the diagnosis and treatment of intestinal parasites, to be given to all students as a requirement for graduation.
7. To enlist the press of the State in the work.
8. To see that the teaching of the dangers of soil pollution and how to prevent soil pollution is made a regular part of the instruction given in the public schools of the State.
9. To make at least one complete community demonstration; to select a rural community where the infection is reasonably heavy; to get every person examined; get every infected person cured; get soil pollution stopped; then tell the people of the State the story of how this one community has eradicated hookworm disease.

10. And, if possible, to help lay the foundation of a county and community health service that will in the end take care of hookworm infection and all other preventable diseases.

The following summary shows something of the growth of the work:

Total number microscopic examinations—	
In 1910.....	1, 020
In 1911.....	43, 308
In 1912.....	249, 958
In 1913.....	427, 401
In 1914.....	171, 078
Total number of persons treated—	
In 1911.....	70, 687
In 1912.....	151, 509
In 1913.....	120, 433
In 1914.....	39, 500
For each person treated the commission expended—	
In 1911.....	\$1. 77
In 1912.....	1. 03
In 1913.....	1. 45
In 1914.....	2. 21

Recently measures have been taken, where the dispensaries have done their work thoroughly, to follow the next logical step in the direction of permanent control of health conditions. In North Carolina the State board of health has secured for a number of counties and communities full-time health officers, who, in addition to fighting hookworm diseases, will do other needed health work. Instead of selecting a county and spending a short time there—the dispensary method—the board now has full-time men employed, who can remain until every case of hookworm disease is treated and cured. In addition to this, sanitary arrangements are being instituted for every home in the community, with a view to preventing hookworm disease, typhoid fever, and all other diseases due to soil pollution. One community, Knott's Island, in Currituck County, N. C., has already had the benefit of such intensive work. One community in Albemarle County, Va., and three communities in North Carolina, Salemburg in Sampson County, Castle Hayne and Wrightsboro in New Hanover County, Philadelphus in Robeson County, and Red Oak in Nash County are under this plan at the present time.

III. THE STATE DEPARTMENTS OF EDUCATION.

Cooperation between the State departments of health and education has been one of the most hopeful signs of progress in the movement for community control of health conditions. In no field has this cooperation been more practical or effective than in the work for the eradication of hookworm disease. The school authorities

have furthered in every way possible the efforts of the State health authorities in the various steps of survey, cure, and prevention.

In some of the States, notably Virginia, North Carolina, Alabama, and Kentucky, the alliance has been particularly close. The State health authorities have furnished bulletins on public health especially adapted to use in the schools, and the State school authorities have distributed these bulletins of information to all the schools in the States.

The "health catechism" has been a favorite form of publication. The purpose of the Virginia "catechism" is stated as follows:

School authorities throughout the Commonwealth have voiced frequently their need of a simple but comprehensive statement of the elementary truths of disease prevention. * * * It is to meet this demand that the board issues in this bulletin a catechism dealing with the great and fundamental truths of public health. As far as possible, technical terms and statistics have been avoided, and an effort has been made to state the answers as concisely as possible.

The catechism is prefaced by the following signed statement:

We commend to the teachers in the public schools of the Commonwealth the Catechism on Public Health prepared by the State board of health. We trust it may be used widely and feel sure that the time spent in teaching it will yield most valuable results.

R. C. STEARNES, *Superintendent of Public Instruction.*

JACKSON DAVIS, *Supervisor of Colored Rural Schools.*

JESSE H. BINFORD, *Executive Secretary, Cooperative Education Association.*

This catechism consists of three separate sections: (1) The germ theory of disease; (2) specific germ diseases; (3) general sanitation. To indicate the character of the questions, section 1 is here given in full, together with typical extracts from sections 2 and 3.

1. THE GERM THEORY OF DISEASE.

Question. What should be the normal state of the human body?—Answer. Strong and healthy.

Q. Why?—A. Because the human body is so constituted that, if cared for, it can overcome disease.

Q. If this is true, why are so many people afflicted with disease?—A. Because they allow the body to be weakened or exposed to disease.

Q.—Can one hope to escape all disease?—A. Not yet, because many diseases are of obscure origin and can not be prevented by means known at present.

Q. What name is given these diseases?—A. They are called the unpreventable diseases.

Q. Give an example of such a disease.—A. Cancer is so regarded.

Q. Is it probable that this and other diseases may in time be prevented?—A. Yes, as soon as we learn the cause and understand how to build up the body to prevent them.

Q. But what other great class of diseases is there?—A. The preventable diseases.

Q. What enables us to make a disease preventable?—A. To discover the cause and to be able to keep the cause from operating.

Q. Do we know the causes of all preventable diseases?—A. No; but when we do not know the cause we understand enough to prevent the carrying of the disease.

Q. To what are most of the preventable diseases due?—A. To very small plants in the body.

- Q. What are these plants called?—A. Germs or bacteria.
- Q. Do all the little plants called bacteria cause disease?—A. No, only a very few varieties of them are dangerous.
- Q. Can one see these germs?—A. Not with the naked eye, but very easily with an instrument called the microscope, which magnifies the germs.
- Q. How do these little germs grow?—A. Like any other plants, except that they may multiply very rapidly.
- Q. What do they require to grow?—A. The same conditions that other seeds must have to grow.
- Q. And what are these conditions?—A. The seed must be alive and must fall in fruitful soil under favorable conditions.
- Q. Will dead germs multiply?—A. Never.
- Q. What sort of "fruitful soil" do these germs require to cause disease?—A. They grow best in a body that is weakened.
- Q. And what "favorable condition" must they have?—A. To do their destructive work they must not be overcome in the body by anything hostile to them.
- Q. If germs will not grow in a body unless it is weakened, what great truth of prevention follows?—A. That if the body is kept strong and vigorous, the germs of disease will not grow and the person will not suffer from them.
- Q. And if the germs will not grow in the body if they meet anything hostile to them, what great truth follows?—A. That often we are able to build up a sick body so that it will overcome disease germs.
- Q. But is there not a better way to prevent disease?—A. Yes; to keep the germs away from the body.
- Q. Whence come the germs of disease?—A. Always from the body of some one who had the disease.
- Q. What great truth of prevention follows from this fact?—A. That if we kill the germs as they leave the body they will not attack other persons.
- Q. You have named three rules for prevention of disease. Repeat them.—A. Keep the body strong to resist disease. Destroy the germs that come from the body of the diseased person. Keep the germs away from the body.
- Q. If applied, will these rules suffice to prevent disease?—A. Yes; they would put an end to all preventable disease.

2. SPECIFIC GERM DISEASES.

[Questions on tuberculosis and typhoid are followed by those here given.]

- Q. There is another disease which is spread by carelessness in disposing of that which leaves the body. What is this disease?—A. Hookworm disease.
- Q. What will hookworm disease do?—A. It will keep a young person from growing and will make him pale and weak.
- Q. What causes this disease?—A. A very small worm, not more than half an inch long, which sucks the blood.
- Q. How does this worm cause the disease?—A. The worm grows in the body and lays eggs.
- Q. What becomes of the eggs?—A. These leave the body, hatch into little worms and may reenter the body.
- Q. How, then, may hookworm disease be prevented?—A. By taking care that everything that leaves the body is disposed of so that it can not touch anything that people use.
- Q. Can hookworm disease be cured?—A. Very easily, by a simple drug called thymol.
- Q. Who examines persons for the disease and gives treatment?—A. The State board of health, free of cost.
- Q. Name another disease caused by germs.—A. Diphtheria, a disease which affects the throat or nose.

Q. Is this disease very dangerous?—A. At one time it was and killed thousands of people.

Q. What causes diphtheria?—A. A germ which comes from a person who has the disease and lodges in the nose or throat of some one else.

Q. What will the germs do?—A. Grow and multiply in the throat or nose and produce a poison injurious to the whole body.

Q. Can this disease be prevented?—A. Yes, by keeping all those who have it where they can not come in contact with others and give them the disease.

Q. What else must be done?—A. We must be careful not to use pencils, drinking cups, and like things used by others.

Q. Can diphtheria be cured?—A. Yes; by the use of a great remedy known as diphtheria antitoxin.

Q. What will this antitoxin do?—A. It will overcome the poison caused by the diphtheretic germs.

Q. There is one very important rule about giving antitoxin. What is it?—A. To give it as soon as the disease is found to be diphtheria. Delay may mean death.

Q. There is another great disease caused by germs. What is its name?—A. Smallpox—a disease that once killed thousands.

Q. Has anyone ever found the germ of smallpox?—A. No; but we know it must be due to a germ because of the way in which it is carried.

Q. What is smallpox?—A. A fearful disease which causes high fever, very bad eruption, and pain, and leaves scars on the body.

Q. Can it be prevented?—A. Yes, more easily than any disease we know.

Q. How can it be prevented?—A. In one way only—by vaccination.

Q. Should everyone be vaccinated?—A. Yes; otherwise smallpox will spread.

Q. Is there any danger in vaccination?—A. None, if properly done.

Q. What is vaccination?—A. It is simply giving a person a very mild disease called cowpox to keep that person from having smallpox. * * *

3. GENERAL SANITATION.

Q. Why is the well so important?—A. Because if it becomes polluted with filth it may spread fever.

Q. Is unclean water dangerous when it does not contain the germs of fever?—A. Yes; because impure water weakens the body and makes one liable to disease.

Q. What is the important rule to remember about our wells or springs?—A. To have them in such a place and protect them in such a manner that no filth can enter them.

Q. How would you protect a well?—A. I would place it a long way from any outhouse or stable or pig pen, and would wall it carefully. I would carry the wall about a foot above the surface and would then cover the well with a tight plank floor. I would also grade the surface around.

Q. What are the most important things in making a school healthy?—A. A good outhouse, good ventilation, individual drinking cups, and good light.

Q. Why is the individual drinking cup so necessary?—A. Because where there is a dipper or common cup, if one person with disease drinks from the dipper or common cup, the next person drinking may get into his mouth the germs of that disease.

Q. Why is good ventilation so important?—A. Because without it we grow stupid and will slowly have our strength reduced.

Q. Why is good light so important?—A. Because unless we have it our eyes will be strained and our sight will be poor.

Q. How should one sit for the best light?—A. With the light coming over the left shoulder or from the left side. * * *

Q. Should the State and county protect the health of its citizens?—A. Above all else, for the health of the people is the greatest wealth.

Q. Should the State and county spend money for this purpose?—A. Liberally, because money spent in health work brings the most valuable return. * * *

The North Carolina State Department of Education has published a number of bulletins on health for the use of schools, as follows, each edition approximating 10,000 copies: 1. Eyes and Ears. 2. Ground Itch or Hookworm Disease, and Soil Pollution. 3. Health Talks. 4. Medical Inspection of Schools and School Children.

The prefatory remarks, written by Dr. J. Y. Joyner, State superintendent of public instruction, for two of these bulletins, indicate the sincere interest which schoolmen of the present day have for health work in the school and in the community. In one of these letters Dr. Joyner writes, in part:

To public school teachers:

This is the first of a series of bulletins on public health and sanitation, prepared by the secretary of the State board of health, at the request of the State superintendent of public instruction, for distribution to the public school teachers.

Every teacher is earnestly urged to read carefully every line of this bulletin and to observe the simple, practical suggestions contained herein. Every county superintendent is urged to insist upon the observance of these suggestions by every teacher and school committee. The first duty of every teacher and every school official is to protect the health and lives of the children committed to their care by providing for them healthful surroundings in schoolroom and on school grounds. Your careful attention to these simple suggestions will result in adding to the comfort and pleasure of your pupils, in improving the discipline, in stimulating intellectual effort and study, and may result in preventing much suffering and in saving human lives.

In matters of hygiene and sanitation example is better than precept, and the teaching of daily surroundings more effective than the memorizing from books of hygienic rules and laws.

Simple brief health talks should be given to all the children of the school by every teacher once or twice a week. This and the bulletins following it will contain helpful information needed for such talks.

Alabama has a specially prepared teacher's bulletin for use in the schools of the State, with an introductory note by the State director of campaign against the hookworm disease in the State. It is explained that—

This Teacher's Bulletin is intended to supplement—not to supplant—the various textbooks on physiology and hygiene used in the schools. Its purpose is to bring before the teachers the main facts regarding preventable disease and such statistics and data as are necessary to them in instructing pupils in hygiene and sanitation.

Legislative action on health matters is of little value unless supported by public opinion. Public sentiment can only be created by education, and education can best be begun in the schools. If every child who attends school be regularly taught the principles of hygiene and see them in effect each day at the school, he will leave with a bias in favor of hygienic principles and will become a focus for the dissemination of sentiment in favor of public-health movements and measures.

Kentucky is another State where special bulletins on health subjects have been prepared by the State board of health at the express request of the State educational authorities. The Kentucky bulletin includes a discussion of hookworm disease, soil pollution, and similar topics. The aim of the department is to put this book into the hands of every school child in Kentucky free of charge.

In 1910-11 every county teachers' institute had lectures by health officers, and the Kentucky State department of education had at all the summer institutes in 1913 an expert furnished by the State board of health, who lectured to the teachers and the general public on the problems of sanitation and preventable diseases.

In Arkansas State Supt. George B. Cook reports that the State department of public instruction has been very closely identified with the work of the Rockefeller Sanitary Commission since the work was first taken up in that State, and that his department is also cooperating to the fullest extent with the State board of health organized under the provisions of the legislative act of 1913. He declares:

This department is conducting a persistent campaign of education for proper sanitary conditions in schools and for the teaching of personal hygiene in all the schools. These related subjects are discussed in all public addresses and are made an important factor in the work of the inspector of high schools, of the two rural-school supervisors, and of the school-improvement organizer.

Not the least of the efforts of the State superintendents in aid of the hookworm campaign has been that of writing letters to the county superintendents of education, the teachers, and other influential citizens, expressing hearty sympathy with the campaign in progress and urging the most liberal cooperation. Supt. Cook's letter to the school directors of his State illustrates the effective appeal that can be made in this way:

To the school directors of Arkansas:

As you are aware, the general assembly of 1913 passed the act creating the State board of health and defining the duties of this board. In their earnest efforts to fulfill these duties, the State board of health is making every effort to enlist the cooperation of the school authorities for better sanitary conditions in and about our public schools. This department is in every consistent way cooperating with the State board of health to bring about better sanitary conditions, and each school director in the State is respectfully urged to lend his cooperation and assistance in this valuable and much-needed work.

I feel that it is not necessary in this connection to discuss with you the importance of the rulings of the State board of health with reference to our schools, for I feel that every director must realize that no greater service can be performed for the health and welfare of his community than to carry out, as far as possible, the orders and requests of the State board of health. I wish particularly to stress the necessity of erecting and maintaining sanitary toilets for each school building, a supply of wholesome drinking water, and the abolishment of the common drinking cup.

The cordial cooperation of various school boards throughout the State is necessary for the successful execution of the health laws, and it is urgent that every school board and school director assist the State board of health in the same spirit of helpfulness and desire for better conditions that actuate this department.

Kansas, while not one of the States where hookworm disease is a problem, offers a good example of State-wide health teaching in country schools. In the new course of study issued for use in all the rural schools of the State, special stress is laid upon sanitation and health-conserving agencies in general.



A. EDUCATING THE PEOPLE BY DEMONSTRATION AND LECTURE AT A TENNESSEE DISPENSARY.



B. A DISPENSARY IN ALABAMA.



4. AN ARKANSAS DISPENSARY.



B. MICROSCOPIST ON FIELD WORK IN GEORGIA.

In reporting on health teaching in Louisiana, State Supt. Harris mentions particularly the work of the State board of health in cooperation with the Rockefeller Sanitary Commission, emphasizing the fact that while engaged in the work of examining and treating school children and teachers "they give a great deal of instruction in other lines of health."

In Mississippi a valuable health work that means much for the hookworm crusade as well as for every other positive movement for good health is the work of the State school improvement associations, of which Miss Susie V. Powell is the director. By means of these associations, working through the State department of education, a special "clean-up and beautify day" has been observed by at least 2,000 schools and communities at the close of school in the spring and again at the opening in the fall. On these days the country people join with the teacher to put their schools in sanitary condition and make them as attractive as possible.

A special health-day program is issued and is observed by the same number of schools. On this day, in addition to the actual work done to improve health conditions about the school, a formal program is given to educate the people of the community in matters pertaining to general health.

One of the most successful ways of impressing the value of special instruction about hookworm disease has been to demand knowledge of it as part of an examination in hygiene and sanitation for the State and county examination for a teacher's license. The North Carolina examination for elementary certificate (five years) given in October, 1913, asked the following five questions; Nos. 4 and 5 apply, or may be made to apply, with considerable definiteness to hookworm disease:

N. C. STATE EXAMINATION, ELEMENTARY SCHOOL CERTIFICATE.
OCTOBER, 1913. (FIVE-YEAR STATE.)

HYGIENE AND SANITATION.

1. State three important regulations that should be observed in order to keep the digestive organs in good health.
2. (a) Give two reasons why the body must have air. (b) Tell how a schoolroom may be ventilated without causing unpleasant drafts.
3. (a) What are some of the benefits of exercise? (b) Discuss the need of rest and sleep.
4. Give three rules for the prevention of germ disease. How would you apply these rules to a case of (a) measles, (b) typhoid fever, (c) pneumonia?
5. What can you do personally to improve the sanitary condition of your own community?

Note.—Applicants for the county certificate may omit any one.

The questions asked on the corresponding examination the year before were notably direct in their application to preventive methods, especially with reference to the hookworm problem. Four of the 10 questions were as follows:

3. Name five important preventable diseases and state a method for the prevention of each.
5. In what ways has the microscope been a blessing to mankind?
8. If authorized by your school board to make a sanitary inspection of the school property and a report carrying recommendations, what would you consider with reference to—(a) The grounds; (b) the buildings; (c) the furnishings?
9. Seeing children as described below, what in each case would you attribute as the cause? What would you do about it?
 - (a) A child seems dull, stares at you, his head turned slightly to one side, and his mouth slightly open.
 - (b) A child wrinkles his forehead while studying, tires easily, and complains of headache.
 - (c) A child has prominent but listless eyes, protruding upper teeth, breathes through his mouth, and snores at night.
 - (d) A child has earache frequently and does not hear well.
 - (e) A child is pale, listless, undersize, puny, and backward.
10. What definite things have you accomplished as a teacher toward improving the hygienic and sanitary conditions of your school district?

Two of the questions for 1911 were: (1) What are the waste eliminating organs of the body, and what wastes do they eliminate? (2) What are the first visible symptoms of hookworm disease, and how may the spread of the disease in a community be prevented?

Of special practical interest in this connection are the textbooks on hygiene used in the various States. In most of the State lists of textbooks, works on hygiene and sanitation have replaced the books on formal physiology formerly in vogue. The publishers of Ritchie's Primer of Sanitation, which gives space to hookworm disease, report Florida, Georgia, Louisiana, North Carolina, Oklahoma, South Carolina, Texas, Virginia, and West Virginia as using the book.

One particularly effective method of health supervision on the part of the State departments of education, especially important for hookworm disease, has not yet been fully utilized. Wherever regulation of schoolhouses and grounds has been centralized, the State authorities have the power to insist upon sanitary disposal of filth, particularly on school premises. In Virginia and North Carolina this opportunity has been availed of in the matter of school privies; no new schoolhouses in these States will be accepted unless provision is made for privies that fulfill State requirements as to sanitation. Other States have exerted the same power to a greater or a less degree, but it is clear that its possibilities have only begun to be realized. With a State system of medical inspection such as has been inaugurated in a number of States extended to cover the whole State, and with a definite recognition of the power of the State authorities to condemn

absolutely any feature of school equipment—water supply, hygienic features of the schoolroom, sanitary privies, and the like—a big step will have been taken toward the elimination of hookworm and other preventable diseases.

IV. COUNTY SCHOOL AUTHORITIES.

The problem of more adequate supervision, a fundamental one in rural education, has certain important bearings on health control in the school and the community. As it happens, however, the States where hookworm disease is most serious are for the most part already under county supervision¹—usually considered the most efficient form—and are to that extent in a better strategic position to give help in the crusade. County superintendents of schools and county boards of education in the South have been vigorous supporters of the hookworm campaign. Typical of the attitude of the county school officials was the action of the conference of county superintendents of North Carolina, which, in 1910, the first year of the hookworm campaign, adopted by unanimous vote resolutions declaring:

Whereas we, the members of the State Association of County Superintendents of Schools of North Carolina, are convinced of the widespread prevalence of hookworm disease in the State, and that the disease occasions inestimable loss to the State in lives, vitality, citizenship, and material wealth; and whereas the disease is both preventable and curable: Be it

Resolved, That the association hereby pledges its cooperation in all well-organized movements for the eradication of the disease; and further realizing that such a movement has already been inaugurated, we recommend that the State take such steps as may be found necessary to aid in accomplishing the desired end.

In the campaign for controlling hookworm disease, the members of the county boards of education and the county superintendents of schools have been in close touch with the firing line. They have contributed their personal and official influence and their time in actual field work. Like the county commissioners, they have set an example by attending the dispensaries and having themselves and their families examined. This done, they felt no hesitation in urging their neighbors in all walks of life to do likewise. In many counties their example has created the right kind of sentiment among the people, established a precedent, and made a campaign successful which otherwise might have been a failure.

Officially every opportunity has been used to lend aid to the work. In some counties where the commissioners could not or would not provide the needed local county appropriations for the dispensaries it has been voted by the school board. In Louisiana amounts ranging from \$33 to \$100 have been appropriated by the parish school boards.

¹ District superintendents in Virginia and parish superintendents in Louisiana.

to aid in the free dispensaries for hookworm disease in each of the following parishes: Allen, Beaufort, Bossier, Caldwell, Union, Washington, and Winn. Henderson, Haywood, and Person Counties in North Carolina have made similar appropriations from the school fund. North Carolina has gone even further; it has a provision allowing the county boards of education, after providing for a six-months' term of school, to appropriate a sum not to exceed one-half the amount necessary for the employment of a whole-time health officer, whose duties shall include the medical inspection of the schools and grounds and a medical examination of the pupils.¹ The law declares:

The county board of education may also reserve sufficient funds * * * to pay a part of the cost, not to exceed one-half, necessary to employ a capable physician for his entire time as county health officer whose election meets with the approval of said board and whose duties shall be specified by the county board of health to embrace those provided for in that part of section 11, chapter 62, of the public health laws of 1911, relating to the medical inspection of schools and school children; and he shall lecture to the teachers in their meetings and supply them with printed instructions regarding measures for the proper care of the body, the recognition and prevention of disease, the recognition, prevention, and correction of physical defects, etc., and he shall keep an accurate daily record of the work he does under the provisions of of this act and make weekly, monthly, or quarterly reports giving such information as may be called for by blanks to be furnished by and returned to both the county board of education and the State superintendent of public instruction; and if the county health officer should neglect for a period of 90 days to carry out the spirit of this act, unless his entire time should be required to fight an epidemic of some contagious or infectious disease, the county board of education may, in its discretion, withdraw its financial aid in his employment.

The duties of this county health officer in so far as they pertain to the schools are prescribed as follows:

* * * he shall make a sanitary examination during the summer months of every public-school building and grounds in the county, and no school committee or teacher shall make use of any school building or grounds until the county superintendent of health shall certify in writing that said building and grounds have been inspected and found to be in a satisfactory sanitary condition within four months of the date of the certificate. He shall examine every school child that has previously been examined by the teacher according to methods furnished said teacher by the county superintendent of schools, and reported to said county superintendent of schools as probably defective in the condition of its eyes, ears, nose, or throat, and he shall further endeavor to have examined the feces of every child whom he suspects of having hookworm disease. He shall notify, on blank forms and in accordance with instructions furnished by the State department of public instruction, every parent or guardian of a child having any defect of the aforesaid organs, or hookworm disease, and he shall suggest to said parent or guardian the proper course of treatment and urge that such treatment be procured. He shall cooperate fully with the county board of education, the county superintendent of schools, and the teachers in the public schools, to the end that children may be better informed in regard to the importance of health and the method of preventing disease. He shall, through the county press, public addresses, and in

¹ Par. 2 of sec. 4116, public school laws of North Carolina.

every available way, endeavor to educate the people of his county to set a higher value on health, and to adopt such public and private measures as will tend to a greater conservation of life. Any violation of this section shall constitute a misdemeanor, and shall subject the defendant to a fine of not less than \$10 nor more than \$50.

In addition to this he is expected to instruct the teachers in the essentials of health work; presenting facts about the recognition, prevention, and cure of the common diseases; and indicating methods for detecting the physical defects so common in handicapping the progress of school children.

County school boards have given official sanction to the work in the form of resolutions. The following is a set of resolutions adopted by a parish school board in Louisiana:

Whereas it has been proven that soil pollution diseases, such as dysentery, both acute and chronic; typhoid fever, hookworm disease, and other intestinal parasites, are spread by means of soil pollution and other agencies, such as flies, which act as carriers, and

Whereas the schoolhouse is the center of education along all lines and a proper installment of sanitary methods is especially important to instill into the minds of the young at that early age which will insure sanitary habits in the future life of the child, and

Whereas a campaign for the eradication of hookworm disease and for better sanitation and improved sanitary conditions in Vernon Parish is now going on under the direction of the State board of health:

We, the parish board of school directors, in regular session convened, do pledge out hearty cooperation and support to this movement, and we instruct our superintendents of schools to have remodeled—where old buildings can be utilized—or to construct two new sanitary privies at each schoolhouse in the parish. This step is taken both as a preventive measure, and from an educational point of view.¹

The schoolrooms have been thrown open to the health officers for lecturing to the children or their parents, and as places for conducting the free dispensaries. Aid and encouragement have been given in having the children examined, and the infected ones treated. When the county superintendent could not be present he has written the teachers, bespeaking their cooperation in every way.

In many counties the county school superintendent has gone around with the health director on his weekly itinerary. The letters, however, have been among the most common methods employed by them in rendering assistance. Below will be found types of some of these letters:

NEWLAND, N. C., Aug. 16, 1914.

DEAR TEACHER: Dr. Jacocks, of the State board of health, is in this county conducting a hookworm and public health campaign.

These matters are of vital interest to every community, and the hookworm disease is especially important to the child life of the county. I wish therefore that you would take every means at your hand to get children and parents interested in this work.

¹ Extracts from the minutes of the meeting of the parish board of school directors of Vernon Parish, Apr. 5, 1913, p. 327.

Dr. Jacocks is going to visit as many schools as possible, lecturing and teaching by pictures and microscope. I shall be with him at as many places as I can, and whether I reach your place or not, I shall be glad if you will give him all the aid in your power when he comes to your school.

By all means get every child in your school examined. With best wishes, I am,
Very truly, yours,

FRANK A. EDMONSON,
County Superintendent of Schools.

JONESBORO, LA., August 18, 1913.

DEAR SIR AND FRIEND: Dr. Geo. M. Trezevant, of State board of health and hookworm commission, is now beginning a campaign in this parish for better sanitary conditions and the eradication of the hookworm. This is a work in which all good citizens of our parish are interested, and I am writing to you to request that you cooperate with us in making this campaign as effective as possible. I am sending you a circular by which you can see on what date we shall hold a meeting in your community. Please talk up this meeting among your neighbors and have us a good crowd present. This is a very important subject and one in which we are all interested. It means better health for our people and anything that makes for better health is a benefit in every respect. Better health means more prosperous people, more intelligent people, and happier people. Be sure to come to the meeting yourself and bring as many of your friends as possible. At all of the night meetings the talks will be illustrated by means of a stereopticon.

Thanking you in advance for your interest and cooperation in this great movement, I am,

Very truly, yours,

R. L. DICKENSON,
Parish Superintendent of Schools.

In the programs for county educational rallies, and conferences of committeemen and teachers, time has been generously shared with speakers on health topics. In some instances county school commencements have been features of the county fairs, or were held separately. This in North Carolina has become a great stimulus to the general interest in schools. In Kentucky the chautauquas have drawn wide attention. They combine for the county the work of the school forces, the health agencies, the farm demonstration work, the girls' tomato club work, the boys' corn club work, and the road-building agencies. Immense throngs attend these meetings and learn new truths about bettering their conditions along economic, health, social, and moral lines.

The future of health work in the counties lies in the hands of the county health officer. He must be a whole-time man, needless to say with special training for his work. He will work in close connection with the school authorities, and the effectiveness of his work will in large part depend upon the cooperation he secures from the school officials of the county.

V. THE INDIVIDUAL TEACHER.

The truism that "the teacher is the school" has special application in health work. The teacher's influence is all-powerful. The work of Hoag in Minnesota, as well as of other investigators, shows that the individual teacher can do much more in direct medical inspection than is usually recognized. No one would suggest that the classroom teacher, whether in city or country, should replace the trained medical man in diagnosis or treatment, but the judgment of the teacher is only second to that of the physician in reading the physical capacity or incapacity of the pupil from day to day in school. Similarly the work of the teachers in the Government Alaska service, where expert medical assistance is frequently out of the question, indicates how immediately valuable the teacher can be in guarding the health of the community. All the efforts of State and county authorities will go for little if they are not backed up by the individual teacher. The hookworm campaign has been fortunate in enlisting the whole-hearted support of teachers everywhere.

The teacher, poorly paid, living with the primitive sanitary conditions found at many of the homes, as well as at the school, comes in daily contact with the children. If they are healthy and bright, her work is satisfactory; if they are sick and backward, it is unsatisfactory and trying to the limit. She is exposed to the diseases which may find their way into the community through soil pollution, the "typhoid fly," contaminated drinking water, or any other channel. She has to adjust herself to the comforts in food and lodging representing the standard of the community, which, generally speaking, is not what she has been accustomed to have. Yet the cooperation of the teachers has been given so cheerfully and uniformly in the health work, and whatever else is intended to raise the standards of living to a higher scale, that her aid has been expected and given as a matter of course. She acquaints herself with soil pollution and hookworm disease in detail; and imparts this knowledge so forcibly and so frequently that habits of sanitary living and thinking are finally cultivated by the children. Instances have been reported where teachers have refused to open the fall term of school until privies were provided. The results of their untiring efforts will be carried by child to parent, and much immediate good will result at the homes; but with the next generation of parents will be seen the fuller fruits of the work.

The teachers have aided in getting every child to submit specimens for examination. The writer has recently seen the teachers bring the entire school in a body to the dispensary, not only that each child could be examined, but that he might see the microscope with which the examination is made, see through the powerful lenses

the eggs of the hookworm, and perchance the living larvae bursting forth from the egg; specimens of various intestinal worms; photographs of sick and cured patients; dispensaries, etc. The lecture of the director of the dispensaries is very interesting to school children. Where the distance is great, two or four horse wagons are employed in carrying the entire school to the dispensary.

The teachers have usually been very sensible in handling the children. They have taken the initiative in being examined, and always let the fact be known. Then the children, believing the example the teacher sets to be the proper one, will themselves in a very matter-of-fact way take the examination. Very few under such circumstances fail to be examined. From the school child the idea is accepted by the parents and older heads, and in many counties 50 per cent or more of the entire population have been examined. The teachers lecture to the children on health topics, and teach the lessons of hygiene and sanitation used in the regular prescribed course of study. The following set of questions in a quiz suggest the nature of this teaching:

HOOKWORM QUIZ AT DUNNSVILLE (VA.) HIGH SCHOOL.

Do you believe that there is a hookworm disease?

1. To what is the disease due? Describe the worm.
2. What are the symptoms?
3. How is the disease spread? What persons are most liable to catch the disease?
4. Give the life history of a hookworm from the time the egg is laid until the worm is back in the intestine.
5. Can the disease be cured? Which is the better—cure or prevention?
6. How can the disease be prevented?
7. Will a person that has the disease necessarily have it always?
8. Suppose you had charge of a hookworm patient; describe your treatment and precautions.
9. What can school children do to eradicate the disease in Essex?

Literature on hygiene and sanitation is distributed by the teachers from the State departments of education and of health, respectively. Frequently they hold mothers' meetings, where matters of vital concern to the homes are discussed; visit the various homes and in an inoffensive way prevail on the parents to improve sanitary conditions. Many of them are able to make the rudimentary tests for defective hearing, sight, etc., and often have succeeded in having corrected the defects that were found. Many instances have been reported, also, of teachers having essays written on health topics. Below will be found one written by a North Carolina girl 9 years of age, and another by a Louisiana girl:

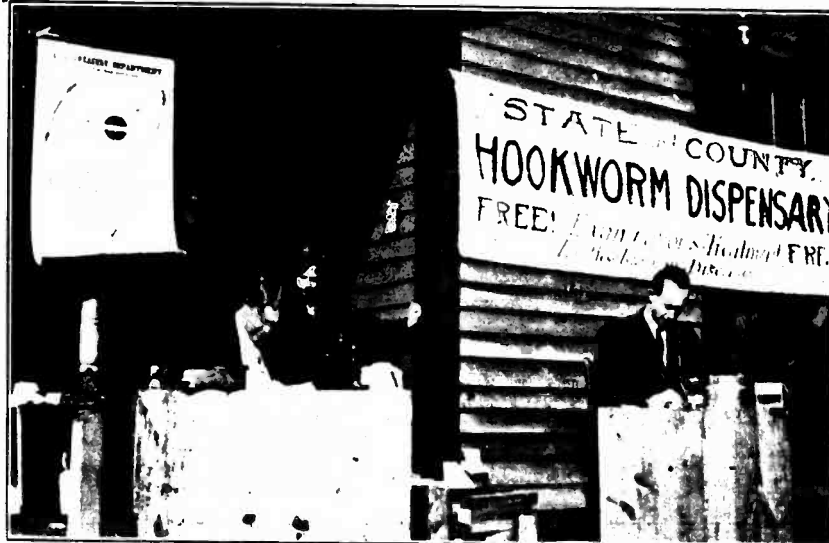
Mrs. Hurr: I won the first prize on my essay on Buster Brown. I dont know, as much about hookworms as I do Buster. Cousin Libbie does. Her boy had hookworms. The doctor gave him some medicine for them. Cousin Libbie got one of the worms I dont know how. She put it under a little glass. It was a little straight worm with



A. DISPENSARY EXHIBIT IN A NORTH CAROLINA COUNTY.



B. TYPICAL DISPENSARY SCENE, ALABAMA.



I. A NORTH CAROLINA COUNTY DISPENSARY IN OPERATION.



II. DEMONSTRATING THE KENTUCKY SANITARY PRIVY TO A GROUP AT THE STATE FAIR.

a hook on one end and a tiny black head. When we were in the country maama would not let us go in the cow lot near hog pens slop pails or dirty mud-puddles for the hook-worm lives in the ground by them. They get in your feet and make sores on them. Then they crawl up in your body mamma says, and hook on your insides, then they just eat all the time. They make you look pale and weak. You feel tired and lazy. But you can live a long time with the hookworms hooked up in you. More and more keep coming until you get full of them. Then I guess you die. Harry did not die. He got well and fat. Mamma says people in the north don't have hookworms like people in the south. I am going to try not to catch them. I guess my cousin in the north will not catch them. This is all I know about hookworms for I have not been to school but three terms. I will have to wait until I can study big books and learn more about them. I am nine years old, and go to the Hemenway School in Wilmington.

Yours truly,

LENORA E. KEEN,
205 Princess Street, Wilmington, N. C.

FEBRUARY 20, 1911.

[Composition submitted in contest by pupils of Roseland High School, La.]

HOOKWORMS.

The hookworm is a curious and interesting little animal, which has aroused a good deal of interest to the people of the South. A very tiny animal one might say to cause so much study and work. But when I tell you all about this queer little parasite, you will not wonder any more.

This tiny creature is about one half an inch long, and of a grayish color, sometimes a little red, this is caused by the blood which it has sucked. The head of this small worm is turned, reminding one of a hook. Examine the mouth, what do you find? Yes, little fang like teeth, these enable him to clutch upon the walls of the intestines and stay without trouble. Look how its tail is broadened out. The female hookworm is the one we are more interested in, for it is she who does the most damage. Look at her body, see the little organs. In these organs are tiny eggs which she lays in the intestines of our body. These eggs are passed out with the waste matter and if deposited in the right soil will hatch out in twenty-four hours.

Here we come to the life process of these many baby worms, our little enemies. If the soil is wet, and filthy these babies thrive. It is along the cow pens and filthy water that they live. A queer place indeed to live, but a better place cannot be found to suit these small parasites. After these little worms have been hatched they begin to eat and grow. They keep this up for about eight days then they stop eating and growing. But while they do this they shed their skins twice. The second time they shed their skins they form a shell or thin layer of skin around themselves, and lie for several months without eating because they have stored up their food in those eight days they were growing, they thus lie dormant until some healthy, plump, rosy cheeked boy or girl comes along with his or her barefeet splashing and slashing through the mud and filthy water, never dreaming of the little enemy who is boring itself into their skin. Oh yes, their feet itch, and they say it is ground itch, but our small parasites know better, they finally bore their way into the skin, and the blood which is circulating around in its daily work, carried these little creatures to the lungs, they reach the mouth and are swallowed, and then they finally land in the place where they have been trying to get, to the walls of the intestines and suck away the blood from the body. These little worms suck away until at last the healthy little barefeet child with his rosy cheeks and brilliant eyes and bright ways becomes a different sort of little fellow.

It affects him so that his complexion becomes tallowy or waxy white, that is if a great many of these little worms have bored their way into his body. His brilliant eyes and merry ways are lost, the rosy cheeks have fled, and a tired unhappy little fellow we see before us. His shoulders droop, and the bones of his chest one can plainly see—The cry, "I am as hungry as a bear," gives way to—"I don't want anything to eat." But it is not only the barefoot boy or girl who is troubled with these little animals. Thin shoes, and worn shoes on the adults who do not discourage him, for he bores his way through the leather. He also gets on the vegetables which have been highly fertilized and often we swallow him. So be careful and not eat anything unless it is thoroughly cleansed. Often young men and women are stunted in their growth and look like little dwarfs.

But you look at me with dismay and ask, "Is there no cure for this?" No cure? ask Dr. Adams and he will tell you there is. But wait, don't bother him, for he has enough on his mind as he is doing a great work for the school children and people of the South. I will tell you myself. It is very easily done. First I will ask Dr. Adams to leave some medicine, for you next time he comes to visit me and on the envelope will be directions. If you are examined properly, and find you have a great many of these tiny creatures in your body, the doctor will probably tell you to take about three treatments, but by the way you have given me your attention I think one treatment will be sufficient unless your case is a severe one.

RUTH SMITH,

10th grade, Roseland High School, Tangipahoa Parish.

Debates on the importance of one disease as compared with another have been entered into in a very lively and original way in certain schools. The following was taken down in shorthand by Dr. Boswell, of Mississippi, in a public-school debate in Alcorn County.

"RESOLVED, THAT THE HOOKWORM IS A GREATER PEST THAN THE TYPHOID FLY."

Miss Fannie Mac Wright, in opening the debate, said in part as follows: Hookworms are more dangerous than the fly, as they are not only more numerous but are more serious. They get into the body through the skin and pass through the blood to the heart. Now, think of anyone with such a thing in his heart. After getting in the bowels he sucks the blood "just like the mink does the chicken when he kills the animal by sucking his blood, so does the hookworm kill the human by sucking his blood." It causes paleness, weakness, and causes some of them to eat dirt and their clothes. [Quotes the report of Dr. Stiles's case where the boy ate the coats.] Think of the loss in this way. Hookworms cause more trouble because of the long-standing disease. It also weakens the body and helps the fly to give the person fever. All the cases of typhoid can not be charged to the fly, as there are many other ways of getting the disease.

More than 2,000,000 people have hookworm disease, and many of the deaths from fever are traceable to the weakened condition as a result of hookworms. They also cause a lack of mental development, even going into insanity, and are an expense to the Government to care for. Sluggishness is caused by hookworms. Many cases in children are invalids and require the assistance of some member of the family constantly, causing loss to the family in work.

Miss Frances Allen, in opening the discussion for the negative, said in part as follows: The most dangerous animals are the lion and rattlesnake, both of which give warning before springing on their prey, but the fly, with all his dangerous load of germs, comes upon us unawares.

In 1873 Dr. Nichols first called attention to the fly as a possible factor in the spread of disease.

It takes about 10 days for the fly to develop. It is possible that one fly may have a family of 195,330,535,000.

There are many families of flies, but the ordinary house fly is the fly that gives us the most concern, as was shown by Dr. Sternberg's report of typhoid during the recent War with Spain. Nations go to war, but it is left to the fly to fire the first gun.

They are much worse than the mosquito, because they may carry many kinds of germs, as was proven by a recent examination of 14 flies, and they found 6,000,000 germs on them. In the State of Washington 9 per cent of deaths are due to typhoid. New York, it is said, has 20 deaths per day as a result of the flies' activities.

We should all act as a committee of one to eradicate the fly.

Gladys Timbes, for the affirmative: Hookworm disease is a very serious thing, because of the damage done the human body and the great number of cases. [Here she exhibits a book on the disease by Dock and Bass showing the pictures of various families and talking briefly on each.] Shape, round and curved; size of a small hair pin. They lay eggs that hatch in the soil. The young worm sheds his first skin in a short time and then another one, which he stays in for protection, and crawls down into the soil; then, when some one comes along barefoot, as people do in the country, they get into the skin. It is said that they are able to bury themselves in the skin in about eight minutes.

We may get them also from eating raw vegetables from dirty gardens.

In Hungary it is said that they had 95 per cent infection and reduced it to 35 per cent by fighting it.

Lenoir Alvis, for the negative: The house fly is more dangerous. My opponents say that screens will protect from the house fly; so will the sanitary privy protect from the hookworm.

The fever is given to us in such a way that we are most dead before we know what is the trouble. You can live a long time with hookworm disease, but typhoid kills soon.

Rupert Alvis, for the affirmative: It is undoubtedly more dangerous than the fly, when most every house in our community has felt the effects of it by the children having toe itch and not being able to work, as some of my opponents have been, and we have had very few cases of fever. I am sure that we have 10 cases of hookworms to 1 of typhoid, and then, too, hookworms weaken the person so that he really helps the fly give him fever. They also help to give consumption, diphtheria, and many other diseases, by making the person so weak that he is not able to fight off the other diseases.

Hookworm disease causes the boys to drag around the streets and interferes with them at school, keeping them back in their studies. And it also causes a degeneration in morals which may account for some of our criminals.

Lillie B. Wright, for the negative: If hookworms are such a danger to the human family, as my opponents would have you believe, why didn't the Lord send them as a plague to Egypt instead of the fly?

The reason that the house fly was not called the "American murderer" was because no one happened to think of him as such. It is impossible to destroy the danger of the fly by screens, because in most families they have children that will leave them open and allow the flies to enter.

Typhoid is more dangerous because it kills at once, and hookworm disease will live for a long time. One can wear shoes and keep off hookworms, but the fly will creep up on you and give you the fever before you know it.

Guy Greene, for the affirmative: Glad to be on the hookworm side, as I have had some experience with typhoid and know that the fly did not give me the disease. Hook-

Worms cause ground itch and pass from the skin through the blood and get into the stomach. It not only hurts them, but ruins their looks.

In many schools the infection is almost 100 per cent, and in cotton factories very high. It causes poverty, and possibly this is the cause of many of them eating dirt and other filth.

It is much easier to protect against the fly. Hookworms cause weakness, dizziness, and the child does not grow, and worst of all hinders in the education of the children, many students failing in examinations.

If the fly was the worse enemy why was it not called the American murderer?

Miss Adah Timbes, for the negative: So many cases of typhoid are gotten from water where the fly has carried the germs, we do not suspect the danger. By wearing shoes we are secure against the infection of hookworms.

So far as eating dirt, it is purely a lack of food and would not be done if they had anything else to eat in sufficient quantities.

Flies not only scatter disease in the kitchen, but to the bedroom as well. They bring us the germ of typhoid where we never would get hookworms except by going barefoot.

Clifford Greene, for the affirmative: Hookworms are worse of course. As one of my opponents said something about flies multiplying, I will give you a few things about the hookworm. It is possible that one worm will lay 2,400 eggs in 24 hours, in one year 8,765,000.

I notice in a sanitary edition of one of our papers a picture [exhibits the paper] showing a section of skin with 47 worms in it. These will lay 4,011,728 eggs the first year.

Hookworms are scattered all over the South and cause toe itch. They may be gotten in several other ways. Many poor people all over the South are in a very critical condition on account of this disease. It causes headaches, stomach troubles, eye troubles.

[He exhibits a picture showing two of the parasites in the lung and calls attention to the great danger of infection in this wound. He calls attention to his opponent's statement of the children leaving the screens open and letting in the flies, and shows them that by the use of a spring it would be impossible for them to do so.]

George Ragan, for the affirmative: The fly is only a carrier and the hookworm is producer of the disease. He is about five-eighths of an inch in length, curved like a hook, and is called the American murderer. He gets into the body through the skin and passes to the stomach. It is said that they can enter the skin in eight minutes.

They pass through the blood to the heart, then to the lungs, up to the mouth, and are swallowed. They fasten themselves on to the stomach wall and suck the blood. This weakens the stomach and it can't perform its work, causing many of the severe cases of indigestion that we see about over the country. The worm lives at the expense of the human body.

The germ of typhoid is not near so large as the tip of the worm's tail and couldn't do so much damage. Both of them multiply fast enough.

Typhoid only kills about 5 per cent and if one has the fever he is aware of it, but you may have hookworms and not know it for a long time. All this time you are giving it to other people, and still have the same ones eating your blood.

No doubt many die from the disease, and it is called heart failure or dropsy. We can screen against the fly, but we can not against the worm. It is also almost impossible to get people to wear shoes all the time.

Miss Alma Wright, for the negative: Flies are a greater pest than the hookworm. Typhoid fever is caused by a germ, and a person may carry the germs for years after having recovered from the disease and discharge them to be given to some one else by the fly. [Here she draws a picture of the fly's foot, showing how it is possible for one fly to carry many hundred germs.] Flies bring the germs from filthy places and give

them to unsuspecting persons, while we must get out and get hookworms. Hookworms do not multiply in the body as do the germs, and a person may have a few that will never hurt them.

During the Spanish-American War, when 120,000 men were mobilized, in that crowd there was somewhere a typhoid carrier who deposited the germs in the bounds of the camp; then the fly carried it to the mess tent, and as a result four times more men died from disease than were killed. Hookworms are outlived in a few years. Germs increase much faster than worms.

As to dirt eating and eating of the clothes, I doubt it.

Flies carry the germs from the filthy privies to the water and to the dining room, and no doubt in this country, where the privies are in the orchards, many of the germs are deposited upon the fruit and eaten by the people. The worms are in the ground, and by the mere precaution of wearing shoes we can protect against them.

So far as the mental effect is concerned, many are sent to the asylums from the results of typhoid.

Hookworms are often found in children, and they may outgrow them. The picture of the family exhibited was indeed bad, but suppose you could see one of a family with the fever. Flies carry other diseases than typhoid. Hookworms are all over the South; so are flies, and in the North, too.

Dr. Boswell, who furnishes this report, says:

I have tried to give the exact words of the papers as I took them from listening to the debate. I have never spent a more enjoyable time and was never so surprised as when the children brought out the ideas so clearly and with such accuracy.

PREVENTIVE WORK.

In this health teaching, not only in the grades, but in the high school, there is an encouraging tendency to emphasize the preventive phase of health work. The "physiology" of a few years ago has become quite regularly "hygiene and sanitation"—positive instruction in conserving good health. In some of the secondary schools specific courses of the newer type are given. In the high school at Mannington, W. Va., for example, there is a course in hygiene and sanitation of 18 weeks. The work of the first 12 weeks of the course is based upon Hough and Sedgwick's *Elements of Hygiene and Sanitation* as a text. Numerous reports and papers are required of the pupils. These reports and papers are given upon special topics assigned by the instructor with definite reference to such books as Pyle's *What Health is Worth to Us*, Pyle's *Personal Hygiene*, Blaikie's *How to Get Strong and How to Stay Strong*, Eddy's *Text in General Physiology and Anatomy*, Sinclair and Williams's *Good Health and How We Won It*, and various magazine articles.

The last six weeks of the course are devoted to the study of special topics on sanitation, and the work of this period is based upon United States Government bulletins as text matter. The bulletins are supplemented by other reading matter and investigation of local conditions by the pupils. To emphasize the importance of the investigations, an address on sanitation problems is given to the

class by the city health officer. The Government bulletins used in the course this year are as follows:

1. The rat, a sanitary menace and public burden.
2. Tuberculosis, its prevention and nature.
3. Vegetables as a possible factor in dissemination of typhoid fever.
4. Antityphoid vaccination.
5. Medical inspection of schools.
6. Disposal of sewage and garbage of foreign countries.
7. The purification of public water supplies.
8. Study of the typhoid fly, its extermination.
9. Study of the mosquito, its life history.
10. What the mayor and council can do for the sanitary conditions of a town.

Of practical value to the teacher, especially in rural schools, is the Outline for the Health Grading of School Children, drawn up by Dr. Ernest B. Hoag for the Minnesota schools. With this non-technical but fundamental survey the teacher or parent can make a worth-while beginning in the elements of health supervision. Both parts of the survey are here given:

HEALTH SURVEY—PART I.

[Questions to be answered by pupil or parent.]

Name..... School.....
Date..... Grade.....

1. How old are you?
2. Have you ever had much sickness?
3. Are you well now?
4. Do you eat breakfast every day?
5. Do you eat lunch every day?
6. Do you drink coffee?
7. Do you drink tea?
8. Do you have your bedroom window open or shut at night?
9. Have you ever been to a dentist?
10. Do you own a toothbrush?
11. Do you use a toothbrush?
12. Do you have headache often?
13. Can you read easily what is written on the blackboard?
14. Does the print blur in your book?
15. Do your eyes trouble you in any way?
16. Do you often have earache?
17. Do your ears often run?
18. Can you hear easily what the teacher says?
19. Is it hard for you to breathe through your nose?
20. Do you have sore throat often?
21. Do you tire easily in school?
22. Do you work any out of school hours?
23. What kind of work?
24. How much?

HEALTH SURVEY—PART II.

[Questions to be answered by the teacher.]

A. GENERAL APPEARANCE.

1. Is the child healthy appearing?
2. Is his color good?
3. Is he physically well developed?
4. Is he free from apparent deformities?
5. Has he a good standing posture?
6. Has he a good sitting posture?
7. Are the shoulders even?
8. Does the child walk normally?
9. Are the ankles straight when the child walks?
10. Is the physical age of the child apparently equal to that of his actual age?

B. MENTAL CONDITIONS.

1. Is the child normally advanced in school?
2. Is he mentally alert?
3. Does he answer ordinary questions intelligently?
4. Does he play normally?

C. NERVOUS CONDITIONS.

1. Is the child good tempered?
2. Is he free from abnormal emotion?
3. Does he have good powers of muscular coordination?
4. Is the child free from spasmodic movements?
5. Is he free from the nail-biting habit?
6. Does he speak without stammering?
7. Is he free from pronounced peculiarities such as irritability, timidity, embarrassment, cruelty, moroseness, fits, general misbehavior, etc.?
8. Is he apparently free from bad sexual habits?
9. Is he free from so-called "bladder-trouble" (requests to "go out")?
10. Is he usually free from complaints of headache?

D. TEETH

1. Are the teeth clean looking?
2. Are the teeth sound looking?
3. Are the teeth regular?
4. Does the child use a toothbrush every day?
5. Are the gums healthy looking?
6. Are the upper teeth straight (not prominent)?

E. NOSE AND THROAT.

1. Does the child ordinarily breathe with the mouth closed?
2. Is he free from nasal chronic discharge?
3. Is he free from "nasal voice"?
4. Has he a well-developed face?
5. Has he a well-developed chin?
6. Has he straight, even teeth?
7. Is the child mentally alert?
8. Is he usually free from complaints of sore throat?
9. Is the hearing good?

F. EARS.

1. Does the child usually answer questions without first saying "what"?
2. Is he fairly attentive?
3. Is he fairly bright appearing (not stupid)?
4. Does he have a voice with good expression (not expressionless)?
5. Does he spell fairly well?
6. Does he read fairly well?
7. Is he free from complaints of earache?
8. Is he free from ear discharge?
9. Is he free from any peculiar postures which might indicate deafness?

G. EYES.

1. Are the child's eyes straight?
2. Is he free from chronic headache?
3. Does he do his work without fatigue?
4. Is he free from squinting or frowning?
5. Is the child free from postures which might indicate eye defects, such as leaning over too near the desk, holding the head on one side, etc.?
6. Are the eyes free from redness and discharge?
7. Are the eyelids healthy looking?
8. Can the child read writing on the board from his seat?
9. Have the eyes been tested separately with the Snellen test type?

Teachers may use their own judgment about this test.

H. DISEASES OF THE SKIN.

1. Is the head free from signs of disease (lice, ringworm)?
2. Is the skin healthy looking?

I. ERUPTIVE DISEASES.

The following points often indicate the early signs of transmissible diseases in children. They will, of course, not ordinarily be observed at the time of making this health survey.

- | | |
|------------------|------------------------------|
| 1. Flushed face. | 6. Nasal discharge. |
| 2. Lassitude. | 7. Persistent cough. |
| 3. Vomiting. | 8. Scratching of the skin. |
| 4. Eruptions. | 9. Sore throat. |
| 5. Red eyes. | 10. General aches and pains. |

The school authorities, in former years, in endeavoring to meet what seemed emergencies, gave their efforts primarily to work in training the minds of the children they received; and only secondary consideration was given to the health and physical preparation of the children for school. A broader policy is now being pursued. "Where a State for its own protection compels a child to go to school, it pledges itself not to injure itself by injuring the child." If a child who is diseased, defective, or otherwise handicapped is forced to compete with a normal, healthy child, he is overburdened and is subject to a more complete wrecking of his mental or physical well-being. If his ambition is stifled and he refuses to compete, he is likely to grow up to swell the ranks of the unemployed and unemployable. In spending "pence on children rather than pounds on paupers," the schools are strictly within the province of their duties and responsibilities, and are fulfilling their highest mission.

In outlining here what the school authorities are doing for the health of the children, for the prevention of soil pollution, and of disease in general, it is not intended to imply that every teacher or every official has done the things enumerated. However, most of them have, and I believe that as soon as it is practicable, the commendable work will be more or less uniform throughout all the States and counties. Medical men engaged in health work have watched keenly the growing activity of the schools in preserving and safeguarding the health, vitality, and life of the children; and many of them feel that no words of commendation can speak too highly of the progress made and the results accomplished. The attitude of the public school forces is, and has been, all that could be asked.

VI. THE SCHOOL AS A MODEL OF SANITATION FOR THE COMMUNITY.

It is the general testimony of those who have investigated actual rural conditions that the rural school is ordinarily inferior in building and equipment to the average farm dwelling of the community it

serves. Certainly in respect to sanitary facilities it has been a disgrace to American civilization. Recently, however, much has been done toward making the school house and grounds in the country what they should ever be—a real model for the community to follow. In States where the rural movement is at its best, particular attention is paid to the two fundamentals of water supply and sanitary privies.

Many of the States where hookworm disease has to be reckoned with have incorporated sanitary privies into the demands for standardization of rural schools. Georgia requires two separate sanitary privies for a standard rural school, and up to December, 1913, 39 schools had qualified as standard. Score cards for rural schools, such as those adopted in West Virginia and Arkansas, regularly assign several points to toilet provision. Arkansas credits 2 points out of a total 100 for "two good outhouses, well kept and clean." In North Carolina—

All plans for new schoolhouses must include plans for sanitary privies [as specified in a special bulletin], and the construction of these must be included in the building contract before approval by the State superintendent of public instruction.

This requirement has the force of law. Virginia now requires that—

Every building used for public school purposes shall be furnished with two closets, one for males and one for females, separated as far as possible from each other and so arranged to give the greatest possible privacy to persons using same.

Buildings to which water and sewerage are available shall be provided with water closets and connected with the sewerage system. Where water and sewerage are not available, buildings shall be provided with dry closets, built and maintained in accordance with the standard given in these regulations on dry closets. Such closets shall be at all times maintained in a clean and sanitary condition.

SPECIAL REGULATION FOR SANITATION OF PUBLIC SCHOOLS.

Whereas many public schools in Virginia are not provided with proper sanitary conveniences, and whereas such conditions are dangerous to the health of pupils and to the public health: Therefore be it

Ordered by the State board of health, That from and after September 1, 1912, no buildings shall be used for public school purposes in Virginia unless same shall be provided with two sanitary privies and maintained in accordance with regulations of this board.

Be it further ordered, That officers and agents of the State health department are ordered to proceed with enforcement of this law in any case of violation of its provisions observed after September 1, 1912.

Various methods have been adopted by school officials to arouse public sentiment on the problem of the insanitary privy. A. H. Mathewson, of supervisory district No. 3, Cattaraugus County, N. Y., recently mailed a circular letter to all the residents of his district, calling attention to the prevailing type of privy in country schools. His circular was illustrated with photographs of the bad things, as well as of the desirable things that could be substituted—forms of

chemical closets, etc. In his letter he describes conditions easily recognizable in the vast majority of rural schools; denounces school trustees who vote for good school buildings of a modern type, but neglect to provide anything better than the old-time vault privy; and urges that the new form of closet be installed within the school building instead of outdoors. "I believe the closets should never be set off somewhere in a corner of the lot, in seclusion behind a fence," he declares, calling attention to the menace to morals in the outdoor privy. In explaining his method of reaching the people in his community, Supt. Mathewson writes to his fellow superintendents:

DEAR SIR: Probably we agree that one of the worst conditions of the rural school—if not the worst—is the closet or outbuilding. While I realize that personal touch with the trustees and people is most efficient, I consider that I can not touch many of the residents in a short time; so I do the best I can by circular letter. Of course the letter helps. I send it to all parents and others interested in schools, teachers and "kickers." The problem is to teach fundamental scientific principles so that the people will demand better conditions for themselves. I believe we must make some use of "sentiment" in order to do the most.

Some people will blush perhaps because of some old idea of so-called modesty. I state the facts as they are, with no spirit of malice, but to give the bare truth, which I believe will solicit the cooperation of the decent people of the district. Internal improvement coming voluntarily from the people will be lasting, if we can only arouse the people to their duty. Of course we must do some preaching to stir some people who are always thinking of that tax rate and use force and authority as last resort.

I have sent out circulars on the jacket stove heater, and if I can find the funds I shall send out circulars on seats, the drinking water supply, etc.

I take up one thing at a time. I send this to you to invite an exchange of our efforts through letters, or work from the desk. I believe we may profit by the exchange of ideas, and I am willing to go that much deeper in my pocket to mail letters to other superintendents who will also favor me.

ESSENTIALS OF A SANITARY PRIVY.

No problem is of more fundamental importance to rural life than that of disposing adequately of human excrement. It has been repeatedly stated in this bulletin that hookworm disease would be impossible without soil pollution, and soil pollution is directly due to the lack of sanitary privies. Theoretically the remedy for soil pollution is simple, and should be provided with enthusiasm everywhere in the country, at every farmhouse and at every school. Practically its application is very difficult. Ingrained habits must be changed, and to accomplish this requires that people be educated out of the present uncivilized custom to the point where they will gladly devote the necessary time and money for the construction and use of sanitary facilities for night-soil disposal; in other words, sanitary privies.

What constitutes a sanitary privy? The term is applied to various contrivances, from a pail with a lid and directions for properly disposing of its contents, to the large, expensively constructed, more or

less automatic septic tanks. The great difficulty has been, first, to collect the excreta in water-tight, fly-proof receptacles; and second, to devise simple and practical means of disposing of it in a way to satisfy sanitarians. All plans approaching the ideal thus far presented seem to be too expensive or otherwise impractical. The feeling is growing that some practical arrangement should be recommended, even though from the standpoint of the idealist it is not without danger.

Sanitarians are now recommending as a minimum for a privy, first, that a hole be dug in the ground; second, that a substantial box with a hole in the bottom be turned upside down over the hole in the ground and dirt banked around the lower edge of the box; third, that the hole in the bottom of the box be covered when not in use; fourth, that the box be moved from time to time and the pit be filled up with dirt. This privy may be built out in the bushes or it may be within expensively constructed walls. For all practical purposes an arrangement of this kind will insure the destruction of hookworm eggs, and so long as it is fly-proof it will guard against the spread of typhoid fever by flies. If located a reasonable distance from the spring or well, the danger of pollution is negligible, except perhaps in certain areas where the formation is largely limestone.

This is, of course, the lowest kind of a minimum requirement. No school should satisfy itself with anything so meager, except as a temporary improvement on nothing at all. A number of the States have published bulletins describing in simple terms the construction of sanitary privies of every type, from the simplest outdoor privy to complete septic tank arrangements for schools or country residences. It is not the purpose of this bulletin to go into the details of construction, but appended herewith is a list of pamphlets from which detailed information may be obtained. Only such pamphlets are here mentioned as are easily accessible in some local library, or may be obtained free or at a nominal cost from the Government:

Dresslar, F. B. *Rural Schoolhouses and Grounds*. Washington, Government Printing Office, 1914. (U. S. Bureau of Education. Bulletin, 1914, No. 12.)

Chapter XII describes a number of types of privies, with detailed plans and specifications.

Stiles, Charles Wardell. *The Sanitary Privy. Its Purpose and Construction*. Department of the Treasury. Public Health Bulletin No. 37, 1910.

— — — and Lumaden, L. L. *The Sanitary Privy*. Department of Agriculture. Farmers' Bulletin 463.

BULLETIN OF THE BUREAU OF EDUCATION.

[Note.—With the exceptions indicated, the documents named below will be sent free of charge upon application to the Commissioner of Education, Washington, D. C. Those marked with an asterisk (*) are no longer available for free distribution, but may be had of the Superintendent of Documents, Government Printing Office, Washington, D. C., upon payment of the price stated. Remittances should be made in coin, currency, or money order. Stamps are not accepted. Documents marked with a dagger (†) are out of print.]

1906.

- †No. 1. Education bill of 1906 for England and Wales as it passed the House of Commons. Anna T. Smith.
- *No. 2. German views of American education, with particular reference to industrial development. William N. Hallmann. 10 cts.
- *No. 3. State school systems: Legislation and judicial decisions relating to public education, Oct. 1, 1904, to Oct. 1, 1906. Edward C. Elliott. 15 cts.

1907.

- †No. 1. The continuation school in the United States. Arthur J. Jones.
- *No. 2. Agricultural education, including nature study and school gardens. James R. Jewell. 15 cts.
- †No. 3. The auxiliary schools of Germany. Six lectures by R. Maennel.
- †No. 4. The elimination of pupils from school. Edward L. Thorndike.

1908.

- †No. 1. On the training of persons to teach agriculture in the public schools. Liberty H. Bailey.
- *No. 2. List of publications of the United States Bureau of Education, 1867-1907. 10 cts.
- *No. 3. Bibliography of education for 1907. James Ingersoll Weyer, Jr., and Martha L. Phelps. 10 cts.
- †No. 4. Music education in the United States, schools and departments of music. Arthur L. Manchester.
- *No. 5. Education in Formosa. Julean H. Arnold. 10 cts.
- *No. 6. The apprenticeship system in its relation to industrial education. Carroll D. Wright. 15 cts.
- *No. 7. State school systems: II. Legislation and judicial decisions relating to public education, Oct. 1, 1906, to Oct. 1, 1908. Edward C. Elliott. 30 cts.
- No. 8. Statistics of State universities and other institutions of higher education partially supported by the State, 1907-8.

1909.

- No. 1. Facilities for study and research in the offices of the United States Government in Washington. Arthur T. Hadley. 10 cts.
- No. 2. Admission of Chinese students to American colleges. John Fryer.
- *No. 3. Daily meals of school children. Caroline L. Hunt. 10 cts.
- †No. 4. The teaching staff of secondary schools in the United States; amount of education, length of experience, salaries. Edward L. Thorndike.
- No. 5. Statistics of public, society, and school libraries in 1908.
- *No. 6. Instruction in the fine and manual arts in the United States. A statistical monograph. Henry T. Bailey. 15 cts.
- No. 7. Index to the Reports of the Commissioner of Education, 1867-1907.
- *No. 8. A teacher's professional library. Classified list of 100 titles. 5 cts.
- *No. 9. Bibliography of education for 1908-9. 10 cts.
- No. 10. Education for efficiency in railroad service. J. Shirley Eaton.
- *No. 11. Statistics of State universities and other institutions of higher education partially supported by the State, 1908-9. 5 cts.

1910.

- No. 1. The movement for reform in the teaching of religion in the public schools of Saxony. Arley B. Shaw.
- No. 2. State school systems: III. Legislation and judicial decisions relating to public education, Oct. 1, 1908, to Oct. 1, 1909. Edward C. Elliott.
- †No. 3. List of publications of the United States Bureau of Education, 1867-1910.
- *No. 4. The biological stations of Europe. Charles A. Kofoid. 50 cts.
- *No. 5. American schoolhouses. Fletcher B. Dresslar. 75 cts.
- †No. 6. Statistics of State universities and other institutions of higher education partially supported by the State, 1909-10.

1911.

- *No. 1. Bibliography of science teaching. 5 cts.
- *No. 2. Opportunities for graduate study in agriculture in the United States. A. C. Monahan. 5 cts.
- *No. 3. Agencies for the improvement of teachers in service. William C. Ruedger. 15 cts.
- *No. 4. Report of the commission appointed to study the system of education in the public schools of Baltimore. 10 cts.
- *No. 5. Age and grade census of schools and colleges. George D. Strayer. 10 cts.
- *No. 6. Graduate work in mathematics in universities and in other institutions of like grade in the United States. 5 cts.
- *No. 7. Undergraduate work in mathematics in colleges and universities. 5 cts.
- *No. 8. Examinations in mathematics, other than those set by the teacher for his own classes. 5 cts.
- No. 9. Mathematics in the technological schools of collegiate grade in the United States.
- †No. 10. Bibliography of education for 1909-10.
- †No. 11. Bibliography of child study for the years 1908-9.
- *No. 12. Training of teachers of elementary and secondary mathematics. 5 cts.
- *No. 13. Mathematics in the elementary schools of the United States. 15 cts.
- *No. 14. Provision for exceptional children in the public schools. J. H. Van Sickle, Lightner Witmer, and Leonard P. Ayres. 10 cts.
- *No. 15. Educational system of China as recently reconstructed. Harry E. King. 15 cts.
- *No. 16. Mathematics in the public and private secondary schools of the United States. 15 cts.
- †No. 17. List of publications of the United States Bureau of Education, October, 1911.
- *No. 18. Teachers' certificates issued under general State laws and regulations. Harlan Updegraff. 20 cts.
- No. 19. Statistics of State universities and other institutions of higher education partially supported by the State, 1910-11.

1912.

- *No. 1. A course of study for the preparation of rural-school teachers. Fred Mutchler and W. J. Craig. 5 cts.
- No. 2. Mathematics at West Point and Annapolis.
- *No. 3. Report of committee on uniform records and reports. 5 cts.
- *No. 4. Mathematics in technical secondary schools in the United States. 5 cts.
- *No. 5. A study of expenses of city school systems. Harlan Updegraff. 10 cts.
- *No. 6. Agricultural education in secondary schools. 10 cts.
- *No. 7. Educational status of nursing. M. Adelaide Nutting. 10 cts.
- *No. 8. Peace day. Fannie Fern Andrews. [Later publication, 1913, No. 12.] 5 cts.
- *No. 9. Country schools for city boys. William S. Myers. 10 cts.
- *No. 10. Bibliography of education in agriculture and home economics. 10 cts.
- †No. 11. Current educational topics, No. I.
- †No. 12. Dutch schools of New Netherland and colonial New York. William H. Kilpatrick.
- *No. 13. Influences tending to improve the work of the teacher of mathematics. 5 cts.
- *No. 14. Report of the American commissioners of the international commission on the teaching of mathematics. 10 cts.
- †No. 15. Current educational topics, No. II.
- *No. 16. The reorganized school playground. Henry S. Curtis. 5 cts.
- *No. 17. The Montessori system of education. Anna T. Smith. 5 cts.
- *No. 18. Teaching language through agriculture and domestic science. M. A. Leiper. 5 cts.
- *No. 19. Professional distribution of college and university graduates. Bailey B. Burritt. 10 cts.
- *No. 20. Readjustment of a rural high school to the needs of the community. H. A. Brown. 10 cts.
- *No. 21. Urban and rural common-school statistics. Harlan Updegraff and William R. Hood. 5 cts.
- No. 22. Public and private high schools.
- No. 23. Special collections in libraries in the United States. W. Dawson Johnston and Isadore G. Mudge.
- *No. 24. Current educational topics, No. III. 5 cts.
- †No. 25. List of publications of the United States Bureau of Education, 1912.
- No. 26. Bibliography of child study for the years 1910-11.
- No. 27. History of public-school education in Arkansas. Stephen B. Weeks.
- *No. 28. Cultivating school grounds in Wake County, N. C. Zebulon Judd. 5 cts.
- No. 29. Bibliography of the teaching of mathematics, 1900-1912. David Eugene Smith and Charles Goldsfer.
- No. 30. Latin-American universities and special schools. Edgar E. Brandon.
- No. 31. Educational directory, 1912.
- No. 32. Bibliography of exceptional children and their education. Arthur MacDonald.
- †No. 33. Statistics of State universities and other institutions of higher education partially supported by the State, 1912.

1913.

- No. 1. Monthly record of current educational publications, January, 1913.
- *No. 2. Training courses for rural teachers. A. C. Monahan and R. H. Wright. 5 cts.
- *No. 3. The teaching of modern languages in the United States. Charles H. Handshin. 15 cts.
- *No. 4. Present standards of higher education in the United States. George E. MacLean. 20 cts.
- *No. 5. Monthly record of current educational publications. February, 1913. 5 cts.

- *No. 6. Agricultural instruction in high schools. C. H. Robison and F. B. Jenks. 10 cts.
 - *No. 7. College entrance requirements. Clarence D. Kingsley. 15 cts.
 - *No. 8. The status of rural education in the United States. A. C. Monahan. 15 cts.
 - *No. 9. Consular reports on continuation schools in Prussia. 5 cts.
 - *No. 10. Monthly record of current educational publications, March, 1913. 5 cts.
 - *No. 11. Monthly record of current educational publications, April, 1913. 5 cts.
 - *No. 12. The promotion of peace. Fannie Fern Andrews. 10 cts.
 - *No. 13. Standards and tests for measuring the efficiency of schools or systems of schools. Report of the committee of the National Council of Education. George D. Strayer, chairman. 5 cts.
 - No. 14. Agricultural instruction in secondary schools.
 - *No. 15. Monthly record of current educational publications, May, 1913. 5 cts.
 - *No. 16. Bibliography of medical inspection and health supervision. 15 cts.
 - *No. 17. A trade school for girls. A preliminary investigation in a typical manufacturing city, Worcester, Mass. 10 cts.
 - *No. 18. The fifteenth international congress on hygiene and demography. Fletcher B. Dresslar. 10 cts.
 - *No. 19. German industrial education and its lessons for the United States. Holmes Beckwith. 15 cts.
 - *No. 20. Illiteracy in the United States. 10 cts.
 - †No. 21. Monthly record of current educational publications, June, 1913.
 - *No. 22. Bibliography of industrial, vocational, and trade education. 10 cts.
 - *No. 23. The Georgia Club at the State Normal School, Athens, Ga., for the study of rural sociology. E. C. Branson. 10 cts.
 - *No. 24. A comparison of public education in Germany and in the United States. Georg Kerschensteiner. 5 cts.
 - *No. 25. Industrial education in Columbus, Ga. Roland B. Daniel. 5 cts.
 - *No. 26. Good roads arbor day. Susan B. Sipe. 10 cts.
 - *No. 27. Prison schools. A. C. Hill. 10 cts.
 - *No. 28. Expressions on education by American statesmen and publicists. 5 cts.
 - *No. 29. Accredited secondary schools in the United States. Kendrick C. Babcock. 10 cts.
 - *No. 30. Education in the South. 10 cts.
 - *No. 31. Special features in city school systems. 10 cts.
 - *No. 32. Educational survey of Montgomery County, Md. 10 cts.
 - †No. 33. Monthly record of current educational publications, September, 1913.
 - *No. 34. Pension systems in Great Britain. Raymond W. Sles. 10 cts.
 - *No. 35. A list of books suited to a high-school library. 15 cts.
 - *No. 36. Report on the work of the Bureau of Education for the natives of Alaska, 1911-12. 10 cts.
 - No. 37. Monthly record of current educational publications, October, 1913.
 - No. 38. Economy of time in education.
 - No. 39. Elementary industrial school of Cleveland, Ohio. W. N. Hallmann.
 - *No. 40. The reorganized school playground. Henry S. Curtis. 10 cts.
 - No. 41. The reorganization of secondary education.
 - No. 42. An experimental rural school at Winthrop College. H. S. Browne.
 - *No. 43. Agriculture and rural-life day; material for its observance. Eugene C. Brooks. 10 cts.
 - *No. 44. Organized health work in schools. E. B. Hoag. 10 cts.
 - No. 45. Monthly record of current educational publications, November, 1913.
 - *No. 46. Educational directory, 1913. 15 cts.
 - *No. 47. Teaching material in Government publications. F. K. Noyes. 10 cts.
 - *No. 48. School hygiene. W. Carson Ryan, Jr. 15 cts.
 - No. 49. The Farragut School, a Tennessee country-life high school. A. C. Monahan and Adams Phillips.
 - No. 50. The Fitchburg plan of cooperative industrial education. M. R. McCann.
 - *No. 51. Education of the immigrant. 10 cts.
 - No. 52. Sanitary schoolhouses. Legal requirements in Indiana and Ohio. 5 cts.
 - No. 53. Monthly record of current educational publications, December, 1913.
 - No. 54. Consular reports on industrial education in Germany.
 - No. 55. Legislation and judicial decisions relating to education, October 1, 1909, to October 1, 1912. James C. Boykin and William R. Hood.
 - *No. 56. Some suggestive features of the Swiss school system. William Knox Tate. 25 cts.
 - No. 57. Elementary education in England, with special reference to London, Liverpool, and Manchester. I. L. Kandel.
 - No. 58. Educational system of rural Denmark. Harold W. Fought.
 - No. 59. Bibliography of education for 1910-11.
 - No. 60. Statistics of State universities and other institutions of higher education partially supported by the State, 1912-13.
- 1914.
- *No. 1. Monthly record of current educational publications, January, 1914. 5 cts.
 - No. 2. Compulsory school attendance.
 - No. 3. Monthly record of current educational publications, February, 1914.
 - No. 4. The school and the start in life. Meyer Bloomfield.

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- No. 5. The folk high schools of Denmark. L. L. Friend.
- No. 6. Kindergartens in the United States.
- No. 7. Monthly record of current educational publications, March, 1914.
- No. 8. The Massachusetts home-project plan of vocational agricultural education. R. W. Stimson.
- No. 9. Monthly record of current educational publications, April, 1914.
- No. 10. Physical growth and school progress. B. T. Baldwin.
- No. 11. Monthly record of current educational publications, May, 1914.
- No. 12. Rural schoolhouses and grounds. F. B. Dresslar.
- No. 13. Present status of drawing and art in the elementary and secondary schools of the United States.
Royal B. Farnum.
- No. 14. Vocational guidance.
- No. 15. Monthly record of current educational publications. Index.
- No. 16. The tangible rewards of teaching. James C. Boykin and Roberta King.
- No. 17. Sanitary survey of the schools of Orange County, Va. R. K. Flannagan.
- No. 18. The public school system of Gary, Ind. William P. Burris.
- No. 19. University extension in the United States. Louis E. Reber.