DEPARTMENT OF THE INTERIOR
BUREAU OF EDUCATION

BULLETIN, 1916, NO. 23

OPEN-AIR SCHOOLS

BY

SHERMAN C. KINGSLEY
ELIZABETH McCORMICK MEMORIAL FUND CHICAGO

AND

F. B. DRESSLAR
PEABODY COLLEGE FOR TEACHERS, NASHVILLE, TENN.

WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

ADDITIONAL COPIES

OF THIS PUBLICATION MAY BE PROCURED FROM
THE SUPERINTENDENT OF DOCUMENTS
GOVERNMENT PRINTING OFFICE
WASHINGTON, D. C.
AT
50 CENTS PER COPY

CONTENTS.

FIGURES.

LIST OF FORMS.

LETTER OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
BUREAU OF EDUCATION,
Washington, June 8, 1916.

SIR: Modern political, social, and industrial life demands some degree of education for all people. Modern humanitarian idealism recognizes the right of every child to such education as will enable it to live happily and successfully. That no child may be denied this right and that society and industry may be served most effectively, most progressive countries of the world have enacted laws for compulsory school attendance through the elementary grades or to the age of 12, 14, or 16. But many children are afflicted with tuberculosis in some form; some are poorly nourished and are anemic; others suffer from various other physical defects. For these, regular attendance upon indoor schools may be very injurious. The education of the schools is important, but life and health are more important. Some means must therefore be found by which these children may acquire education without danger to life or further impairment of health. It has been fully demonstrated that the open-air school rightly conducted is much better for these children than the ordinary schools, housed too often in dusty, overheated, and badly ventilated buildings. So it has come about that, although the modern open-air school is of very recent origin, it is now found in most or all of our larger cities and towns and in many of the smaller ones. Its special value both for education and for health is due to the combination of pure fresh air, proper nourishment, and a freer regimen which makes possible a wiser alternation of work and rest than is permitted by the schedule of most schools.

The movement in this country for the establishment and maintenance of open-air schools has been hastened through the initiation and financial assistance of various volunteer societies and private foundations for the prevention of tuberculosis or for the general conservation of public health. One of the foundations which has been especially helpful in this movement is the Elizabeth McCormick Memorial Fund, of Chicago, Ill., established by Mr. and Mrs. Cyrus Hall McCormick in memory of their daughter, "to improve the condition of child life in the United States." This foundation has assisted very largely in the establishment and maintenance of open-

air schools in the city of Chicago. It has also rendered valuable service by gathering and publishing information on the equipment, organization, and work of open-air schools and by advising school officers in all parts of the country in regard to these. I was, therefore, glad to accept the cooperation of this foundation in the preparation of this manuscript, which I am transmitting herewith, on the organization, equipment, and conduct of open-air schools in this and other countries. To this end Mr. Sherman C. Kingsley, director of the Elizabeth McCormick Memorial Fund, was appointed a special collaborator in this bureau; and Dr. Fletcher B. Dresslar, special agent of the bureau and professor of health education in George Peabody College for Teachers at Nashville, Tenn., was requested to work with him. In their work they had the assistance of Miss Mabel Broun Ellis. The manuscript was prepared after a very careful and thorough study of open-air schools in most or all of the more progressive countries of the world. Fortunately, the material from Europe was collected before the outbreak of the present war. I recommend that the manuscript be published as a bulletin of the Bureau of Education. The importance of the subject and the widespread interest manifested in it justify its publication.

Respectfully submitted.

P. P. Claxton,
Commissioner.

The Secretary of the Interior.

INTRODUCTION.

Open-air schools represent one of the latest developments in public-school organization. They came as the result of a desire for better conservation of the health of those children who, by reason of a tuberculous affection, poor nourishment, or other debilitating conditions, were unable to profit physically and mentally by the life and work of regular indoor schools. This method of dealing with physically defective children signalizes one of the most interesting and decided changes undertaken in school management for many centuries. Indoor schools have for the most part grown and developed under the idea that teachers had to do with the minds and not with the bodies of children, while open-air schools are based on the conception that the first essential to a worthy education is sound bodily health. The former grew out of the error of assuming that mind is not closely associated with the physical body and that early mental training was paramount to the demands of health; the latter have grown out of a new emphasis on the value of health and physical soundness and recently discovered facts bearing on the nature of certain diseases and the best methods of protecting human life from the possible effects of these diseases.

Naturally, as in the case of all progressive movements, many direct and indirect causes have contributed to this end. Chief among these were the discovery of the germ which causes tuberculosis and the great value of an out-of-door life and nourishing food in the treatment of those afflicted with this disease. The world is directly indebted to Dr. Koch, of Germany, for the former and mainly to Dr. Trudeau, of America, for the latter. In addition to the impetus gained by these discoveries the study of children both in health and disease has been encouraged in the past generation as never before, and hygiene is now recognized as of more worth than medicine.

No one with an unbiased mind can read the accounts of the history of open-air schools and the results they have already achieved without in some measure forecasting the time when the same conditions and the same sort of care will be extended to the whole school population. Surely there is greater reason for keeping the school children of this or any other nation from sickness than there is for attempting to save them after their health and physical vigor have been im-

paired. The opinion expressed by the late Dr. Arthur T. Cabot that in the future "all schools will be open-air schools," is in line with this changed emphasis, and when considered in connection with the results already attained in open-air schools seems eminently reasonable.

The chief purposes of this bulletin are to record something of the history and progress of the open-air school movement, to point out some of the results which have been attained through this means of dealing with delicate school children, to designate in some detail the programs followed in such schools, and to bring together in a convenient form other information which may be needed by those who are planning to organize and equip schools of this character.

OPEN-AIR SCHOOLS.

Chapter I.

SITES AND BUILDINGS.

The original open-air school was located in a forest, and was called a forest school. This fact has had an important influence in the selection of sites upon which open-air school buildings were to be built. The forest plan has not been followed generally in the United States, however. In a few notable cases parks and large grounds have been utilized for this purpose, but many American open-air schools are on the roofs of city buildings, in old schoolhouses or on vacant lots and beaches.

There are some special needs in open-air schools which can not be satisfied short of large grounds, where nature study may be undertaken readily and naturally, where gardening is possible, where playgrounds are ample, where there is room for rabbit hutches and cages for pets, and especially where the air is clear and pure, and where the children may be removed from the distressing noises of city life. Children in open-air schools are usually sick or anemic because they have been cheated out of the birthright all children should have—fresh, clean air, opportunity to get acquainted with the lives of plants and animals, good food, and a chance to play in the open; and roofs, vacant lots, or other available in-town spaces for getting the children out in the fresh air are only makeshifts, after all.

In Europe the arrangement of buildings and the choice of sites for open-air schools have followed in general the lines laid down in the original open-air school at Charlottenburg, Germany. The Charlottenburg School is situated in a beautiful pine forest. The ground is rolling and sandy. The buildings are of inexpensive construction, but are carefully planned for the purposes of the school and are grouped in convenient relation to each other as well as to the outdoor features of the place. The immediate grounds are not only ample for the buildings, but they afford room for both vegetable and flower gardens, each child having an individual allotment. There is also an open-air gymnasium surrounded by an

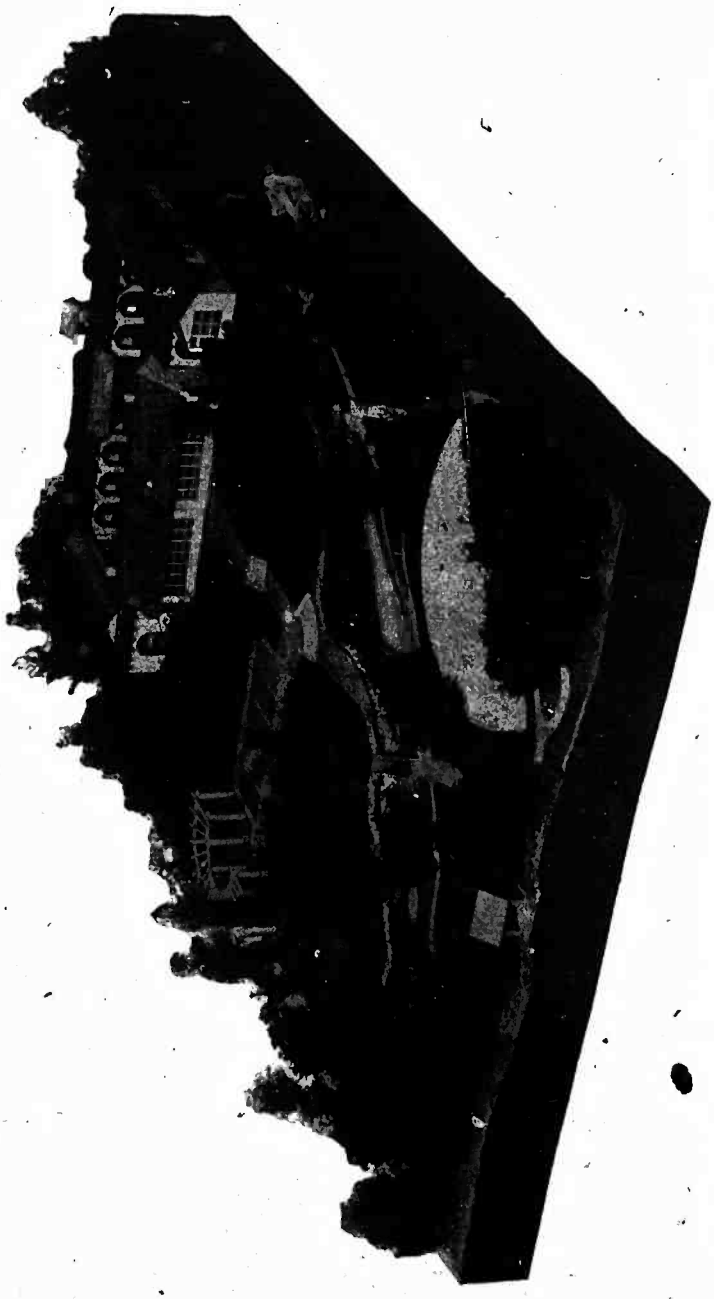


FIG. 1.—Model of an open-air school and grounds on the unit plan, as exhibited at the Panama-Pacific International Exposition, San Francisco, 1915.

inclosure, where the children have sun baths in connection with open-air exercises. Another section is set apart for play, where the children are allowed to engage in games and sports of their own choice. They build wonderful trenches and construct buildings and other devices to suit individual fancies. Adjoining this, and usually merging into it, is a section where pets of different kinds are kept. The children not only care for the pets but help to build cages, pens, and houses for them.

The forest extends in every direction from the school and affords large possibilities for walks and nature study, such as the obser-

FIG. 2.—The first modern open-air school, Charlottenburg, Germany.

vation of seed distribution, study of plant and animal life, the change of seasons, and other aspects of nature.

Experiences gained in these different activities are utilized in drawing work, arithmetic, geography, reading, and in fact have a bearing on nearly all school subjects. Drawing lessons, as well as arithmetic, have an added interest when the work is applied in the construction of a pen or house or some article of convenience or comfort for the children's animal friends.

The whole plan and conception of the school enables the teachers to make an ally of nature in their great work of education. These

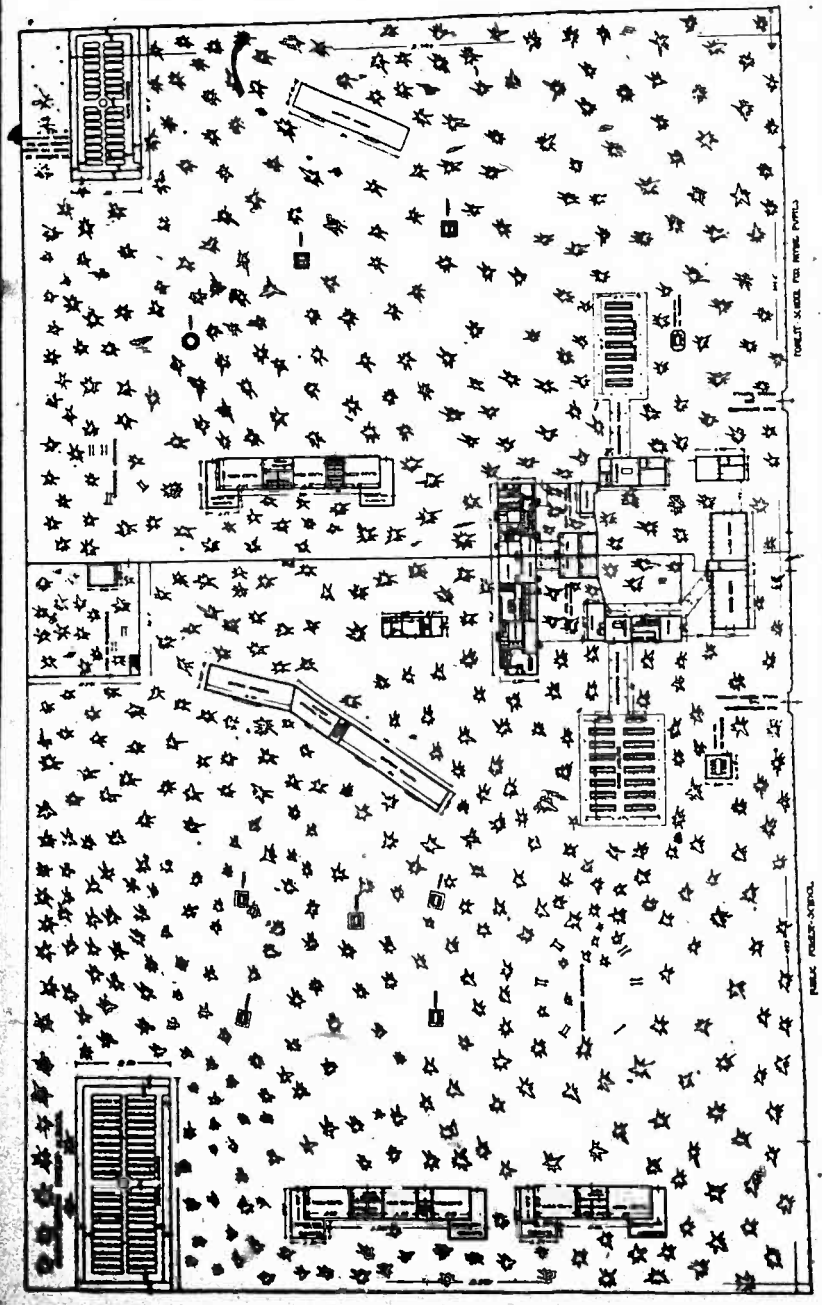


FIG. 3.—Plan of buildings and grounds, "The Forest School," Charlottenburg, Germany.

features not only keep the children in the fresh air and sunshine, but bring them into direct contact and cooperation with the primary and fundamental interests of a child's life.

While few sites for other European schools are as ample as that of the Charlottenburg School, the general features are much the same. At the Uffculme Open-air School, near Birmingham, England, the gift of Mr. and Mrs. Barrow Cadbury, the immediate site is adequate for the school buildings, for gardens, playgrounds, and quarters for the pets and gives ample space besides. Moreover, it adjoins the estate of Mr. and Mrs. Cadbury, and the open-air school pupils are allowed access to the grounds. Shooters Hill Open-air

FIG. 4.—Uffculme Open-Air School, Birmingham, England. The school garden.

School, near London, is also located near a large forest. The chief medical officer of the Board of Education of London, in his report for 1913 (p. 258), outlines the considerations which in his opinion should enter into the establishment of open-air schools, and, in general, the schools of England have developed as he indicates. This report states:

> The site should be sheltered, though fairly open and easily accessible. One acre of land should be available for, say, 50 children. The buildings should be inexpensive and constructed in such a way as to allow of cross ventilation and maximum admission of air, with adequate protection against stormy weather. In winter some means of heating is advisable. The classrooms must be adapted for the various educational methods of the open-air school, including manual work. These classrooms should be constructed for 25 pupils. The

school premises should consist of an administrative building, classrooms, and a resting shed. On the question of administrative detail, the requirements

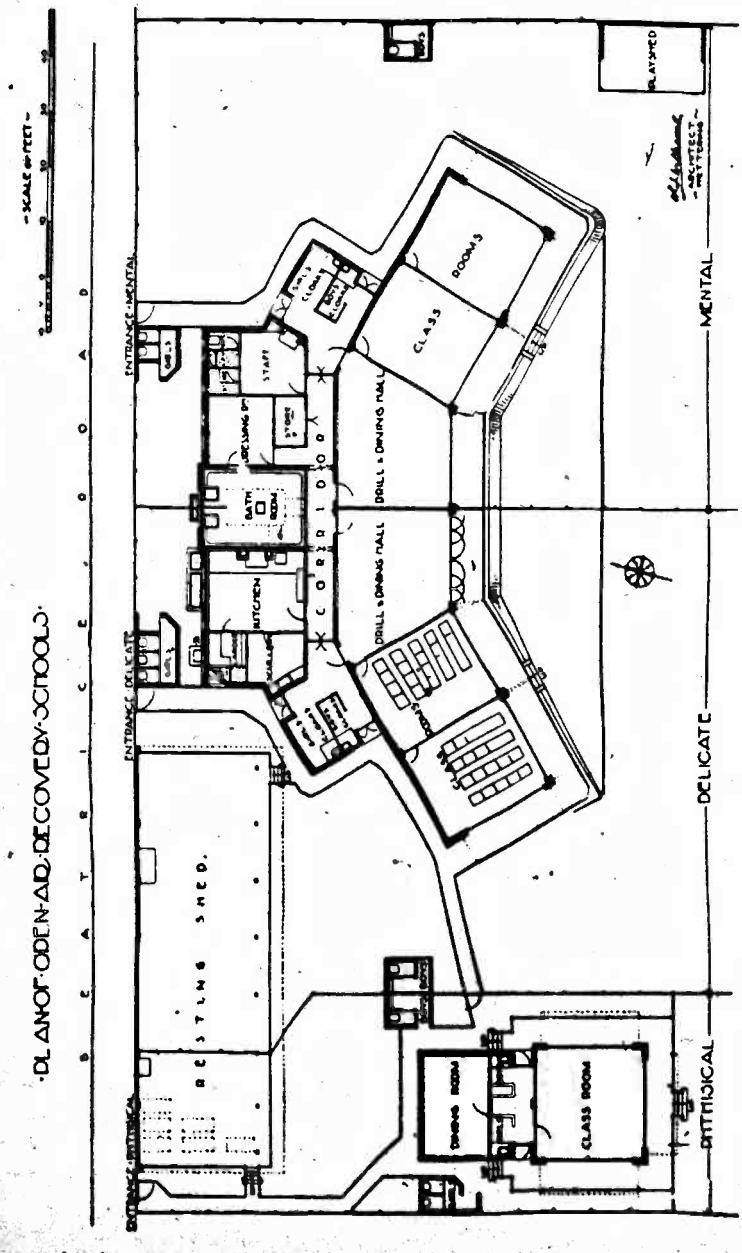


Fig. 5.—Plan of buildings and grounds, Open-Air Recovery School, Ketterlug, England. This plant accommodates 40 tuberculous, 40 delicate, and 40 mentally subnormal children.

are a kitchen, diningroom, doctor's and nurse's room, and provision for shower baths. As a usual thing, the schools abroad are established for a considerable number of children, 100 or more.

The same report states—

> that there should be a head teacher for from 120 to 180 children and a teacher for each 25. The teacher selected should have special knowledge of nature study, manual training, hygiene, and physical exercise. There should be a fully qualified nurse and the necessary assistants for cooking and serving meals and for bathing, say, 4 women for 120 children.

The earlier open-air schools in the United States made their beginnings in less favorable quarters than are enjoyed by the European schools. In this, as in many other enterprises in the United States, private initiative led the way, and such expedients as unused school-

FIG. 6.—Interior of Providence (R. I.) Open-air School.

houses, ferryboats, roofs, porches, tents, and remodeled buildings were pressed into service.

The first open-air school in the United States was established in Providence, R. I., in 1908. Like most open-air schools established since, it had its impetus and its initial support wholly or in part from individuals and organizations actively engaged in antituberculosis work. Dr. Mary S. Packard, whose letter is quoted below, had been connected with charity organization work for a number of years and had been instrumental, with Dr. Ellen Stone and others, in starting the Providence League for the Suppression of Tuberculosis. In the summer preceding the inauguration of the Providence

school they had taken a group of children who were predisposed to tuberculosis to a country place belonging to a friend. They encountered numerous difficulties in carrying on the project; but their earnestness and zeal and their ability to demonstrate to the community that these children were in no sense a menace to the health of others allayed the fears of the community and made possible the establishment of this summer school.

Dr. Packard's letter to Dr. Jay Perkins, president of the Providence League for the Suppression of Tuberculosis, written August 14, 1907, is as follows:

Do you think it is too early to attempt to have a single small school, necessarily ungraded, for those [tuberculous] children, arranged so as to approxi-

FIG. 7.—Sea Breeze Hospital, Coney Island, N. Y.

mate an out-of-door school? It would, of course, be an experiment and in all probability would not be undertaken by the public school authorities; but we have thought it might be run very inexpensively, and that possibly the Providence League for the Suppression of Tuberculosis or some other society would bear the expense of housing and heating, and that the city would supply a teacher. Probably there are some tuberculous teachers. The building would be very simple; it is suggested that the horse sheds of the Friends' meetinghouse, on North Main Street, could be arranged for it, and that the owners would be willing, since they are using their meetinghouse so little and have given the yard for a playground this summer; or the little house on Conanicut Street, now used as a pure milk station, probably could be had rent free.

We shall have about ten children at the camp who will soon have to go back to the ordinary schools, or would be at home in close rooms, and you will know of many more than these who should have an out-of-door life either during the day or the night, if it is impossible to give them both. Now that the

general interest in the prevention of tuberculosis is so much greater than ever before, do you think that some such experiment might be started this fall?

This letter met with an enthusiastic response. The Charlottenburg School at this time was only in the third year of its existence, and little or no data were at hand for guidance and direction. However, the school department of Providence had already shown its progressiveness by establishing the first ungraded room in the United States for retarded children, and the board members were alive to the educational importance of this new opportunity of rendering real service to children in need.

FIG. 8.—Outdoor activities at Sea Breeze Hospital, Coney Island, N. Y.

The League for the Suppression of Tuberculosis stood ready with offers of assistance. A schoolhouse not at that time in use, and centrally located, was requested for the purpose of a fresh-air school, and the committee on city property not only granted this request, but made all the changes desired, which included the remodeling of windows of one room and the installation of stoves for heating and cooking. These arrangements were so carefully made that they have been continued almost without change up to the present time.

Another similar effort was going on at about the same time in the city of New York. For many years the Association for Improving the Condition of the Poor had been taking children from the congested districts of New York to Coney Island for recuperation

during the summer months. Among the thousands of children benefited were many children suffering from tuberculosis of the bones and joints. In order to meet the needs of these children, the association established at Sea Breeze, Coney Island, in the summer of 1903, a seaside tent camp for the treatment of children suffering from tuberculosis of the bones and glands. The New York Board of Health estimated that there were from 4,000 to 5,000 children under 15 years of age in that city suffering from nonpulmonary forms of tuberculosis, and that at least three-fourths of these children were to be found in the tenement districts.

The report on the experiment, written at the close of this first summer, states:

> It was a pathetic group of children who came to us in June, so weak and emaciated that it was necessary to send one adult with each child. It is not an exaggeration to say that at the present time it would be difficult to select among normal children in our tenement district 50 who look as happy and as rugged as those among our earliest patients who have remained until the end of the summer. * * * These children have lived out of doors practically every hour. Each of the four dormitories accommodates 12 children and is ventilated with 15 windows always open, so that even at night the ventilation is thorough.

In 1904 the New York Board of Education sent a teacher to instruct these children. The original purpose was not to conduct a school, but to take a group of these little children and restore them to health, not only gratifying their desire to play like other children, but putting them on the way to useful citizenship.

The results achieved at Providence and Sea Breeze, reinforcing as they did those at the Charlottenburg School, marked the beginning of a rapid development of open-air schools in the United States. Boston, Mass., made use of a park refectory; New York City secured a ferry boat and converted it into an open-air school. In other cities tents and buildings of inexpensive construction were pressed into service.

So far in the United States the open-air school has attempted, first, to take care of anemic, undernourished, debilitated children. These schools have had the problem of providing not only for proper classrooms but facilities for kitchen, diningroom, bathing, rest period, and for the physician's and nurse's use. A tent structure or cheap building often serves satisfactorily for the classroom work, provided there is near it a building which will afford these other facilities which are indispensable.

The first open-air school in Chicago was conducted by the Chicago Tuberculosis Institute in cooperation with the school board in the summer of 1909. A tent was placed in the yard of the Graham School and this, together with rooms in the school plant, enabled the organizations to carry on a summer's work for 30 anemic and

debilitated children. The results of this experiment were so gratifying that the friends of the movement felt that Chicago should go forward and conduct a year-round school.

The best available site that could then be found was the roof of the Mary Crane Nursery, which is located almost at the exact center of population of Chicago. Large numbers of children needing special care lived in the congested tenements surrounding this building. The roof equipment was not designed or constructed for open-air school purposes but had been used as a fresh-air station for sick babies during the summer time. The building was a tent-like structure 14 by 25 feet, built of asbestos board. There was also a canvas

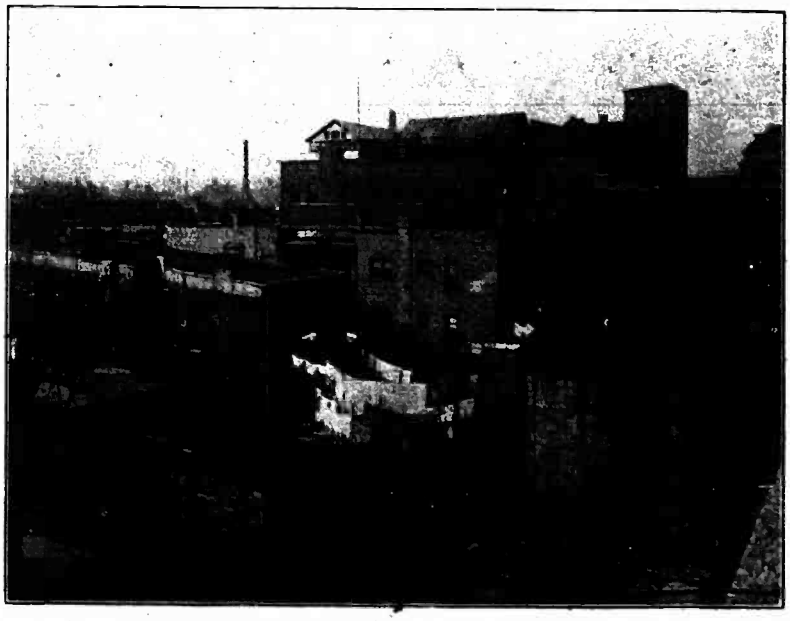


FIG. 9.—Site of first year-round open-air school, Chicago, Ill.

shelter of about the same dimensions, which was used to accommodate the children during the rest period. Outside this tent was an inclosure which afforded some space for recreation. The kitchen and diningroom were located in the rooms of the nursery, one floor below. There was no heat on the roof. The floor of the schoolroom was made of common boards covered with linoleum. The windows were hinged from the top and could be raised and lowered by pulleys and ropes from the inside. These windows thus formed an open zone for air, but could be closed from any side against the storm and wind.

The room was equipped for 25 children, but from the beginning there was always a large waiting list, and the number sometimes

rose to 30. During the first year the children ranged from 6 to 16 years of age, and from the point of view of their educational progress represented eight grades of the elementary school.

Two years later another school was opened on the roof of the Hull House Boys' Club, which adjoins the Mary Crane Nursery. On this roof there is now a locker room, lavatories, shower baths, and toilets, and a large resting shed which is anchored to a frame made of gas pipe. The building here is also of asbestos board. This site connects with another roof, that of Bowen Hall, another of the Hull House group of buildings, and this roof is used as a garden,

FIG. 10.—Roof garden, Elizabeth McCormick Open-air School No. 2, on roof of Bowen Hall, one of the Hull House buildings.

where both vegetables and flowers are grown. The dining room and kitchen are on the top floor of the Hull House Boys' Club, just under the roof structure.

In the United States many cities have adapted ordinary schoolrooms to open-air school work by simply opening the windows. In a room where there is a ventilating system the out duct should be cut off when the windows are opened. When this detail has been observed, no interference has occurred with the ventilating system. Care should be taken also that children do not sit in immediate drafts and that the wind does not blow directly on them. This is easily taken care of by using screens or ventilators to deflect air

currents upward. Sometimes an alteration in the windows is necessary, or the removal of a side wall and installation of a different type of windows may be desirable.

In the original open-air school in the United States, at Providence, the windows were hinged at the top and could be swung to the ceiling by means of a pulley. In the open-window rooms in Chicago a canvas ventilator has been found to be one of the most practical ventilators. The principle of this ventilator is the same as that of ventilators in commercial use; the difference is that it allows the windows to be half open and provides a greater intake. In New

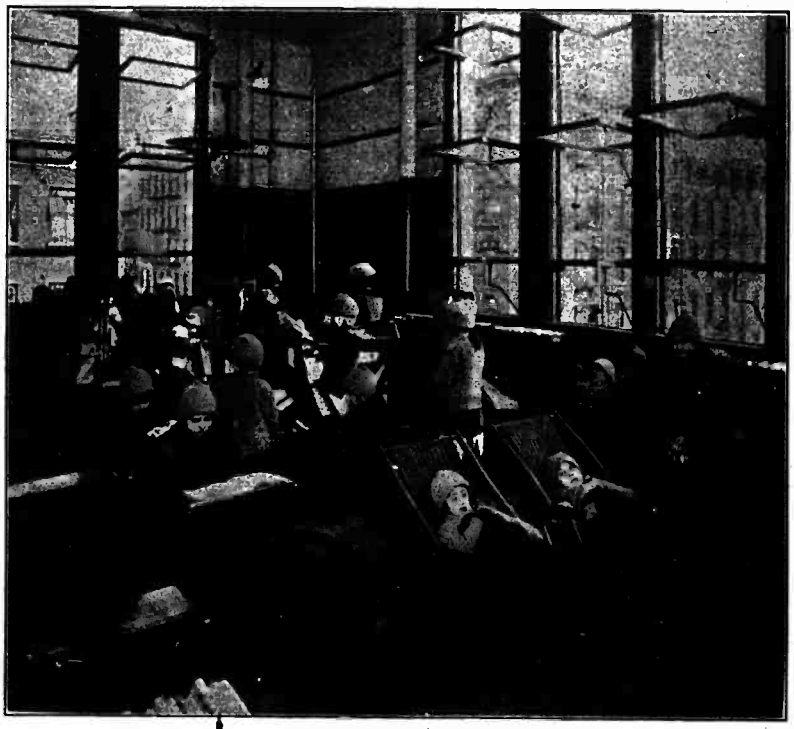


FIG. 11.—Open-window room, New York City. Double-hung window.

York City, where there are now more than 200 open-window rooms, the double-hung window is the type most generally used.

Dr. John B. Todd, of Syracuse, N. Y., advocates a ventilator made by stretching unbleached muslin over a frame and operated after the manner of an ordinary wire screen. This slides up and down according as it is desired to have the upper or lower sash open.

In selecting locations for open-window rooms, it is preferable to have those with two exposures. South and east or south and west exposures, other things being equal, are most desirable. In the first open-window room in the city of Chicago one room was used both for recitation work and for the rest period. The desks were removed and were replaced by tables and chairs. The tables and chairs could be pushed to one side to allow placing the cots for the rest period. These cots were kept in a corner or on one side of the room.

FIG. 12.—Tables and chairs replace stationary desks in the first open-window room at the Franklin School, Chicago, Ill.

The children wore their ordinary street wraps. It was found necessary, however, to provide extra clothing for schoolroom use, and now an Eskimo coat and lumberman's boots are furnished by the Elizabeth McCormick Fund for each child in an open-window room. The temperature averages about 55° in these rooms in the winter months. There are now 13 such classes in Chicago.

In some of these open-window rooms a portion of a cloakroom is partitioned off and converted into a kitchen. In other instances a gas plate is placed in a corner of an ordinary schoolroom which is used as a diningroom. A good-sized kitchen cabinet will hold the necessary dishes and cooking utensils. There has been no difficulty

so far in the schools where open-window rooms exist to find space that satisfactorily accommodates these added features.

The open-air school movement has reached a phase where it is receiving a permanent embodiment in definitely planned and constructed buildings for the purpose. A number of cities have already built permanent buildings and others have them in contemplation. Still other cities are modifying their schoolhouse architecture and are providing for special open-air classes and more adequately providing for fresh air and sunshine in all the rooms.

Besides the definite details of planning and constructing buildings to accommodate the different features of open-air schools, a number of cardinal points should be kept in mind. A mistake often made in open-air school structures is the use of wide overhanging eaves instead of windows to give protection against wind and storm. This not only fails to give control of these elements, but has the great disadvantage of shutting out the sunlight in winter and the free movement of air in summer. There should be regular windows or canvas covers for such openings, preferably windows, because it becomes necessary at times to close the building on the side from which the storm or wind is coming.

Dr. I. N. Woodruff, medical director of open-air schools in New York City, calls attention to the difficulty of constructing out-of-door classrooms so that they will be satisfactory in both warm and cold weather. He says:

> The type of classroom required in warm weather is one in which there is a maximum amount of air movement and in which the roof is so constructed as not only to shut off the sun's rays, but with an air space to act as an insulator to prevent the air underneath the roof from becoming too heated.

For this and other reasons Dr. Woodruff considers that most of the classrooms for anemic children in New York are open-window rooms rather than outdoor classes, and says that for New York City children he distinctly prefers them to the outdoor classrooms.

The site for an open-air school should be well drained and supplied with abundance of pure water. An open-air school should not be located on a bare hilltop, nor set in a damp, shaded valley. One naturally associates an open-air school with trees and rolling lawns, with abundance of sunshine over all. An ideal situation can not be found short of the outlying country sections of the city. The problem of transportation needs to be solved. A natural forest in some accessible place, yet out of the main currents of the hurry and worry of modern life, seems to offer the best opportunity to meet the hygienic needs of such children as are gathered together for open-air school work. The presence of the trees stimulates the children to an observation of nature and begets in them a love of

outdoor life, which is of vital importance for them if they hope to reach any large degree of strength and usefulness.

The orientation of the open-air school building, despite the fact that many more liberties can be taken in its construction than in that of the ordinary classroom structure, nevertheless calls for certain common features. There is no value in useless exposure to winds and biting weather. There is value, however, in sunshine and in fresh, pure air, wholesome food, and abundance of quiet, undisturbed repose. It is important, therefore, that structures used for open-air work should receive abundance of sunshine, yet not so much as to interfere with the children in reading, writing, or any other task requiring close application. It is therefore justifiable to open a rest shed toward the south, so as to get a full amount of sunshine, if only the eyes of the children while reclining may be shaded from the strong light. With proper precaution, indeed, it is better for children to sleep and rest in the sunshine than in the shade. When, however, the children are working at their books, the same rule for proper lighting of the classroom, that is, receiving the light from the left, to prevent the direct rays of the sun from falling across the page, is applicable. Open-air classrooms ought to get their main light from the east or west, so that there will be a thorough sunning each day, and at the same time a chance to regulate the light in such a way as to prevent eyestrain.

Some heat is desirable in classrooms in open-air schools, especially in the northern latitudes of the United States. The diningroom, kitchen, showers, and toilets should always be properly heated. Many open-air schools have no heat in the classroom, but this makes it necessary in cold weather to use soapstones, extra foot covering, electric warmers, or other devices. Even these expedients, though they incur inconvenience and expense, are preferable to a schoolroom kept air-tight in order to conserve the heat.

If heat is introduced into an open-air classroom, care should be taken to avoid the old-time mistake of closing windows and keeping them shut in order to conserve the heat. The children must be kept comfortable; but this can be done by proper attention to clothing, exercise, and food. It is an advantage to be able to modify the temperature in cold weather, but open-air school teachers must see that the air is kept fresh and stimulating, and that the stove or heating plant is made to serve, not to dominate. The air must be kept fresh and pure.

Even permanent open-air school buildings are of comparatively inexpensive construction. The first open-air school in St. Louis, Mo., was located outside the city, on a lot which commanded a good view and which provided space for play and for gardens. Its first building was of a simple shack construction, and here the early years of

the school were spent. One teacher has been in charge since the beginning and has been able to keep in personal touch with all the children who have been through the school. The success of this school and the need of additional facilities have led the school authorities of St. Louis to secure permanent grounds in the city and to enlarge the work. They purchased a large dwelling occupying a block which adjoins the Harris Teachers' College. The dwelling-house has been remodeled and will furnish quarters for the dining room, kitchen, showers, lockers, nurse's and doctor's rooms. The ground plan of this new school is shown in figure 13. The plant is to accommodate 175 tuberculous children. Three one-story buildings will project as wings from a loggia which provides a covered passage between the different buildings and connects with the main building. Heating and other service pipes run in the floor of this loggia and

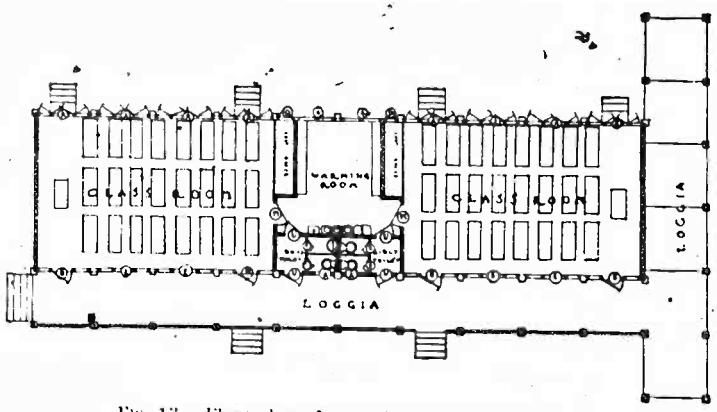


FIG. 13.—Floor plan of open-air school built, St. Louis.

under the floors of the classrooms. The cost of this building will be $37,500, and the estimated yearly cost of operation $26,250.

In September, 1912, Mr. Frank B. Leland presented to the city of Detroit a building and grounds known as the Nellie Leland Open-Air School. (For building and plans, see figures 14 and 15.) It was first constructed to accommodate 25 children, but in the year following it was enlarged to double the capacity and now has 50 children. Originally the expense other than the teacher and school equipment was paid by the Detroit Society for the Prevention and Study of Tuberculosis. In 1914 the city assumed the entire expense for the operation of the school.

Toledo, Ohio, has a new building known as the Cherry Street Open-Air School. Schoolrooms, diningroom, and kitchen are provided on the first floor; dormitories, musicroom, and bathrooms on the second floor. The schoolrooms are screened and have canvas windows open-

ing on the inside. It accommodates 60 children, 30 of whom remain at the school both day and night. Expenses of food and nurse are paid by the Anti-Tuberculosis Society. The balance of the expenses are met by the board of education of Toledo. (See figure 16.)

Columbus, Ohio, has an open-air school building, erected by the Columbus Society for the Prevention and Cure of Tuberculosis, at an expense of $6,111. The frame building shown in figure 18 contains a large schoolroom, diningroom, kitchen, lockers, lavatories, storeroom, bath, nurse's and recitation rooms. An 18-foot porch surrounds the building. The board of education provided the site and pays for school supplies, teacher, and caretaker. The Anti-Tuberculosis Society bears the other expenses. The capacity of this school is 25.

FIG. 14.—The first Nellie Leland School, Detroit, Mich.

Rochester, N. Y., is another city which began its open-air school work in a modest way and has grown through its success into permanent quarters, as illustrated in figure 19. The new building is located in a city park, 8 acres of which have been given to the school exclusively for open-air school purposes. The site is easily accessible to the cars. The present building accommodates 65 children and cost $18,000. The plans call for the construction of an additional wing, which will enlarge the capacity of the building to 130.

In 1912 the city of Oakland voted a $2,000,000 bond issue for the construction of new school buildings. In order that this sum might be most advantageously spent, the board of education created an honorary commission, composed of school men, architects, sanitary engineers, and sociologists, to recommend a program for schoolhouse construction. Their opinion was especially requested on gymnasia, lunchrooms, provision for the department of health developments,

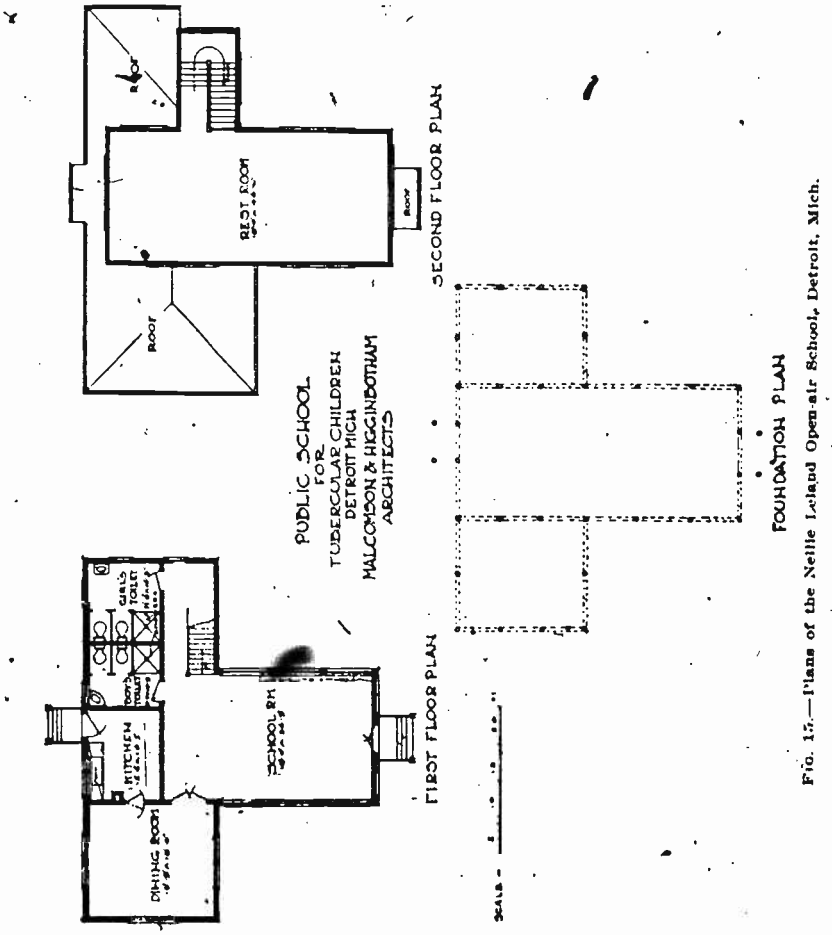


Fig. 15.—Plans of the Nellie Leland Open-air School, Detroit, Mich.

and sanitation and open-air schools. The following recommendation on open-air schools was included in the report of this commission:

> In each new building there shall be at least one "open-air" schoolroom that can not be entirely closed, preferably opening to the east.
>
> In all new buildings there shall be provision made whereby every classroom may be easily transformed into an "open-air" room, such transforming measures not to be under the control of teachers and pupils.

One or more school buildings entirely of the open-air type should be erected. All halls and corridors should be so constructed that they can not be entirely closed from the outside air.

All rooms designed as open-air rooms should be provided with some means for warming and drying. Most likely some method of direct radiation will be necessary.

Fresno, Cal., has worked out a simple classroom structure for open-air school work that can be built for about $500. Through a covered passageway this unit connects with others, and a completed plant that will accommodate about 150 pupils, as illustrated in figure 22, can be built at an estimated cost of from $6,000 to $10,000.

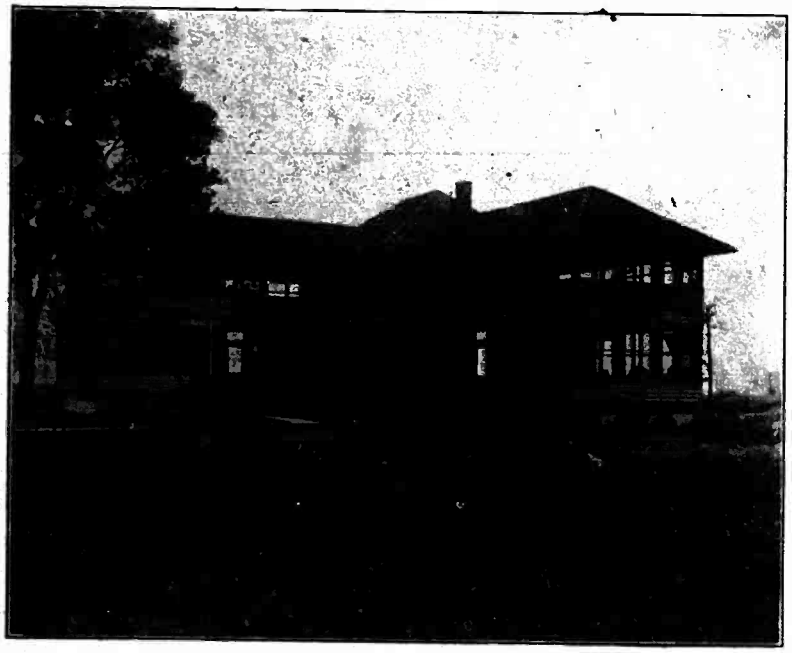
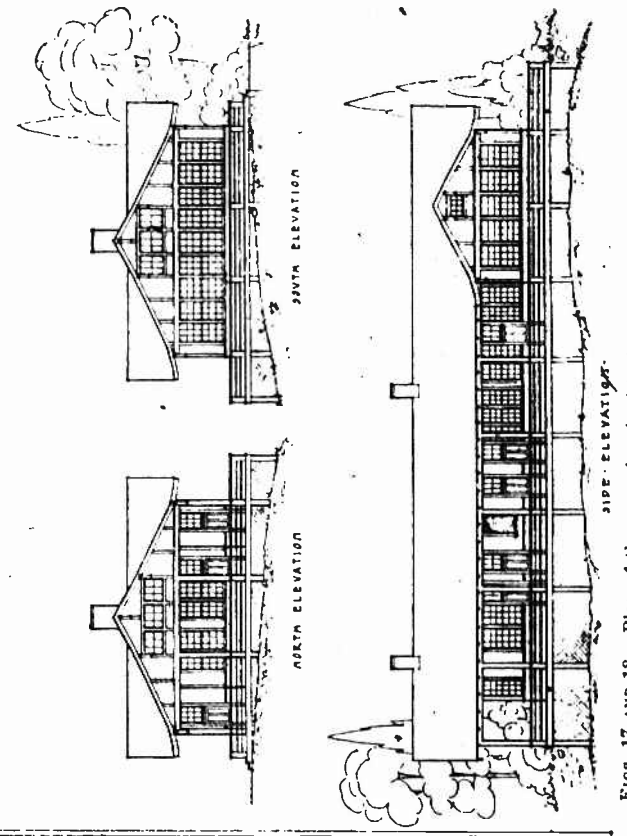


FIG. 16.—Cherry Street Open-air School, Toledo, Ohio.

The open-air school idea is beginning to influence the architecture of regular school buildings. A notable example in this line is the Eagle School in Cleveland, Ohio. Careful attention has been given to placing of windows, to heating and ventilation throughout the whole building, and the top floor is built for open-air school purposes. The plan of the third floor of this building is shown in figure 23.

An interesting example of an open-air school building is that at Coronado, Cal. This is a concrete structure of mission type, with French doors on one side and high transom windows on the other. One whole side can thus be thrown open. It provides for all the

children of the grammar grades, and is maintained by the public school authorities.



FIGS. 17 AND 18.—Plan of the open-air school built by the Columbus Society for the Prevention and Cure of Tuberculosis at a cost of $6,111.50. The building is of frame, containing one large schoolroom with windows on three sides, dining-room, kitchen, two lockers, two lavatories, store-room, bath, nurse, and reception room. An 18-foot porch surrounds the building. Capacity, 25 children.

Many such schools are being constructed throughout California and in other States where the climate is favorable. Other schools with specially designed open-air rooms are the Steele School in

Denver, Colo., and the Marr and Stephens Schools in Detroit, Mich. In Boston, Philadelphia, and other cities all the new school build-

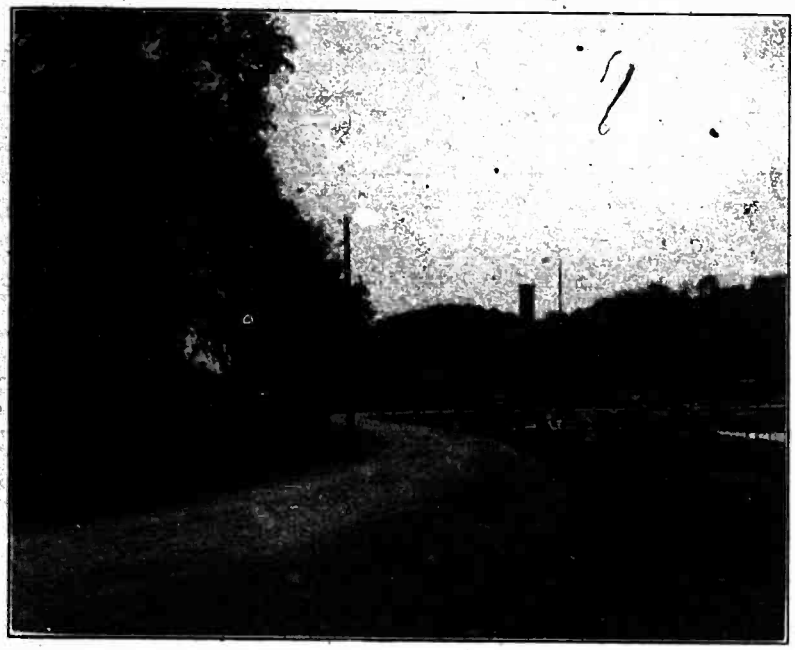


FIG. 19.—Edward Mott Moore Open-air School, Rochester, N. Y.

ings are making some provision for open-air school work, usually one or more rooms of this type being built in each schoolhouse.

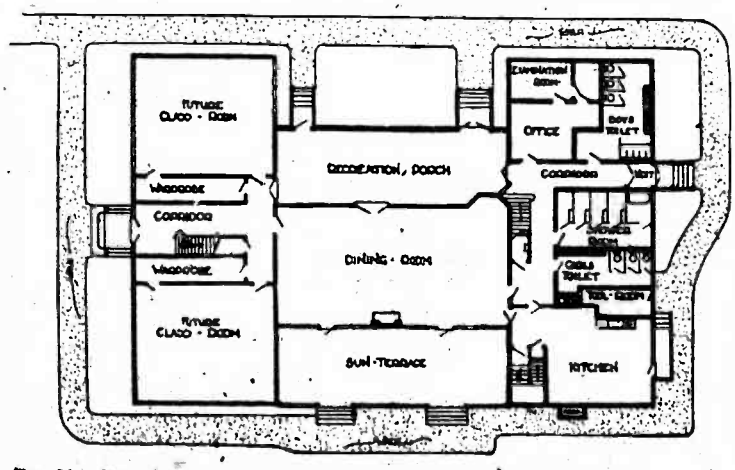


FIG. 20.—First-floor plans, Edward Mott Moore Open-air School, Rochester, N. Y.

It is natural that people should ask with increasing frequency, "Why not open-air schools for normal children?" This idea was

voiced by a pupil in one of the Chicago open-air schools who brought a little companion to the doctor and eagerly asked, "Say, Doctor, how sick has a feller got to be to get in this 'ere school?"

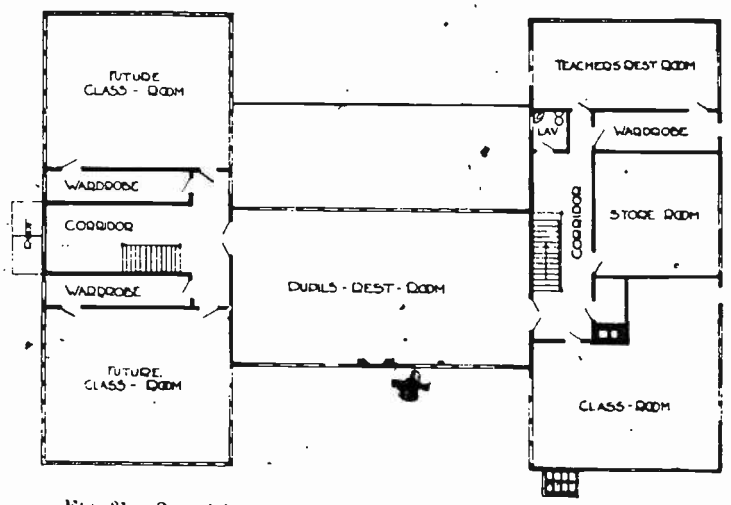


FIG. 21.—Second-floor plans, Edward Mott Moore Open-air School.

Figure 25 illustrates an open-air school for normal children, built in Canton, Mass. John C. Davis, superintendent of schools of that city, says, in the Journal of Education for March, 1914:

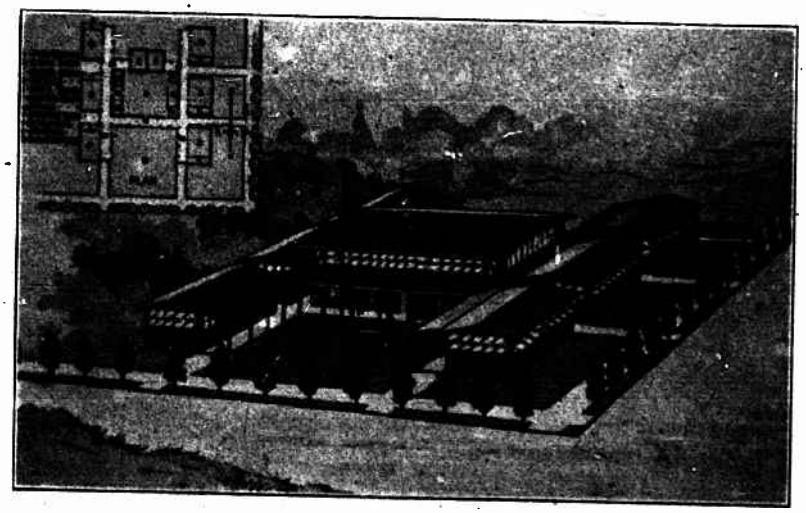
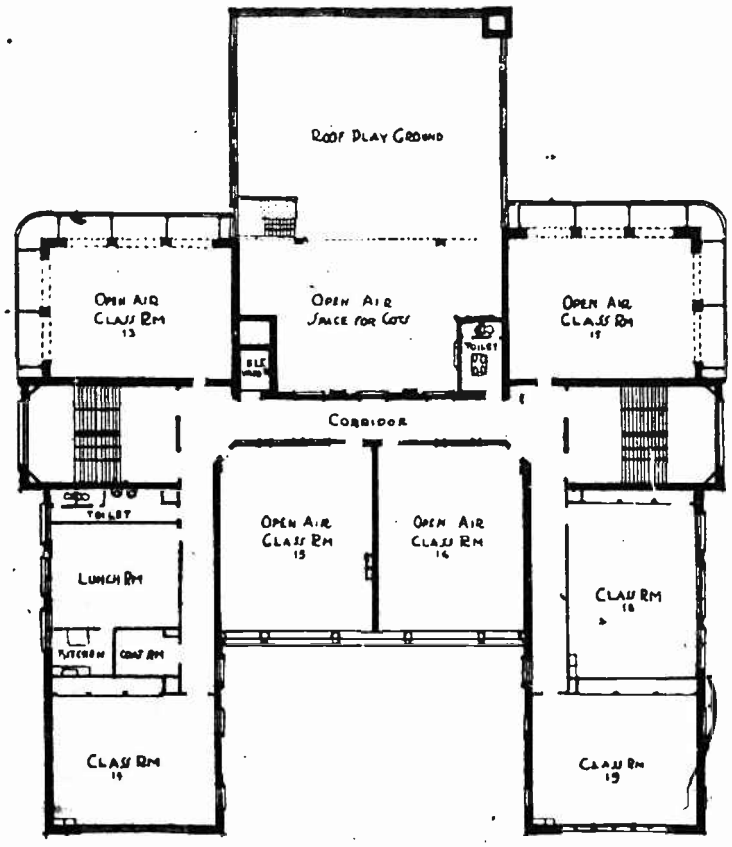


FIG. 22.—Plan for complete school plant composed of units of Fresno type. John B. Woollett, architect.

An examination of the plans of the proposed new 4-room elementary school building at Canton, Mass., will reveal several features as yet entirely new in schoolhouse construction. Perhaps the most important departure from

the ordinary is the elimination of the dark shaft for the admission of air and the substitution of the monitor roof system of ventilation which has been successfully worked out at the Massachusetts Hospital school under the direction of the superintendent, Dr. John E. Fish. It also has four outdoor rooms opening directly from the schoolrooms, where some of the school work will be carried on in pleasant weather and where all the games, folk dances, and other physical exercises will take place. There are no rooms



THIRD FLOOR PLAN

FIG. 23.—Third-floor plan, Eagle School, Cleveland, Ohio.

in the basement to be used by either pupils or teachers. Each room has its own toilets, placed where they are easily supervised by the teacher; this arrangement does away with the very undesirable association of older and younger pupils in basement toilets.

The building committee spent a great deal of time in consultation with architects and medical experts in regard to schoolhouse ventilation. The plans of the new building call for direct heating by means of radiators and coils around the walls of each schoolroom. Fresh, cold air is admitted

through the windows, some of which open to the floor; this air becoming heated, passes along the curved ceiling and out the monitors at the top. The proper slope of the ceiling has been determined after much experimenting at the Massachusetts Hospital school, and is the angle at which air was found to flow most freely. The monitor openings are easily controlled by a wheel on each side of the room, a slight turn opening all the monitors to one side.

This building is an attempt to get more fresh air and at a lower temperature, and when the weather permits, to enable each teacher at a moment's notice to turn her classroom into what is practically an open-air room without disturbance to any other room.

Outdoor air has qualities which air admitted through stacks and over heat coils can never possess, however much humidifying and washing is done regardless of expense. If fresh air is good for anemic and tuberculous children, is it not advisable to provide fresh air as a means of keeping children well? A careful record will be kept of children in this building both as to health and progress in their school work as compared with children in other school buildings in town. This is to be the subject of a report to the school committee at a later date.

FIG. 24.—Grammar School, Coronado, Cal.

In the judgment of the building committee, this building means for the children who occupy it less anemia, fewer head colds, fewer adenoids, fewer diseased tonsils, and fewer cases of tuberculosis. It is the gospel of fresh air and sunshine applied to schoolhouse construction.

There are open-air schools, public and private, for normal children in 30 cities in 8 States. The movement has grown, and just as there has been a marked change in the construction of dwelling-houses, so the demands for better ventilation and more stimulating working conditions are modifying schoolhouse architecture. People are beginning to realize that the pleasure and profit which should be derived from meetings and assemblages in audience rooms of different kinds is greatly reduced by improper heating and ventilation. Public speakers are conscious of the added strain of talking to audiences who are in a half-asphyxiated condition. School-teachers know only too well the nervous strain and overtaxing of nerves

that come from trying to teach children who are in a similar condition. It is beginning to be realized that one of the biggest possibilities of loss in efficiency exists in the schoolrooms of the United

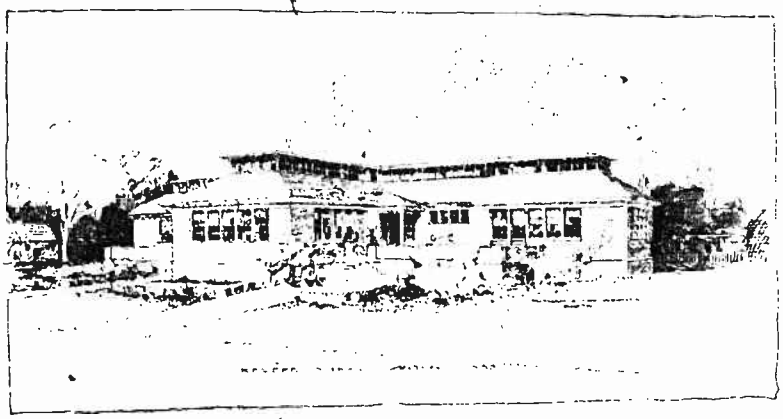


FIG. 25. Revere School, Canton, Mass.

States, where 20,000,000 children are supposed to spend 100,000,000 hours a day every school day of the year.

It required the breath of life to make man a living soul, and it likewise requires pure clean air to make and keep a living body.

Chapter II.

EQUIPMENT AND COST OF OPEN-AIR SCHOOLS.

The ideal equipment for an open-air school is still in process of evolution. The United States has been able to learn little from Europe in this regard because the European open-air schools are, for the most part, in session only from May until October, and the weather, save in the extreme east, seldom attains the severity which it does in the Northern States. American cities that carry on fresh-air schools for public-school children in very cold weather are still resorting to all kinds of experimental devices to protect the children from storm and cold. Only the undeniable benefits that come from the stimulation of the fresh cold air could justify the trouble and expense involved. The demonstrable results, however, convert the most skeptical.

CLOTHING.

Clothing the child properly for winter weather is no easy task. American houses are proverbially overheated; and schoolrooms, where the temperature is supposed to be regulated by law, as a matter of fact are often equal offenders. If children are dressed to be comfortable at home, they are often too thinly clad for the street or overburdened with heavy wraps. If they are sensibly prepared for the street, they are uncomfortably hot for the school.

Under any conditions safeguards must be thrown about the transition from an overheated atmosphere to the keen and nipping air of out-of-doors. This is particularly true in the case of delicate children. It is of the utmost importance to see that such children are carefully clothed and wrapped.

The method usually followed by the open-air schools is to provide wraps of one kind or another, to install a system of feeding, and to modify somewhat the program of the ordinary school by the introduction of periods for bathing, resting, and medical examinations. All these features necessitate special equipment and clothing.

The personal equipment needed varies with the location of the class. Pupils in a classroom on a roof, or in an unheated recitation room, exposed to strong winds, will require heavier and more elabo-

rate clothing than children in an open-window room receiving some heat. If the floor is warmed, it may be unnecessary to provide extra foot covering. The one essential is comfort at the minimum expense, and it may be noted in passing that a child's judgment can not always be relied upon to decide whether he is comfortable or not. Open-air school pupils soon come to take a queer pride in their ability to withstand cold. Zero weather challenges their reputation, and rather than surrender to a mere thermometer, they will assert, even while their teeth are chattering and their noses are blue and

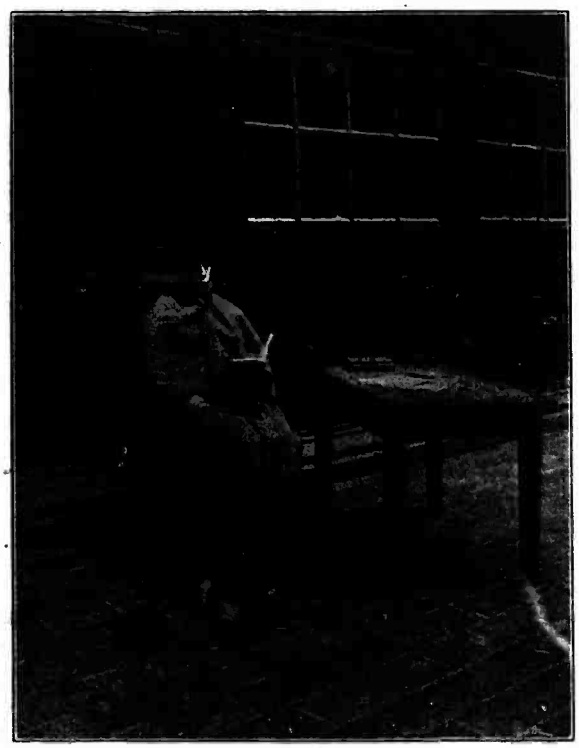


FIG. 26.—The sitting-out bag used in open-air schools in New York and elsewhere.

pinched, that they are "perfectly comfortable." The condition of the children's hands is a good index of their comfort. It is a good plan, on cold days, for the teacher to pass from pupil to pupil and ascertain by actual contact whether or not the hands are cold. The nurse or teacher should always assure herself, by personal investigation, that each child has on warm underwear and dry stockings, and extra articles of this nature should be kept at the school for use in an emergency. Experience teaches that children who are not sup-

plied with clean, warm underclothing, good stockings, and warm shoes are much more likely to suffer from cold than are the others. Often the exterior appearance will mislead the teacher.

The open-air school outfit in general use in this country has been developed from either the sitting-out bag type or the so-called Eskimo suit.

The sitting-out bag is made from a long strip of heavy canvas, lined with blankets and doubled over at the bottom to form a pouch into which the children thrust their legs. Some bags come only to

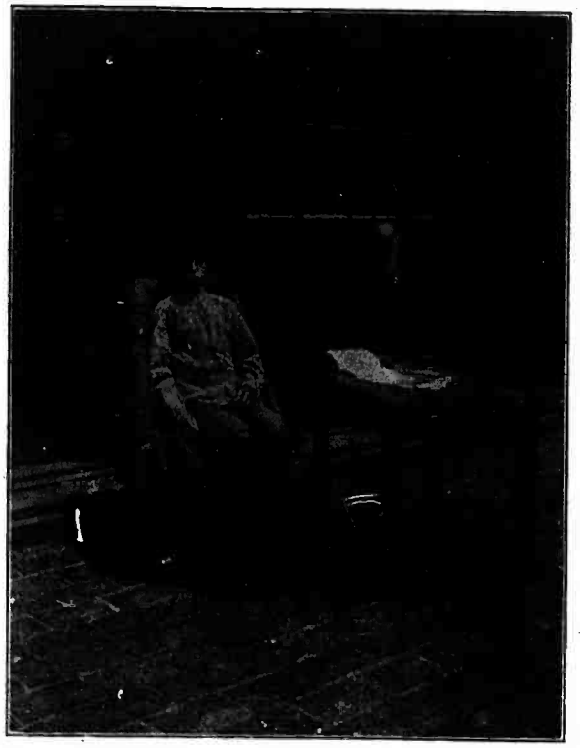


FIG. 27.—The sitting-out bag fastens with metal snaps which are easily manipulated by children.

the waist, others to the shoulder line; but the best design is that which permits one end to fold about the shoulders in the form of a cape.

Mr. Frank H. Mann, secretary of the New York City committee on the prevention of tuberculosis, who devised such a bag for use in the New York and Brooklyn schools, describes it thus:

The garment is made of heavy brown felt. The bottom is square in shape and reinforced with extra heavy material about 1 inch in thickness to protect

the feet from cold weather. In addition the bottom is covered with a special detachable piece of canvas to insure against wear and tear.

The system of fastenings was specially devised to facilitate convenience in getting in and out of the bag. A series of snap catches all the way from head to foot makes the means of access far more practical than the old way of stepping in and out from the top. Hooks around the garment at the center enable the wearer to buckle it snugly about the waist.

Another interesting new feature is the pocket at the side provided for handkerchief and mittens.

These bags cost $4.50 to $5.50. They will last indefinitely. A cap, overcoat, or sweater, warm overshoes, and mittens complete the outfit, which need not, all told, cost more than $10.

FIG. 28.—This type of wrap allows too many chances for cold air to enter about neck and shoulders of children.

The chief advantages of these bags are the ease with which the children can get into and out of them, the convenience with which a large class of different-sized children can be equipped without special fittings, the durability of the bag, and the comparatively low cost.

Unfortunately, however, the sitting-out bag deprives the child of freedom of motion. He can not go from desk to blackboard without stepping out of the bag, and in cold weather this means either getting chilled or keeping quiet. The principal of a private open-air school for young children writes:

The main objection to the open-air school work in cold weather is that, having put the children into their bags, I find in order not to spend all my time in getting them in and out I have to keep them sitting for an hour and a half without much change of position. This is contrary to all my convictions; but as there seems to be almost no restlessness or complaint I have concluded that the fresh air counteracts this disadvantage.[1]

The Boston schools have discontinued the use of the sitting-out bags because of inability to clean them properly after continued use. Dr. Ayres, in Open-Air Schools, page 133, says: "The children are very apt to regard them as ideal places for collecting and guarding a miscellaneous collection of the treasures of childhood, including food supplies, which they store up for future possible need."

FIG. 29.—Sitting-out bag used at Providence (R. I.) Open-air School. Excellent for lower part of body, but insufficient protection for neck and shoulders.

If the sitting-out bag completed the whole outfit which the open-air schools must supply, the argument about the cost of fitting might hold good, but the sweaters, stockings, and caps must be of the right size, and this in itself necessitates taking measures of individual children.

The Eskimo outfit is a two-piece pajama suit, with hood, made of heavy woolen blankets. It slips on over the ordinary school clothing. Designed in the Elizabeth McCormick Open-Air Schools in Chicago, its picturesqueness has won wide publicity, and its utility has been demonstrated by five years of constant use. It gives perfect freedom of motion, satisfactory warmth, cleans nicely, and wears well. Its disadvantages are the initial cost and the necessity of fitting the suits to individual children.

Four-pound single blankets, which are heavy enough for any but the most exposed open-air schools, can be bought at wholesale for

[1] Letter from Mrs. Ada C. Beckwith, New Rochelle, N. Y.

about $4.85. They are 70 by 80 inches in size, and one will make a complete suit for a child under 12. For larger children three blankets will make two suits.

For teachers and matrons a long hooded coat may be made of the blanket material. This coat is lined below the waist and slips on easily over outer wraps or sweaters, cleans well, and is universally becoming.

Eskimo suits for children are now handled by several commercial houses. They usually run in five sizes: No. 1 for children 5 or 6 years of age; No. 2 for those 7 or 8 years of age; No. 3 for those 8 to 10 years of age; No. 4 for those 10 to 12 years of age; and No. 5 for those 13 and 14 years of age. The suits cost $5.15. Care must be observed, either in ordering or making the suits to get them large enough. It must never be forgotten that they are put on over the child's ordinary clothing, and often over the sweater or extra wrap.

FIG. 30.—The Eskimo coat should be cut large enough to go on over sweater or heavy wrap.

So simple is the pattern that groups of club women or domestic science classes can easily follow it. In Cleveland, Ohio, the girls in the sewing classes of the Technical High School made the suits. In Pittsburgh the chairman of the clothing committee of the Civic Club gave the use of two rooms in her house and the help of a seamstress for two weeks to the women of her committee who made, in that time, 26 of the suits, including two long Eskimo coats; one for the teacher and one for the matron.

If mothers wish to provide their children's suits themselves, they ought to conform to the color and style of blanket recommended by the school. To introduce a variety of stripes, checks, and colors into an open-air classroom is to destroy that element of picturesqueness which contributes no little to its success.

The boots used with the Eskimo outfit are the so-called "lumberman's boots." They reach to the knee, and the trousers of the Eskimo suit are tucked into them. The soles are reinforced with heavy canvas, which prolongs the life of the boot. They are slit over the instep, and eyelets are put in for lacing, in order to give greater ease in putting on the boots over the shoes; they cost $1.35.

The fleece-lined sheep-skin boot that can be bought for $1.55 wears out too quickly to be practical for the children. Some teachers prefer it, however, to the higher lumberman's boot.

FIG. 31.—The Eskimo suit gives perfect freedom of motion.

Recently a heavy leather boot, with upper part of felt, lacing nearly to the knee, has been placed on the market. It cost $2.50, but it will give double the service of the felt boot. It has also the advantage of permitting the child to remove his own shoes, which is not possible with the felt boot. The fact that the use of this boot requires the children to remove their shoes gives the teacher an opportunity to note whether the stockings of the pupils are wet or even damp, a very important consideration for the health and safety of the children.

The warm overshoes with leggings, which some schools provide, while doubtless warm enough for open-window rooms, do not seem sufficiently heavy to protect against the cold of the roof schools.

A mocha kid glove with flannel lining gives much more freedom to the fingers than a mitten, and it will not crock or chap the hands. If it fits loosely enough, the children can easily handle pencil or chalk during the coldest weather. The gloves clean satisfactorily, and with ordinary care will last two seasons. They cost about $12 a dozen.

SLEEPING COTS.

The introduction of a rest period into the open-air school program brings with it the necessity for further equipment. The earliest

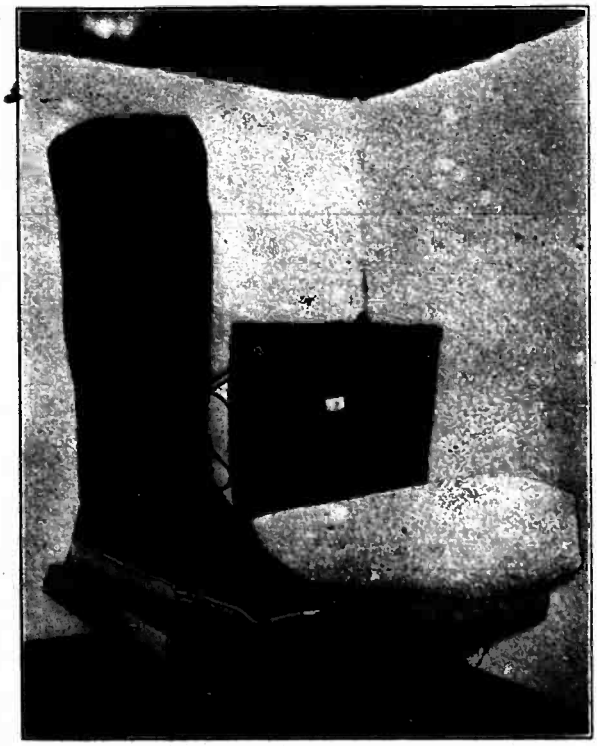


FIG. 32.—The lumberman's boot, re-soled with canvas. Cost, $1.15.

American schools, following the example of Charlottenburg, provided steamer chairs, but experience shows that a child trying to sleep in a steamer chair almost invariably knots himself up into an uncomfortable tangle of arms and legs which hinders deep breathing and prevents the complete relaxation which sleep should give. The chairs are heavy and awkward to handle. It is hard for a child to lift them or move them about, and few American open-air schools have room enough to avoid a certain amount of daily adjustment of furniture.

A light-weight cot which can be folded into small compass is much to be preferred. For ease in handling and storing, a canvas cot which folds over at the head and foot into a rectangular shape is better than one which doubles up in the middle down its whole length. If the space which can be used for the rest period is limited, instead of the ordinary 6-foot cot one may buy a made-to-order cot 5 feet 2 inches long and 28 inches wide, which is quite large enough for the average 14-year-old child. Strips of heavy canvas across the points of greatest wear, and especially reinforced corners, prolong its usefulness. Such cots can be bought for $3.

FIG. 33.—A leather boot, with upper part felt. Cost, $2.50.

FIG. 34.—The ordinary steamer chair is unhygienic for children to sleep on. Note the uncomfortable positions in this picture.

Blankets or sleeping bags will be needed for the rest period in cold weather. The sleeping bag shown on this page can be made of canvas and lined with shoddy blankets at a cost of $4.45. It launders well and lasts indefinitely. One double blanket in addition gives ample protection without too great weight. In open-window rooms the double blanket alone is equally satisfactory.

The care of this equipment requires no small amount of time and thought. St. Louis has devised a good locker in which cots, blankets, Eskimo suits, boots, and gloves can be conveniently stored away by the children themselves. Something of the sort must be provided for use at night and during vacations. Each locker space and every article of personal equipment, from cot to gloves, should bear an identifying mark. Numbers are better than initials, since articles so marked are easily transferable. Ordinary laundry labels marked

FIG. 35.—Suggested type of cot for open-air use.

with indelible ink prove satisfactory. Gloves should be fastened by tape to the coats.

DISINFECTION.

All articles of clothing, blankets, and sleeping bags should be laundered or disinfected at the end of the first half year of use, during the summer vacation and always at any change of ownership. Blankets ought to be shaken out and sunned frequently.

A simple method of disinfecting blankets is to sprinkle a sufficient quantity of formaldehyde over them and put them in an air-tight box for 24 hours. If a large number of blankets are to be disinfected at once, they should be hung on clothes lines in a room which can be sealed and disinfected.

The method here given is the one usually employed by the Chicago Department of Health in disinfection of schoolrooms. Formaldehyde disinfection is most efficient if the temperature is above 60° F. and the atmosphere not too dry. When the air of the room (as in many steam-heated buildings) is very dry, the vent cocks of the radiators may be opened for a few minutes to permit the escape of steam into the room, or vessels containing water may be placed in the room.

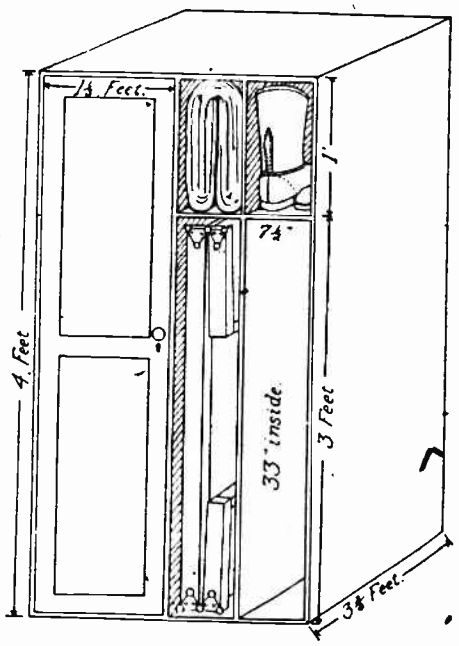


FIG. 36.—Locker devised by St. Louis Open-air School for storing cots and Eskimo suits.

1. Ingredients for 1,000 cubic feet of air space:
   (*a*) Paraformaldehyde, 30 grams (7½ drams).
   (*b*) Potassium permanganate, 75 grams (18¾ drams).
   (*c*) Water (hot, if possible), 90 cubic centimeters (3 ounces).
2. Procedure:[1]
   (*a*) Make the rooms to be disinfected approximately air-tight by sealing with gummed paper all doors, windows, chimney flues, etc.
   (*b*) Freely expose all articles in the rooms; place clothes, etc., across backs of chairs, or hang them on a clothesline; open books and place them on end; open all drawers and closet doors.
   (*c*) Secure enough vessels or dishes, one for every 1,000 cubic feet of air space to be disinfected, put about 1 inch of water in each, and place the mixture pans in them.
   (*d*) Place in each mixing pan the contents of one carton of potassium permanganate (75 grams).
   (*e*) Measure, in the aluminum cup, 90 cubic centimeters of hot water for each outfit, pour over permanganate crystals, and let them dissolve.

[1] The local health department can usually be called upon for this service.

2. Procedure—Continued.

(*f*) When all the pans used for the space to be disinfected have been prepared, pour into each the contents of a carton of paraformaldehyde (30 grams). In doing this be careful to add the first charge of paraformaldehyde to the pan furthest from the exit left open, and then in succession to the others in the order of distance from the exit. Before adding paraformaldehyde remove all your surplus material and equipment from the room.

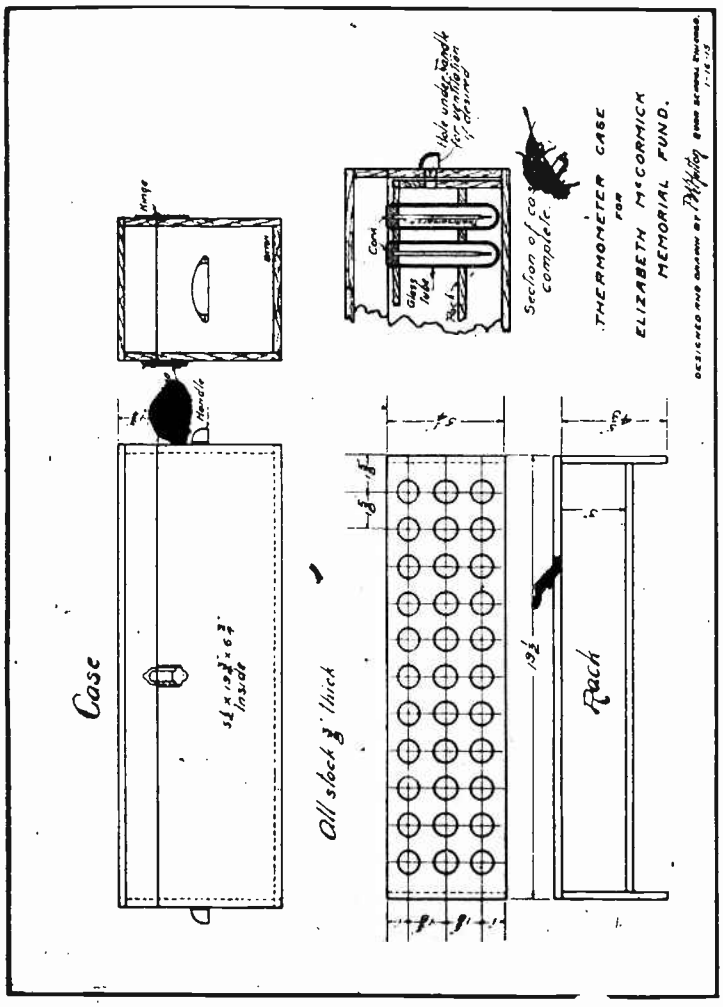


FIG. 37.—Thermometer rack for use in schools where temperatures are taken.

3. Length of time necessary for efficient disinfection, four hours.

4. Always advise a thorough scrubbing and ventilating of the room after disinfection.

(*Chicago (Ill.) Field Employee's Handbook. Bureau of Medical Inspection, pp. 61–63.*)

BATHS, SCALES, AND OTHER EQUIPMENT.

In schools where daily shower baths are given, each child must have a rubber cap and two Turkish bath towels. Paper towels are better for all other purposes. Soap may be provided in the liquid form more conveniently than in individual cakes. Toothbrushes, combs, hairbrushes, nail files, and other small toilet articles help to impress the lessons of personal hygiene which the open-air school aims to inculcate. The individual thermometers needed in schools

FIG. 38.—Cloak rooms adjoining open-air class rooms have been fitted up for kitchens by the Chicago Board of Education.

where temperatures are taken may be conveniently kept in a receptacle similar to that illustrated in figure 37. The top of the thermometer is thrust into a cork which fits the test tube, and the mercury end is suspended above a pad of absorbent cotton soaked in formaldehyde.

In the interests of accuracy, the school scale with measuring rod should stand in the bathroom so that the children may be weighed, and their measurements taken without the variable factor of cloth-

ing. A weighing slip of unbleached muslin protects against unnecessary exposure of the person.

FURNITURE.

A list of the furniture needed for kitchen and diningroom for 25 children follows:

Kitchen equipment.

Articles.	Number.	Size or kind.	Approximate cost.
Asbestos mats	2	For the stove	$0.06
Bread board	1	Oval	.25
Bread box	1	No. 3	1.50
Bin, flour	1	25 pound	1.25
Bin, sugar	1		1.15
Boiler, double	1		2.25
Bowl, mixing	1	China, 2 quart	.35
Broom	1		.35
Brush, scrub	1	Small	.15
Can opener	1		.15
Cupboards	2		25.00
Dish cloths	2		.14
Dish towels	9		.90
Drainer, dish	1	Large	.75
Egg beater	1	Dover	.15
Food chopper	1	No. 3	2.00
Gas range	1		25.00
Kettle, stock, granite	1	4 gallon, with cover	3.00
Kettle, potato, granite	1	10 quart, with cover	1.35
Kettle, tea	1	No. 8	1.15
Knife, bread	1	Saw	.25
Knife, carving	1		.60
Knife, paring	1		.15
Knives and forks	1 pairs	Steel	.30
Ladle, soup	1	Heavy tin	.15
Measuring cup	1	Tin	.05
Milk bottle opener	1	From the dairy	
Mop and stick	1		.50
Nutmeg grater	1		.05
Pail, garbage	1	With cover	.50
Pail, scrub	1	Small	.20
Pan, frying	1	Iron, No. 8	.50
Pan, ginger	2	1-9 by 13¼	.76
Pan, dish	1	Oval, 15 by 19	.55
Pan, roasting	1	With cover, 12 pound	1.10
Pan, sauce	1	Granite	.29
Pitchers	2	Enamel, 3 quart	1.50
Potato masher	1	Wire	.15
Salt jar	1		.35
Scale, family	1	25 pound	1.25
Scrub cloth	1		.15
Sink, enamel	1	With back and drain board	15.00
Skimmer	1	Heavy tin	.10
Spoon, basting	1	do	.10
Soap shaker	1	Wire	.18
Stool	1	3 feet high	1.75
Strainer, soup	1		.65
Table, kitchen	1	With drawer (28 by 48 inches).	2.25
Toaster	1		.15
Towel rack	1	For dish towels	.25
Do	1	For paper towels	.25
Total			90.73

Dining room equipment.

Articles.	Number.	Size or kind.	Approximate price.	Approximate cost.
Bowls, soup	30	No. 30	$0.17	$5.10
Chairs	30		.60	18.00
Cupboard	2		25.00	25.00
Knives and forks, pairs	30	For the table	[1].90	2.25
Mugs, enamel	2	White enamel	.15	.30
Plates	30	3 by 3	[1]1.35	3.38
Do	6	9 inches, edge to edge	.15	.90
Sauce dishes	30	8 inches, edge to edge	[1]1.40	3.50
Salt shakers	30	4 inches, edge to edge	[1].75	1.88
Spoons, dessert	4	Glass	.10	.40
Spoons, table	30		[1].20	.50
Spoons, tea	6		[1].25	.13
Tables, dining room	60		[1].15	.75
Tureens, soup	2	21 feet by 30 inches		40.00
	2	White enamel, 1 gallon	1.50	3.00
Total				105.09

[1] Price per dozen.

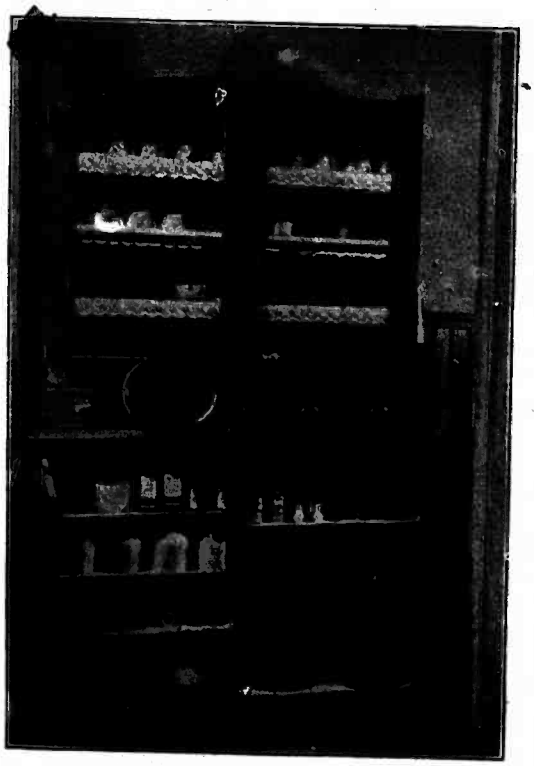


FIG. 39.—Supply-closet kitchen formerly used as a cloak room.

In cities where open-air schools are financed by agencies other than the board of education the board can ordinarily be depended

upon to provide the schoolroom equipment of desks, blackboards, books, etc. If one room is to serve for recitation and rest, movable chairs with attached desks are recommended. They give wide possibilities of arrangement of floor space, can be chosen with reference to the size of the occupant, and otherwise conform to the usual requirements of school hygiene. Movable blackboards give the extra room for board work sometimes needed when the wall space is largely taken up with windows.

The personal equipment and the articles needed for dining room and kitchen have been frequently provided by some private agency, but there is a distinct tendency on the part of boards of education to recognize their obligation in this regard. Since practically all articles remain the property of the school and never become the possession of the individual child, there seems to be no good reason, except that of expense, why other cities should not follow the example of Cleveland, Buffalo, Cincinnati, Rochester, New York City, and others in paying for all facilities that are necessary to insure to these children reasonable opportunities for preserving health and acquiring that modicum of knowledge which our conception of public education demands as the prerogative of each child.

Chapter III.

SOCIAL AND ECONOMIC CONDITIONS OF OPEN-AIR SCHOOL CHILDREN.

An effort has been made to secure as careful information as possible on the physical, social, and economic condition of the pupils who attend open-air schools in the United States.[1] For this purpose a questionnaire was prepared and sent by the Bureau of Education to a number of open-air schools. The securing of answers to these questions devolved upon teachers, nurses, and physicians whose time was already more than filled. Many of the points called for were not covered in any existing record forms and, as a consequence, it was necessary to make original investigations and to seek information from new sources. This often involved visits to the home, to charitable organizations, conferences with parents, interviews with family physicians and other interested people.

The points covered in the questionnaire concerning open-air school children were as follows:

1. Total number in household?
2. How many in household have tuberculosis?
3. What relation are they to the child?
4. Is any other exposure to tuberculosis known?
5. Estimate of income per month for family during six months immediately preceding admission of child to open-air school?
6. How much rent is paid per month?
7. Number of rooms occupied by household?
8. How many of these rooms are used as sleeping rooms?
9. Does the family occupy a detached house? A tenement?
10. Have they a private yard? A vegetable garden?
11. Is general intelligence of family held high? Medium? Low?

At time of admission.	*At end of school year.*
12. Cleanliness, good? Fair? Bad?	Cleanliness, good? Fair? Bad?
13. Ventilation, good? Fair? Bad?	Ventilation, good? Fair? Bad?
14. Overcrowded?	Overcrowded?
15. Irregular meals?	Irregular meals?
16. Alcoholism?	Alcoholism?
17. Hour of retiring of child?	Hour of retiring of child?
18. Does child occupy bed alone?	Does child occupy bed alone?
19. Room alone?	Room alone?
20. How many windows in bedroom?	How many windows in bedroom?
21. Are windows open at night?	Are windows open at night?

[1] Special considerations have made the gatherings of accurate data difficult. Both doctors and teachers have had all they could do to give the proper physical and educational care to the children, and records when made came as added duties. These and other difficulties were encountered in getting information about pupils in open-air schools. When it came to matters of comparison of gains in weights, school attendance, and school progress, it has generally been impossible to get reliable information from regular school records.

Replies were received from the following cities for the schools and number of children indicated:

	Pupils.
Boston Mass.:	
Geo. J. Angell School	7
L. Crocker School	16
Lafayette School	8
Washington School	5
Winchell School	10
Chicago, Ill.:	
Burr School	34
Foster School	33
Franklin School	118
Graham School	117
Haines School	27
Hamline School	37
Holden School	38
Moseley School	41
Open-air Schools Nos. 1 and 2	65
Open-air School No. 3	28
Seward School	34
Sheridan (Phil) School	35
Thorpe (Ole A.) School	36
Cincinnati, Ohio:	
Dyer School	26
Guilford School	24
Cleveland, Ohio:	
Eagle School	97
Murray Hill School	26
Louisville, Ky.: Audubon School	15
Minneapolis, Minn.:	
Geo. Bancroft School	25
Peabody School	20
Montclair (N. J.) School	14
Newark, N. J.:	
Elizabeth Avenue School	15
Montgomery School	15
Morton Avenue School	15
New York, N. Y.:	
Class Public School No. 12	20
Class Public School No. 21	19
Class Public School No. 33	41
Oakland, Cal.: Hawthorne School	24
Pittsburgh, Pa.: Irene Kaufman School	18
Providence (R. I.) School	25
Rochester (N. Y.) School	26
St. Louis (Mo.) School	45
Schenectady, N. Y.:	
McKinley School	15
Washington Irving School	15
Springfield (Mass.) School	25
Total (16 cities, 40 schools)	1,263

In many instances it was impossible for those who gathered the information to get full and complete answers, and it is therefore equally impossible to give detailed information on all the points concerned and for all of the children returned. These data have been carefully studied and tabulated by a trained social worker. Not only have the returns to the questionnaire been studied and classified, but subsequent correspondence has been necessary to verify certain points and to get fuller information where answers were incomplete or equivocal.

The first item in the questionnaire calls for the number in the households of the pupils in open-air schools. This question was answered for the families of 587 children in cities outside of Chicago and for 488 families of children in Chicago open-air schools. The average number in the families of these two groups is 6.12 and 6.2, respectively. These are unusually large averages. It should be borne in mind, however, that the open-air schools, especially in the United States, concern themselves with undernourished, physically debilitated children. The size of the family is at least one of the factors in the problem of insufficient food.

The number of rooms occupied by these families and the character of the dwelling occupied are matters of special interest in the light of the foregoing statement. The average number of rooms per family for the whole group was 4+. The prevailing type of house in the congested quarters of Chicago is the four-room flat. Many of these flats contain two rooms of fairly good size and two smaller rooms, just large enough for a double bed, but sometimes only large enough for a three-quarter bed. The family is usually restricted to the kitchen and possibly one other room during the day, and to the two bedrooms at night.

FIG. 40.—A one-room apartment. In this home the mother worked in a factory, and the older girl was kept from school to care for other children.

One room must, of course, be used as a kitchen; another may be the living room, but this usually also serves as a sleeping room. The proportion of the living quarters used for sleeping purposes ranged from 45 per cent to 79 per cent. About 14 per cent of the families live in one, two, or three room homes. As a rule the incomes in these families are the lowest of the group studied; as a rule, also, the families were large and in many of the homes conditions were such that good school work could not reasonably be expected from the children. In the majority of the homes each bedroom was occupied by more than two persons. This meant for some families four or five people in one sleeping room. In this connection it should be re-

membered that there was an average of more than one tuberculous member for each family studied.

Twenty-eight of the families studied, or 7 per cent, were living on their own property. In some of these cases, however, the house was mortgaged, and in their efforts to meet financial obligations the family itself lived in two or three rooms, in order that they might rent the balance of the building and thus increase their meager income. Some of the worst conditions of overcrowding were found in these homes.

The average rent for all the families studied is $12.34 per month. This item varies not only as between different cities, but in different parts of the same city. For instance, the average amount paid per room per month in one district of Chicago by the families having children in open-air schools is $4; in another $1.97. In New York City it was, respectively, $4.57 and $4.16 per room per month for two different schools; in Pittsburgh, $4.25, and in Providence, R. I., $1.90.

The question regarding the character of the dwelling was answered for 375 families and shows that 73 per cent lived in tenements and 27 per cent in detached houses. A detached house does not mean, in this study, a separate dwelling for one family, but might contain two or three apartments. It simply means that the building was separated from other buildings by some width of air space.

One question asked was whether the family had or had not a private yard and vegetable garden. There were practically no answers to the question from the schools outside of Chicago. It was answered by comparatively few of the Chicago families, and when answered was in the affirmative. These replies show that 60 families had a yard. It should be recalled that 73 per cent of the families of Chicago children covered in this study lived in tenements, and the yard was used in common by two or more families, and was principally as a space in which to dry clothes.

The tenement districts of modern cities mark the final retreat of the children from a life in the open. Mrs. Albion Fellows Bacon, in her book "Beauty for Ashes," speaks of "the essential unrighteousness of the 25-foot lot." Tenement houses in congested quarters of large cities usually rob the child of both the front and back yard. There are often two and sometimes three tenements on one of these 25-foot lots. When this is the case the essential unrighteousness is usually discernible in the children who live in such tenements.

Nineteen of the families were indicated as having gardens. A garden meant, however, a vegetable or flower garden, and any little plat along the fence was called a garden. Any return of vegetables from such gardens would be comprehended in a few radishes, onions, beans, lettuce, and possibly peas. In no case were the gardens appreciable factors as a source of food supply. They were unques-

tionably of value, however, in the life of the family, for, no matter how small or insignificant, they gave diversion and a profitable use of time to fathers and mothers as well as children.

Window boxes, kegs, and other receptacles, where struggling plants and sometimes vegetables grew, were evidences of the tenacity with which people hold to the desire to grow things from the ground. When the yard and the garden with their tasks and chores and pets, and chance for initiative in work and play and for the development of responsibility were cut away, and when the home shrank from the ranch, the farm, an individual house on a lot with its own garden and yard, to the three or four rooms on one floor level of a tene-

FIG. 41.—The kind of home that produces malnourished children.

ment house, and when ready-made and ready-to-serve commodities were brought into the home, new conditions, problems, and responsibilities came into the schoolhouse.

The question concerning tuberculosis was answered for 598 Chicago open-air school children and from 620 open-air school children outside of Chicago.

Of 598 Chicago open-air school children,

450, i. e., 75 per cent, were diagnosed as tuberculous (lungs, glands, bones, etc.).

136, i. e., 23 per cent, were suffering from anemia and malnutrition.

12, i. e., 2 per cent, were suffering from other defects (heart troubles, etc.).

Of 620 open-air school children in different cities,

259, i. e., 42 per cent, were diagnosed as tuberculous (lungs, glands, bones, etc.).

322, i. e., 52 per cent, were suffering from anemia and malnutrition.

12, i. e., 2 per cent, were suffering from other defects (heart troubles, etc.).

27, i. e., 4 per cent, not recorded.

Those who are familiar with work of this kind know how difficult it is to get full and accurate information on this point. Families shrink from examination, often making efforts to conceal the fact that a member of their household has the disease. Moreover, it takes a minute and careful examination to discover tuberculosis in its incipient stages. Accordingly, these figures are undoubtedly below the mark. The questionnaire shows, however, that there was an average of 1.8 tuberculous persons in each of the Chicago families of open-air school children and an average of 0.8 in families outside of Chicago. In the city of Chicago the Municipal Tuberculosis Sanitarium has clinics scattered over the city and a large percentage of the children in Chicago open-air schools reach these schools through the clinics. The absence of an activity of this kind in other cities might easily account for the smaller number of tuberculous children in open-air schools.

These defects are the most prominent, but as the whole physical condition of the child receives attention, many other defects, such as diseased tonsils, adenoids, decayed teeth, and defective eyes, are discovered. Of 598 Chicago open-air school children, 188 had diseased tonsils, 165 had adenoids, 466 had decayed teeth, and 152 had defective eyes. Of 620 open-air school children in different cities, 175 had diseased tonsils, 131 had adenoids, 347 had decayed teeth, and 107 had defective eyes.

The standard of living is a topic which has been much discussed in the literature of social and economic writers in recent years. The question of a living wage has been made the sole topic or has had an important place in many sociological and charitable conferences, and it is receiving more and more attention by all charitable organizations and associations whose work has to do with industrial or social conditions. In his book Principles of Relief (pp. 34–36), Dr. Edward T. Devine gives $600 a year as the amount on which at that time (1904) a family, consisting of man, wife, and three children, could live in New York City and maintain a minimum standard of health and efficiency.

In 1909 R. C. Chapin published a book on "The Standard of Living among Workingmen's Families in New York City." This was based on an extensive study of 391 budgets and working conditions in the year 1907. He placed the minimum income on which efficiency could be maintained at $900 to $1,000 (pp. 245–250). Since 1907 the

articles consumed in laborers' families have risen in cost about 21 per cent.

In its annual report for 1912–13 the New York Association for Improving the Condition of the Poor (pp. 45–50) gives data on the budgets of families cared for in its Home Hospital. This study places the minimum income on which health and efficiency may be maintained at from $1,000 to $1,150 for the Borough of Manhattan.

One of the most definite budget studies so far undertaken was made in the years 1913 and 1914 by the funds to parents department of the Cook County (Ill.) juvenile court. This is the department which administers the mothers' pension work for Chicago and Cook County. The aim is to keep dependent children in their own homes, provided the mothers are fit persons, in other respects than financial ability, to have the care and custody of their children. The purpose of this work is not merely to keep people from starving for a given period, but to give such care to the family as may reasonably be expected to make efficient citizens of the children. A trained dietitian is in charge of this work, and a detailed study has been made of more than 1,000 family budgets. Actual items of expense were carefully tabulated, and the conclusions arrived at were based on purchases and needs of families dealt with in the courts. The conclusion reached by this study was that, in Chicago in 1913–14, an income of $75 per month was necessary to maintain a family of five or six in a state of physical and moral efficiency.

It is not the purpose of this chapter to establish what a minimum standard of income should be, or to argue the merits of the conclusions reached by any of the authorities quoted. The purpose is simply to give the results of studies made as a background for the discussion of the social and economic conditions of children in open-air schools. Military authorities agree that men can not succeed as soldiers without being properly fed and nourished. They also find that it is almost as important to be well shod. The country is beginning to question whether its school children can do the work expected of them on anything short of like conditions.

It is realized, of course, that $75 in the hands of one family may accomplish very different results from the same amount in the hands of another family. But a certain amount of food, clothing, and shelter is necessary for everybody; furthermore, as human beings are constituted, every family, sooner or later, has its share of sickness and other unexpected misfortunes, and no income is complete that does not make some provision for medical and dental service, for sick time, rest, and recuperation. The families studied by the Cook County juvenile court were all city families, and the other studies also related to families living in crowded city districts. It is to be understood, therefore, that under such conditions there is

no subsidiary contribution to the family's maintenance in the way of a garden, milk from the family cow, or eggs or meat from a poultry yard. Everybody probably knows families living on smaller sums of money than $75 a month, but conditions differ.

It is to be remembered also that, in the studies referred to, the whole needs of the family are considered. The sums mentioned as minimum incomes mean that the family should take care of its necessities and that the earnings should not be supplemented by hospital or dispensary care, charitable relief of one kind or another when the misfortunes come. The amount given by the juvenile court through the "Funds to Parents Act" is to relieve the families from the necessity of receiving aid from any other source.

The budget studies by the juvenile court of Chicago show the distribution of the $75 per month about as follows:

1. Rent	$12.00
2. Food	29.00
3. Fuel, light, and ice	5.00
4. Household expenses	1.00
5. Clothing and personal expenses	13.00
6. Car fare	2.50
7. Insurance	2.00
8. Furniture	2.50
9. Education	1.00
10. Care of health (including dentist)	4.00
11. Recreation	2.00
12. Emergencies	1.00
	75.00

As a working basis for relief work the juvenile court treats the item of rent separately, because it varies in different families and in different parts of the city, and because sometimes families own the house in which they live. Since the average rent is about $12, an allowance of that amount is made in the budget. The remaining $63 is divided by five, the usual number in the family. This makes $12.60 per individual per month, and this is the basis on which budgets for families are calculated. Where there are six or more people in the family, the allotment is slightly reduced; where there are less than five, the individual per capita is increased. It is understood too, of course, that the needs of small children are less than those of adults or of children who are working. However, in these families ages average fairly evenly, and the sum mentioned ($12.60) is reckoned as necessary to maintain health, strength, and efficiency.

Accepting this standard, therefore, for the purpose of comparison, and understanding that each one who reads this will reserve the right to establish his own standard, the adequacy of incomes of open-air school children covered in the questionnaire is as follows:

The income was inadequate—

In 329 of 371 Chicago families, or 88.7 per cent; the average income being $5.97 per individual.

In 335 of 398 families outside of Chicago, or 84 per cent; the average income being $6.41 per individual.

The income was adequate—

In 37 of 371 Chicago families, or 13 per cent; the average income being $15.70 per individual.

In 63 of 398 families outside of Chicago, or 16 per cent; the average income being $18.83 per individual.

The figures show that the families having an adequate income are comparatively small. Their average membership is 5.2, compared with 6.4 in the group of families having an inadequate income. Practically all the families in Chicago below the adequate income basis are on the books of from one to five agencies which give material, medical, nursing, or other relief.[1]

The returns on the question of alcoholism were so indefinite and incomplete that it is impossible to give any definite figures. Alcoholism is clearly a factor in some of these families, but there was no medical diagnosis or other study aimed definitely at this problem. Obviously it would be impossible to give any accurate information on this question without such study and observation.

In the Chicago open-air schools, where the services of a municipal sanitarium nurse were available, an improvement of home conditions in families of alcoholists resulted from the definite work of the nurse. In some instances measures were instituted to curb the ability to get liquor; in other instances treatment in some institution was secured. Aside from the physical effects of alcohol, the cost of drink is especially serious in homes from which open-air school children come.

When the open-air school work was begun in Chicago it was believed by many friends of the movement that three or four months in an open-air school would be sufficient to establish a child's health. With favorable home conditions, and where the child has no very serious troubles, this may be true. The experience of the Chicago schools is that a much longer period is desirable for the majority of children. Where it has been possible to keep the child over a considerable period, it has been found that improvement is much more marked in the second year than in the first, and in the third than in the second. Many of the children in open-air schools should, in our opinion, have an opportunity to spend their whole school course in open-air schools.

Facts set forth in this chapter give some of the reasons why this is true. Many of the children in the open-air schools have had several years of adverse conditions before entering school at all.

[1] This study of incomes covered the first half of the year 1913, when industrial conditions were normal in the United States.

They are under height, under weight, under nourished; they have more than their share of defects; a large percentage of them are tuberculous.

The infant welfare movement that has done such notable work in many of the large cities of the United States has thrown a strong light on this subject. The work began in the care of sick babies. It was found, however, that even in babyhood it is often too late to begin after the baby has once become ill. The great feature about the infant welfare work now is to discover the baby and care for him before he is ill at all.

The open-air school has helped to reveal the unfavorable conditions of certain children in the public schools. It has gathered these children together in small classes, and through medical work, proper feeding, and rest it has demonstrated that nearly all of them will respond and thrive under such treatment, and that it is profitable to put forth efforts in their behalf.

The friends of the movement realize, however, that bad housing conditions, inadequate incomes, ignorance, and other adverse environmental conditions can negative anything that the open-air school can do for certain of these children. The final salvation of these children involves not only child care, but a readjustment of the child's whole environment.

Chapter IV.

LUNCHES—THEIR CHARACTER AND COST.

Most of the children who have been admitted to the public open-air schools in American cities give evidence of habitual undernourishment. In 1913–14 the total number of pounds under weight for 210 Chicago children on admission to open-air schools was 1,820.07, an average of 8.66 pounds per child. Only 24 out of 210 pupils weighed what the average child of the same age, height, and sex should weigh.

Such clinical symptoms of malnutrition as undersize, pallor, loose and flabby skin, bad breath, bad condition of mucous membrane about eyes and mouth, are usually present. The children are easily exhausted physically and prove quite incapable of prolonged mental exertion. The body does not develop energy enough to stimulate and sustain the nervous system properly.

Lack of adequate and properly prepared food and failure to assimilate are the chief causes of malnutrition. The income of the families of open-air school children in 14 cities, as revealed in Chapter III, is clearly inadequate to cover the barest necessities of decent living.[1] Society pays the penalty for this social maladjustment in damaged children. No mother, however competent, can purchase milk and eggs and fruit on a bread-and-coffee income. Few women are trained in a knowledge of food values, and those who might, by wise marketing, double the nourishment they give their children, have never been taught how to buy.

A child can not assimilate food properly when such conditions as hurried and irregular meals and nervous exhaustion due to insufficient sleep or irritation by vermin hinder the digestive processes. All these elements enter again and again into the life stories of the children who come to the open-air schools.

Malnutrition is so prevalent among these children that out of 54 American cities listed maintaining open-air schools for physically subnormal children there are only two that do not find it necessary to make some kind of provision for serving food at school. These

[1] See tables on p. 52.

are Denver, Colo., and Oakland, Cal. In both cases the fresh-air rooms are located in the good residence portion of the city, where the children's poor physical condition can not be attributed to lack of sufficient nourishment at home.

Few of the American open-air schools except those at sanitaria and hospitals give more than three regular lunches a day, and most of them find two enough. These comprise ordinarily a breakfast of cereal and milk, bread and butter, and cocoa or some hot drink, and a noon dinner which includes soup and a meat course with vegetables

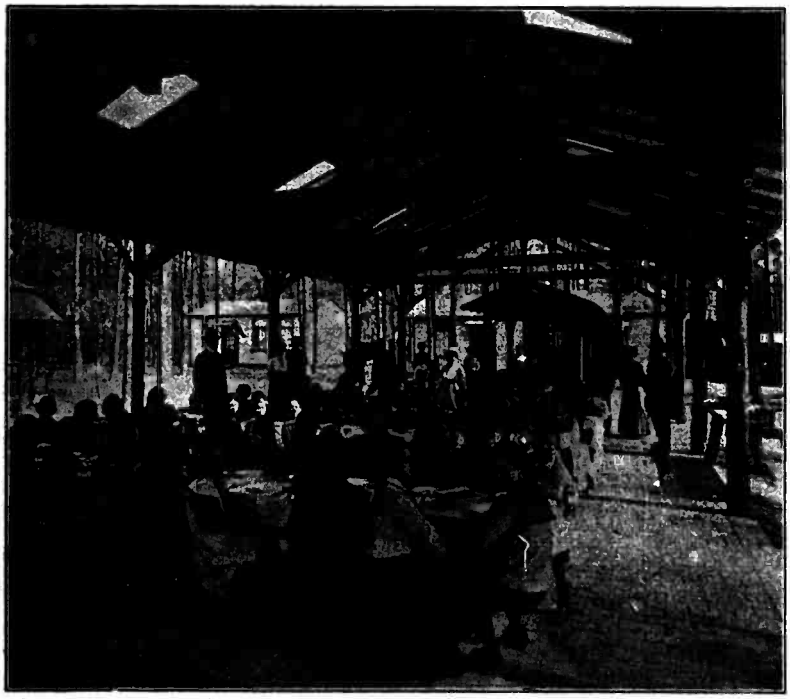


FIG. 42.—The airy dining room of the Charlottenburg Open-air School.

or a meat course and dessert. The plan everywhere is to give the highest possible caloric value consistent with simple and inexpensive meals.

It is estimated that the daily ration of a child of 10 years, weighing 60 pounds, should yield about 1,600 calories and be composed approximately of 60 grams of protein, 40 grams of fats, and 250 grams of carbohydrates. The following table is based upon the estimates of acknowledged experts in school dietaries of Switzerland, Germany, and England, respectively:

Daily food needs of the average child, aged 10 years, weight 27 to 28 kilos.[1]

	Tonsig.	Erisman.	Crowley.	Average of 15 experts.
Fat.....grams	23	41	57	40
Protein.....grams	48	60	68	60
Carbohydrates.....grams	282	225	288	250
Calories	1,531	1,540	1,937	1,600
Calories per kilo	56	55	72	58
Protein per kilo.....grams	1.7	2.1	2.4	2

[1] Table reproduced by permission from School Feeding, Louise Stevens Bryant. J. B. Lippincott & Co., 913, p. 243.

This estimate can easily be made to fit an older or younger child by serving larger or smaller portions of food.

FIG. 48.—Dining room at Uffculme Open-air School, Birmingham, England.

Since the meals given at the open-air school are planned only to supplement the food given at home, and not to take its place, it is necessary to know approximately what the actual food value of each child's home ration is. In the Elizabeth McCormick Open-Air Schools in Chicago a definite effort was made to study these home meals. Each child was asked to write down when he came to school in the morning what he had had for supper the night before and what his breakfast had been. Dinners were provided by the school. The nurse who visited the home went over the records with the physician and was thus able to correct any obviously improbable statements. The reports gave a monotonous list of bread with tea

or coffee for breakfast, and suppers composed mainly of cheap bakery goods and fried meats. The diet of the poor is particularly deficient in protein and fat, since the food articles that provide these elements, such as milk, eggs, butter, and meat, are apt to be expensive. Home breakfasts in particular are rarely planned to meet the needs of growing children.

On the basis of such reports as these the physician in charge estimated that the children in this school, who were largely Italian, received about 450 calories at home. It is safe to conclude that the pupils of the class who have thus far attended the public open-air

FIG. 44.—Kitchen of open-air school, Rochester. The girls of the school do most of the cooking, under the direction of a domestic science teacher.

schools for physically subnormal children probably receive less than 600 calories in their home breakfasts and suppers. In order merely to bring their food supply up to normal, at least 1,000 calories should be supplied during the day by the open-air school. Furthermore, the pupils are exposed during certain months of the year to extreme cold, and even normal children under such conditions need an increased supply of food to make up for the calories transformed into body heat and given off. The private open-air schools recognize this fact when they serve hot lunches during the winter to their well pupils from excellent homes.

Students of school feeding agree that the school meal, if it is a midday dinner, shall supply at least one-half of the daily requirements in heat units and more than half of the fats and proteins.

At Rochester, N. Y., the daily menus are carefully worked out in the following way:

FIG. 45.—Dining room of Edward Mott Moore Open-air School, Rochester, N. Y.

MENU.

Breakfast—Oatmeal with sugar and cream. A glass of milk.
Lunch at 11 o'clock—A glass of milk.
Dinner—Pot roast of beef. Mashed potatoes. Corn. Bread and butter. Milk. Baked apples with cream.
Afternoon lunch—Cocoa and bread.

Food value of the Rochester daily menu.

BREAKFAST.

Food material.	Amount.	Grams of—			Cost.
		Protein.	Fat.	Carbohydrate.	
					Cents.
Oatmeal.....pound..	1	113.5	49.6	450.3	0.075
Milk (whole).....quarts..	6	180.0	217.2	271.2	.360
Sugar.....pound..	1	.....	.....	453.6	.070
Total for 30 children.....	.....	293.5	266.8	1,175.1	.505
Per capita.....	.....	9.7	8.8	39.1	.017

Food value of the Rochester daily menu—Continued.

11 O'CLOCK LUNCH.

Food material.	Amount.	Grams of—			Cost.
		Protein.	Fat.	Carbohydrate.	
					Cents.
Milk for 30 children ..... quarts..	5	150.0	181.0	226.0	0.300
Per capita		5.0	6.0	7.5	.010

DINNER.

Potatoes (1 peck) ..... pounds..	15	121.5	6.0	999.0	0.325
Beef (rump roast) ..... do....	7	437.5	641.2	.....	1.120
Corn (canned) ..... cans..	3	38.1	16.2	258.3	.300
Apples ..... peck..	1	86.4	120.0	3,597.6	.400
Brown sugar ..... pound..	1	.....	.....	430.0	.066
Milk (whole) ..... quarts..	8	240.0	289.6	361.6	.480
Butter ..... pound..	½	3.4	289.1	.....	.300
Bread ..... loaves..	4	166.8	21.6	963.2	.200
Total for 33 individuals	.....	1,093.7	1,383.7	6,609.7	3.191
Per capita	.....	33.1	41.9	200.3	.093

AFTERNOON LUNCH.

Milk (whole) ..... quarts..	5	180.0	181.0	226.0	0.300
Cocoa ..... can..	1	26.6	32.5	42.5	.115
Sugar ..... pound..	½	.....	.....	226.8	.035
Bread ..... loaves..	2	82.1	10.8	481.6	.100
Total for 30 children	.....	287.7	224.3	956.9	.550
Per capita	.....	8.6	7.4	31.9	.018

TOTAL FOR THE DAY.

Per capita	.....	56.4	64.1	278.8	0.14

Summary for month of June, 1912.

Twenty school days. Average attendance, 29, including three teachers.

Total food values:

	Grams.
Proteins	27,203.6
Fat	32,547.05
Carbohydrates	66,931.8

Amount of food per capita per day:

	Grams.
Proteins	46.9
Fat	55.9
Carbohydrates	115.3
Calories	1,151.9

The daily per capita cost of such menus is from 14 to 15 cents. A similar diet plan is in use in Louisville and Lexington, Ky.; Springfield, Mass.; Detroit, Kalamazoo, and Ypsilanti, Mich.; St. Louis, Mo.; Montclair, Newark, and Orange, N. J.; Albany, Buffalo, Syra-

cuse, and Utica, N. Y.; Cincinnati, Cleveland, Toledo, and Columbus, Ohio; Allentown, Erie, Pittsburgh, and Williamsport, Pa.; Richmond, Va.; and Kenosha, Wis.

The menus which follow cost between 11 and 12 cents daily for each child, provided the buying is done at wholesale. The average food value is between 1,100 and 1,200 calories; and the children in the Chicago schools have made as satisfactory gains in weight on this simple diet as they did in earlier years on a three-course dinner with two lunches.

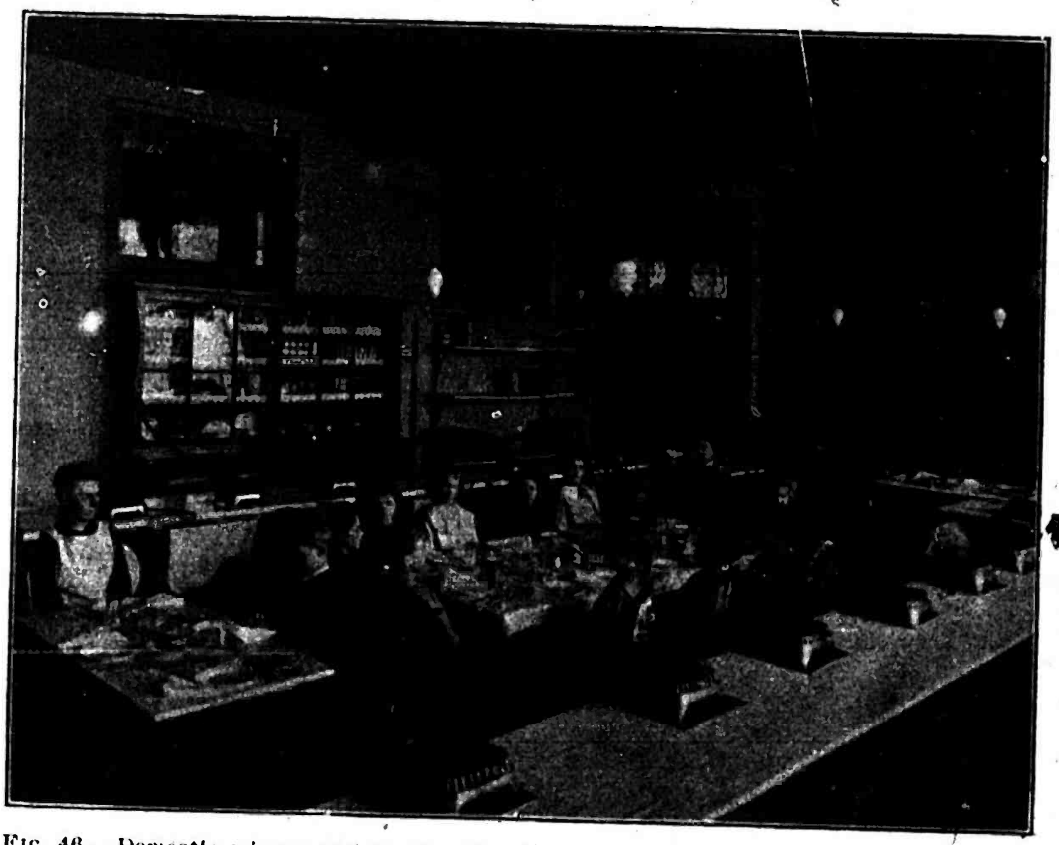


FIG. 46.—Domestic science equipment utilized for open-air school children, Auburn, N. Y.

SAMPLE MENUS FOR A WEEK, ELIZABETH McCORMICK OPEN-AIR SCHOOLS, CHICAGO.

MONDAY.

Morning lunch—Cocoa, bread, jelly.
Noon dinner—Browned beef stew, boiled potatoes, mashed turnips, bread, milk, farina pudding.

TUESDAY.

Morning lunch—Milk, bread, apple butter.
Noon dinner—Lima baked beans, cabbage salad, apple sauce, bread, milk.

WEDNESDAY.

Morning lunch—Milk, bread, sirup.
Noon dinner—Beef loaf with tomato sauce, baked potatoes, chocolate pudding.

THURSDAY.

Morning lunch—Cocoa, raisin bread.
Noon dinner—Milk, bread, vegetable soup, rice pudding.

FRIDAY.

Morning lunch—Milk, bread, jam.
Noon dinner—Creamed salmon, mashed potatoes, bread, milk, stewed prunes.

Average number of calories per child per day, 1,100.
Average cost of food per day per child, 11 cents.
Average cost of service per day per child, 7½ cents.
Total cost of food and service per child per day in Chicago Open-Air School, 18½ cents.

There are few cities where dealers will not grant wholesale rates to an open-air school, even if the amount purchased is small. Twelve cents a day will provide for each child a pint and a half of milk, all the bread and jelly he can eat, a nourishing soup or stew and an inexpensive dessert.

It is possible to work out a great enough variety of combinations to avoid the deadly institutionalism of "bean day," "fish day," etc. Racial and religious customs must be respected in planning the menu. Many children refuse milk at first, but a quiet insistence upon a little each day, combined with the example of their fellows, soon converts them. One of the most important services the open-air school can render is the development of a real liking for wholesome, simple food on the part of these children, most of whom have never known cereals or meat soups.

Simple meals keep down the cost of service and equipment. It is quite possible to equip the cloakroom which usually adjoins an ordinary recitation room with gas stove, sink, cupboards, and kitchen tables at a cost of about $70.[1] The social value of the meal is better secured by a separate dining place than by the use of desks in the recitation room for tables. The equipment need not be expensive. Plain deal tables scoured white or covered with white oilcloth or laid with paper napkins for doilies may stand in any convenient room. Good taste, as well as economy, should be considered in the purchase of dishes and silver.

The simple act of breaking bread together may bring teacher and pupils into a new and delightful relation. A wise teacher welcomes this opportunity of knowing her pupils "off guard" and gladly contributes the dignity of her presence to the common table.

The children themselves can be trained to serve the food, to wait on table and, when desirable, to wash the dishes and put the dining room in order. Unless the school receives cases of open tuberculosis, there is no need of sterilizing dishes. A hemmed square of un-

[1] See complete list of kitchen and dining-room equipment on p. 48.

bleached muslin, with a round opening for the head, makes a good apron for either boys or girls to wear when on kitchen duty.

In Syracuse, N. Y., and Providence, R. I., the teacher plans and helps prepare the meal. The Providence children bring a lunch from home and supplement it with one hot dish prepared at school. An assistant relieves the Syracuse teacher while she cooks the dinner. It is asking too much, however, to expect a teacher to carry such heavy work for an indefinite period of time. To teach an ungraded

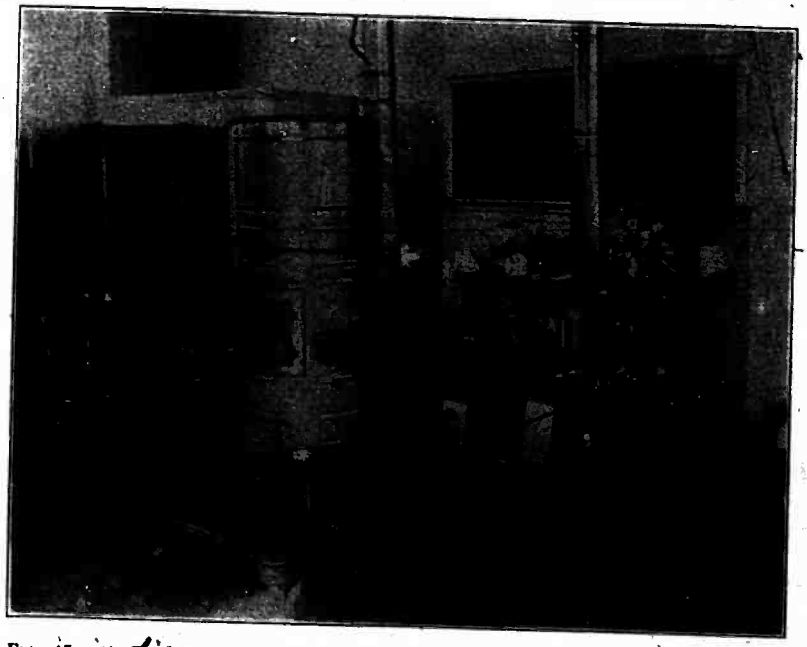


FIG. 47.—An inexpensive kitchen equipment which has served Providence, R. I., since 1908. Only one hot dish is prepared at noon, however, and the children supplement this with lunches brought from home.

room of 25 pupils is a serious undertaking, and she will need all her time for her school duties.

A few cities are seizing the opportunity to make the work of their domestic-science classes more vital by turning over to them the supervision and preparation of food for the open-air school. In Cleveland and Cincinnati, where the whole expense of the fresh-air work is defrayed by the board of education, the girls in the domestic-science classes plan and prepare the diets for the anemic pupils. These classes are all in public-school buildings. Where open-air schools are provided at some distance from the other schools, the plan might not be so practicable.

At Columbus, Ohio, the young women in the domestic-science department of the Ohio State University have planned the menus and

worked out the food values of every meal served at the open-air school, which is conducted jointly by the city board of education and the antituberculosis association.

South Manchester, Conn., has utilized its school of household arts for practically all the work at the open-air school of 25 children. The department is thoroughly equipped with modern cooking utensils of all kinds and is under the charge of a capable domestic-science teacher. The school is attended by 75 girls, each one of whom receives a 2-hour lesson each week. The schedule is planned so that a girl does not repeat the same lesson period until after 15 weeks. The girls attend in classes of five, in the following manner: 8.30 to 10.30; 10.30

FIG. 48.—Girls of domestic science class preparing dinner for children of open-air school, New Britain, Conn.

to 12.30; 1.30 to 3.30. In this way 15 classes are accommodated weekly. Each group moves up one period each week, thus allowing the girls to become familiar with all branches of the work. The following program gives an excellent idea of the work done each day:

A. M.

8.00. Make cocoa.

8.10. Put mugs and napkins at place on table. Put one plate of crackers, piled evenly, in the middle of each table.

8.20. Pour cocoa into mugs. Wash kettle and cooking utensils. Put one shovel of coal on each side of the fire. Pull damper forward.

A. M.

8.30. Clear tables, wash mugs, put crackers in tin box. Fill teakettle, bring in towels—if wet, hang on kitchen rack; if dry, fold and put away.

9.00. Sweep diningroom floor. Sweep bathroom floor, wash and wipe the bowls. On pleasant days open all upstairs windows at top and bottom, except bathroom window.

9.15. Prepare vegetables and dessert for dinner.

10.30. Everything to be served at noon should be in its dish or kettle ready to heat at 10.30. Put kettle of water to boil for potatoes on front of stove. Cream one-half pound of butter for bread. Spread butter; put one bread plate on each table. Fill a bread pan with extra slices spread and ready to replenish bread plates during dinner. Always cut bread thin and arrange evenly, without crumbs on plate.

10.45. If serving baked potatoes, put them in oven at this time.

11.00. Anything to be baked, such as souffle or scalloped dishes, should be in oven between 10.45 and 11.00. Put potatoes in boiling water for boiled or riced potatoes. Finish the cooking of all things to be hot for dinner. Set table. Put plates and soup bowls in warming oven.

11.30. Arrange dessert on individual dishes, if it is to be served cold. Any pickles, butter, cookies, etc., to be served should be put on table at this time. Cooks and waitresses have light lunch.

11.50. Fill mugs with milk.

11.55. Serve food on individual plates. Place on table.

12.00. Waitresses take place at left of hostess. Pass bread, always going first to the one at the head of the table. Pass other food as needed. Take plates to kitchen if more food is desired. When first course is finished and all have stopped eating, remove plates, two at a time. Serve dessert. Pass cakes, etc. During dinner the cook in kitchen replenishes plates brought out for second helping by waitress. Put kettles to soak as soon as empty.

12.30. Waitresses and cooks serve themselves to dinner in kitchen. Fill teakettle.

12.45. Clear table, scrape and pile dishes.

P. M.

1.00. Leave dishes piled in order, kettles soaking. Put soiled towels to boil every Friday.

1.30. Wash kettles and pans, then dishes. Prepare any vegetables or dessert that can be made for next day. Wash spice jars and shelves every Tuesday and Friday.

2.00. Empty all waste baskets. Sweep and dust diningroom. Clean bathroom. Wipe off tops of tooth-powder boxes; brush up tooth powder; scrub bowls with Dutch Cleanser; wash and dry; dust bathroom; sweep floor; empty towel basket and replace it. Wash out ice box every Monday. Make bread.

2.15. Sweep upper hall, front stair, front hall. Close upstairs windows. Wash windows when possible. Wash towels and hang straight to dry. Sweep and dust parlor.

2.30. Put away cooked food prepared for next day. Empty milk cans, put milk in ice box, rinse cans in cold water, wash, and put on porch.

3.00. Put food in fireless cooker. Sweep kitchen floor. Wash linoleum.

3.15. Wash inside and outside of teakettle. Set it upside down on draining board. Wash stove and black twice a week when stove has cooled.

3.30. Close windows downstairs. Leave everything in perfect order.

An idea of the combinations arranged may be obtained from the following menu for the week:

Monday: Hamburg steak, mashed potatoes, celery, bread and butter, milk, cup custard.
Tuesday: Roast beef, baked potatoes, creamed cauliflower, bread and butter, milk, bananas.
Wednesday: Roast lamb, sweet potatoes, succotash, English apple tart.
Thursday: Minced lamb on toast, baked potatoes, tomato sauce, cantelloupe.
Friday: Stuffed baked bluefish, creamed potatoes, bread and butter, pudding.

A cup of milk is always included in the menu.

The instructor estimates that these dinners cost only 13 cents per capita. The children of the open-air school help to keep the cost of food low by raising many of their own fruits and vegetables in a good-sized garden plat back of the school building.

The provision of meals for one or two open-air classes can be met by a private organization or by a board of education without much difficulty. But when a city like New York or Boston faces the problem of making open-air schools available to every child who needs them, the financial end demands serious consideration. It is significant that both these cities recognize their responsibility to the child with open tuberculosis by providing for him at public expense in hospital or sanitarium schools. But the anemic or malnourished children, many of them in contact with open cases of tuberculosis at home, are estimated to form at the lowest estimate 2 per cent of the whole school population, and any plan that contemplates the care of all children of this class in a large city becomes a serious problem.

Boston has worked out a plan by which every child in an open-air class has a chance to purchase a glass of milk or a hot drink—cocoa, chocolate, broth, or chowder—at a cost not to exceed 2 cents daily. Gas or electricity is installed either in the teacher's room or an anteroom adjoining the open-air classroom. In most of the classes the luncheon is prepared by the teacher; in a few it is prepared by the school matron. The children are expected to supplement the hot dish by a luncheon brought from home, and the school nurses are instructed what articles of food are best to recommend to the parents for these lunches.

In buildings where hot luncheons are served for the open-air classes the other pupils of the school have the same privilege of purchasing the hot mid-session luncheon, but the fact that the morning session in Boston closes at 12 o'clock permits most of the children to go home for a regular midday meal.

In New York City the committee on the study and prevention of tuberculosis of the Charity Organization Society provided food,

equipment, and medical supervision for the first open-air classes. The board of education soon assumed the expense of equipment, but could not undertake to supply the food. Realizing that their funds were limited and that the number of anemic children ran into the thousands, the committee early tried to determine whether the work could be successfully carried on without food.

After three years of experiments the supervising physician, Dr. I. Ogden Woodruff, concluded that except in isolated instances poverty was not the cause of the children's subnormal condition, and that irrespective of home conditions they made substantial improvement in hæmoglobin and general physical tone without the provision of

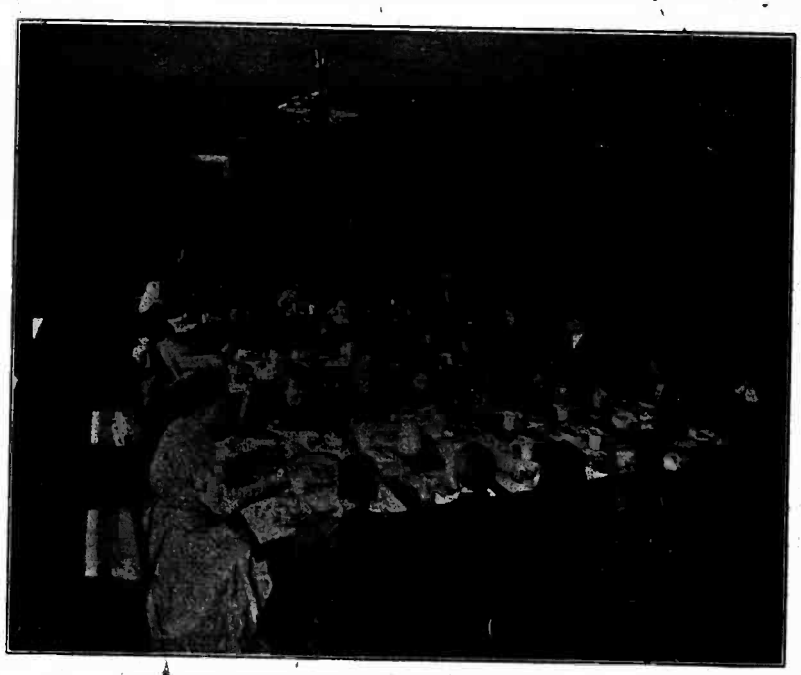


FIG. 40.—Indoor lunch for open-air school pupils, Chicago.

food at school. Accordingly, the two lunches of crackers and milk, which were previously given in the morning and afternoon, have been discontinued. The children may bring food from home if they wish. It must be remembered, however, that some heat is furnished in the New York open-air rooms and that none of the children are supposed to be actively tubercular. Dr. Woodruff does not wish, however, to be considered as advocating running open-air schools preferably without feeding, for he believes there can be no hope of improving the nutrition of poorly nourished and anemic

children by merely bringing them in contact with the fresh air. He says:

> We shall always include in a group of children picked out for the fresh-air classes those who are poorly nourished, those convalescing from illness, those exposed to tuberculosis or with a family history of the disease. The nutrition of these children we wish to raise to as high a point as possible; if we can, to a point beyond the normal. If we are going to attain a proper measure of success in this respect, it is certainly necessary to include additional feeding as an integral part of the work.[1]

Chicago's experiments, though conducted for a short time only and with a comparatively small number of children, seem to indicate that the anemic child will lose, rather than gain, if he is put under true open-air conditions without extra food.

FIG. 50.—Lunching out of doors in the first open-air school in Hungary. The indoor dining room is only used in bad weather.

The difficulties which open-air schools have encountered in their efforts to collect money from children for their meals are due largely to the actual poverty of the families represented, and in the second place to the inability to compel the attendance at the open-air school of a child who needs the treatment but whose father refuses to pay, although able to do so.

A tubercular child who is excluded from the public school by the health regulations of State or city can be forced into the open-air school by the compulsory education law, but with a mal-nourished child, exposed to tuberculosis in the home, but not himself a menace to others, it is in most places impossible to compel the transfer to an open-air room.

[1] Fifteenth Annual Report, City Superintendent of Schools, New York City. Reports on defective children, p. 55.

In the following cities the board of education already pays for the food served at the open-air schools: Hartford, New Britain, and Waterbury, Conn.; Cambridge, Chelsea, and Springfield, Mass.; Detroit, Mich.; Montclair and Newark, N. J.; Buffalo, Saranac Lake, and Utica, N. Y.; Cincinnati and Cleveland, Ohio; Pittsburgh, Pa.; Providence, R. I.; Green Bay and Kenosha, Wis.

In Illinois the law permits cities of 10,000 population or over to provide diets for the tuberculous poor.

The only State legislation in this country directly dealing with school feeding is a recently enacted law in Massachusetts which gives any city the right to provide meals for school children free or at cost, provided 5 per cent of the voters file a petition to have

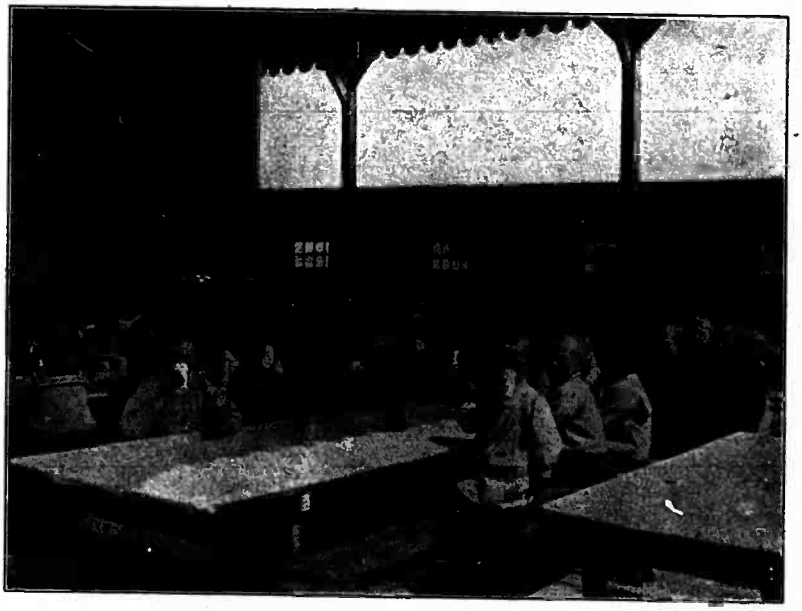


FIG. 51.—Lunch in an open-air school near The Hague, Holland.

the question put on the ballot, and provided a majority at election time vote in favor of it.

The Anti-Tuberculosis Association of Springfield, Mass., circulated such a petition in 1913 and the city voted to assume the food expense of the open-air school.

European countries have long since incorporated school feeding into their general system of public education. School feeding has been made a subject of national legislation in France, Switzerland, Holland, Great Britain, and Denmark. It is national in scope, supported by the municipalities in Germany, Italy, Sweden, Norway,

Finland, Austria, and Belgium. Similar legislation is under way in Russia, Spain, and the United States.

In Germany about 250 cities have some form of school feeding. The children are expected to pay when able to do so. About one-fourth pay. At the Charlottenburg Forest School each applicant for admission must present a card filled out by his father, which states the parent's trade, income, rent, number in family, and other facts which affect his ability to pay the nominal sum charged for school care. Children whose parents' names are already on the list of public or private charitable associations are admitted to free meals without question.

The establishment of "Cantines scolaires," or school restaurants, was made obligatory in France in 1882. About 1,400 now exist. In Paris 68 per cent of the meals were given free during the year 1908–9.

In England the "Provision of Meals Act" of 1906 gave the local education authorities in England permission to install school restaurants as part of the regular school equipment. Two hundred cities have introduced the lunches. Food is furnished at cost to those able to pay and free to the others. The same system is followed in the English open-air schools.

In all these countries meal tickets are used by everyone, so that the children themselves need not know who pays and who does not. Free tickets are distributed only after a thorough investigation of the families who ask for them.

This accords with the conviction of social workers in America. The mal-nourished boy indicates something wrong with the family, and possibly with society as well. He can not be regarded simply as a detached unit reporting from the unknown at 9 o'clock every morning and disappearing into space at 4 each afternoon. Any plan of school feeding which undertakes to deal with him alone is defective.

The Philadelphia school lunch committee, which has worked for four years under the careful direction of such experts in child care as Prof. Lightner Witmer and Dr. Walter S. Cornell, believes that a school visitor who will investigate and try to rectify wrong home conditions is an essential part of any well-rounded school-lunch plan.

In the open-air schools the nurse makes this connection between home and classroom. If she adds to her general nursing information a practical knowledge of the food materials suitable for various nationalities and grades of income, her visit supplements the purpose of the school feeding in the best possible way.

There should also be a definite connection with some agency which will try to restore the family to that point of economic independence where it can provide sufficient nourishing food for the child at home and pay for such lunches as are served at the school.

Until that point can be reached, the advocates of school feeding argue that they are justified in their efforts by the necessity of protecting society from disease and physical incompetency, and by their avowed purpose to make the necessary provision of food for school children not a relief measure, but a means of education.

Chapter V.

HEALTH SUPERVISION.

When the Russell Sage Foundation in 1911 tabulated the results of its study of medical inspection in 1,046 American cities, it found a "relatively chaotic" condition. "Medical inspection" might mean an examination conducted by physicians for the detection and exclusion of cases of contagious disease; it might mean tests conducted by teachers or physicians for the detection of defects of vision or hearing; or it might mean complete physical examinations conducted by physicians. Dr. Ayres found that, while 443 cities had at that time "regularly organized systems of medical inspection," 279 other cities had "some sort of medical inspection." About one-fourth of these 443 cities employed school nurses, and about 1 city in 7 had a school dentist. The physicians almost always received inadequate pay for their services and frequently gave only part of their time for the school work. One hundred and six cities had placed the administration of the medical inspection in the hands of the city health department, while 337, or nearly three-fourths, depended on the board of education for health inspection service. Though conditions have improved very much in the past five years, these statements still remain approximately true.

In England and Germany the open-air school was first developed by the regular school authorities. In America the impetus came from outside, largely from the antituberculosis forces; and the initial health supervision of open-air schools has been for the most part financed by private agencies.

In many cities, where the medical and nursing supervision of the open-air schools has been satisfactorily inaugurated, the work has later been taken over by the regular medical staff of the board of education or the city. This is a desirable arrangement if the board of education is willing to meet squarely the proposition that open-air schools demand a highly specialized supervision, and also that the class of children who attend these schools require much more time from both physician and nurse than the average school child. Cleveland has put one man, a recognized expert on tuberculosis, in charge of all the open-air school work of the board of education. The

medical inspectors are instructed to refer to him any tuberculous or anemic children whom they find in their routine work in the schools. He is the court of last resort for diagnosis. He has personally inspected all the children in the schools in the tenement districts and has carefully examined all who showed signs of tuberculosis infection. For the school year 1912–13 this meant 5,138 inspections, 2,549 physical examinations, and 503 reexaminations. He also planned and supervised the program of the open-air schools, which, in addition to the regular school work, included a daily shower bath, rest period, and three meals at school per day.

In Newark, N. J., the chief medical inspector of the board of education, Dr. George J. Holmes, has worked out a detailed scheme of supervision for the city's open-air school for tuberculous children and the three open-window rooms for anemic children. The essential features in his plans are as follows:

Up to date no pupil has been permitted to enroll in the open-air class unless it is evident after a medical examination that he or she suffers with pulmonary tuberculosis.

The cases are discovered by the medical inspectors in the various schools. Immediately the diagnosis is made by a medical inspector, the case is assigned to a school nurse to visit the home. It is her duty to obtain and record on a printed form a complete record of the family history, previous history of the pupil from birth, present history of pupil, and social history of family, also obtaining written consent for the examination of the pupil by the supervisor of medical inspection.

The pupil then visits the supervisor in his office, accompanied usually by one or more relatives. The supervisor at this time conducts a complete examination covering the general condition of the pupil, recording weight, per cent of hæmoglobin, height, the condition of the eyes, nose, throat, heart, lungs, etc. Should the diagnosis of pulmonary tuberculosis be confirmed by the supervisor, the Von Pirquet tuberculin test is at once conducted and the results recorded at subsequent visits. Recommendation is then made by the supervisor to the superintendent for the transfer of such pupil to the tubercular class.

This school receives a daily visit of a medical inspector whose duty it is to inspect each pupil for the presence of contagious or infectious disease; to consult with the teachers and nurse regarding any pupil in particular; to conduct a complete physical examination of each new pupil on arrival, recording his findings and making his recommendations in writing to the parents; to refer such pupils requiring treatment to the school nurse, with the request to make a home visit and cooperate in the cure of each defect or disease; to weigh each pupil weekly, recording the weight on forms supplied, investigating and recommending for treatment and special care all pupils not gaining or losing in weight or running an abnormal temperature; to recommend to the supervisor regarding the cure and arrest of the disease and the transfer of the pupils cured back to the regular school.

No pupil has been transferred back to its regular school or permitted to go off the roll definitely without the weight, height, and hæmoglobin index being recorded and a definite recommendation stating that the medical inspector finds the pupil well and the disease arrested, and not then unless his findings are corroborated by the supervisor after a careful physical examination.

The school nurse follows up the recommendation of the medical inspector in respect to each pupil, visiting all the homes, consulting with the parent or guardian with regard to the physical condition of the pupil and his needs; making observation of the home conditions with respect to the housing, especially the sleeping apartments; inquiring into the nourishment of the pupil at home and his hours of rest; and instilling in the parent an interest in what is being done for the pupil and a cooperation which, with very few exceptions, has been appreciated, with the result that teeth have been repaired, tonsils and adenoids have been removed, glasses obtained, and a variety of surgical and other medical treatments instituted with resulting benefit to the pupil. * * *

To be assigned to an open-window class each pupil must be subnormal in weight or in general health. This includes pupils who are anemic, frail,

FIG. 52.—Recording pulse and temperature in a Chicago school.

under weight, or convalescent from disease. Each pupil is required to submit to a complete physical examination by the medical inspector, which includes weighing, measurement, and ascertaining the per cent of hæmoglobin.

The health supervision consists of the daily visits of a medical inspector for the detection of contagious disease and general supervision of the health of the pupils; the monthly weighing of pupils and recording of same; the examination of pupils for the detection of disease and defects; the home visits of the nurse to bring about the correction of defects and diseases; and the improvement of health of pupils by urging that treatment be obtained, that home sanitation be improved, and that diet and hours of rest be properly regulated.[1]

[1] See Proc. Fourth Internat. Cong. School Hygiene. Vol. II, pp. 103–119.

The frequency with which observations are made of the children's pulse and temperature varies in different cities. A rise in temperature is the most significant index of the child's physical condition and often indicates something wrong which would otherwise escape notice. Wherever possible the temperature should be taken at least once a day, preferably in the morning. The nurse should also take the weights of the children at least once a month, before and after vacations, and immediately after any prolonged absence from school. The weights should be taken stripped, and the scales should be frequently tested to insure accuracy.

Not the least important contribution which the nurses can make to the extension of open-air work is the keeping of accurate records. They are the basis for reports on all work done either by nurse or

FIG. 53.—Entrance examination, Shurtleff School, Chelsea, Mass.

physician and determine whether or not the children are making proper improvement. They are a form of health bookkeeping on which the budgets for succeeding years are based.

The physicians and nurses assigned to special duty at open-air classes are probably doing the most thorough piece of health inspection and valuable reconstructive work now carried on in the public schools. They have an unusual opportunity to set high standards of efficiency. The chance to do intensive work with a small group of children under the best attainable health conditions at school and adequate nursing supervision at home challenges every scientific mind. It is a hopeful, stimulating, and joyous task.

Wherever open-air schools have been established the results have so conclusively demonstrated the value of careful health work that

they have furnished a powerful argument for making such care available to all public-school children.

In 1913 New York City created the position of medical supervisor of open-air schools and gave the appointment to Dr. I. Ogden Woodruff, who had for three years voluntarily carried on the work as a consulting physician of the committee on prevention of tuberculosis of the New York Charity Organization Society. The duties of this position are to select from the regular schools those children who need open-air treatment and to supervise and standardize methods of management in the open-air classes which are conducted in connection with the public schools. New York City cares for its tuberculous children in day camps or sanatoria. Dr. Woodruff examines the applicants for admission to these schools, but the medical supervision is otherwise in charge of the local attending physician. Dr. Woodruff is thus responsible only for the supervision of the fresh-air rooms for anemic children and the fresh-air rooms for normal children. In a personal letter, which we print by permission, Dr. Woodruff outlines his plan of work, as follows:

The initial selection and examination of the children is made by the medical supervisor, as follows:

First. From a group of children referred by teachers, school physicians and nurses as seeming to need special care on account of their general appearance. But very few children in my experience can be chosen from this group. Teachers are very prone to consider a child's mental ability as an index of his physical condition rather than to refer cases on their physical condition alone. Both teachers and school nurses and the average school medical inspector frequently mistake the sallow skin, particularly if accompanied with light hair, which characterizes so many of the Jewish and Italian children, for anemia. A record of malnutrition on a child's card is not always reliable, because in many instances the school inspector determines malnutrition by the comparison of the weight of a child with the average weight for that age. Thus among Italian and Jewish children a great deal of malnutrition may be suggested simply because these children are frequently somewhat shorter for their age than the American, Irish, or Scandinavian. Obviously in any such instance no true malnutrition necessarily exists.

Second. A personal inspection of the classrooms is made by the medical supervisor, who selects those children which appear to him in poorest condition. Here again certain care has to be exercised not to take too many children whose physical condition is caused by some local trouble, particularly adenoids. On account of the expression, the shape of the jaw, posture, and shape of the chest which a marked defect in breathing produces, these children appear, I believe, in many instances, to be in poorer health than they really are. It has been my experience that unless the adenoid condition can be removed, little permanent or even temporary benefit can be obtained in the open-air class.

Third. A third group of children is selected by cooperation with the association of tuberculosis clinics. At my suggestion this year the secretary of this association requested that a list of the schools attended by each child of tuberculous parents under the care of the clinics be sent in to the association.

Fourth. In addition to children who are poorly nourished and anemic, particular attention has been given to selecting children whose nervous systems seem to be distinctly unstable, both those of a highly nervous kind and those who have incipient chorea and who tend to develop it during the school year.

Children who give a history of frequent absences on account of ill health are also considered unless it is evident from examinations that these absences are due to the presence of some local physical defect.

Cases of cardiac disease have so far been admitted to these classes; but personally I am still in doubt as to the desirability of taking fairly advanced cases of heart disease into the so-called anemic classes. That these children remain in better health I think there is no doubt, but I have not yet made up my mind that it is right to admit cases so far advanced that there is little likelihood of the children reaching adult life, when such admission means the exclusion of other physically abnormal children who would be likely to reach adult life and become useful citizens.

The physical examination of these children includes examinations for the heart and lungs with the children stripped to the waist, the inspection of the throat, examination for adenoids, for carious teeth, and of the glands in the neck. The examination for adenoids consists only in noting mouth breathing, nasal obstructions, and the presence or absence of a high-arched palate. If such defect is presumably present, the child is referred to a nose and throat clinic for a more thorough examination, or an operation, if necessary. Digital examination of the nasopharynx does not seem justifiable.

The posture is noted and chest configuration, also the general condition of the child, the presumable presence or absence of anemia, condition of the hair and eyes. Anemia is now generally determined by the medical supervisor on the child's general appearance. The hæmoglobinmeters with which one can work rapidly are so inaccurate as in my opinion to be of little or no value. The more accurate ones take so much time that it is not possible to use them.

A child may be put in the class for anemics, or removed, only by the order of the medical supervisor. The parents' consent must be obtained. So far complete physical examinations have not been made at intervals during the year, but only on admission and discharge. The medical supervisor visits each class at least monthly. Heights and weights are taken monthly. No medicine is given to the anemic children. If tonics or drugs are considered necessary, the children are either referred to dispensaries or to their family physician. There is no special nurse for the anemic classes, but the board of health nurse in each school cooperates in the work.

Boston has a director of school hygiene appointed by the board of education who has taken great interest in extending the open-air and open-window room work. Dr. Harrington thus described in the 1913 report of the Boston school committee the method by which children are assigned to open-air classes:

All children assigned to the open-air classes are selected by a complete medical examination by the school physician. Each child in the public schools is examined each year by the school physician. The findings of these examinations are given to the school nurses, to whom is assigned the follow-up work necessary to remedy or cure the defects found. The anemic, the glandular, and the undersized children are specially noted by the school physicians and school nurses for assignment either to open-air classes or to fresh-air rooms in the ordinary school organization.

All children assigned to open-air classes are weighed and measured regularly four times each year. Those children not showing a gain are reexamined by the medical inspector or at the out-patient department of the Consumptives' Hospital, and are closely followed up by the school nurse. Daily temperatures

are taken of children who do not show a gain in weight and who might be classified as tuberculous. This temperature taking is done by our school nurses.

Each year the school nurses weigh and measure a specified number of children monthly. This monthly weighing and measuring was begun four years ago with the children then 5 years of age, and has been continued during succeeding years with the children 6 years old, 7 years old, and 8 years old, respectively, each year. This year we weigh and measure all children 9 years of age. The primary object of this weighing and measuring was to establish a monthly norm of gain in height and weight of children from 5 to 18 years of age, inclusive. It has served, however, to give us a line on children not gaining in weight who otherwise might have escaped detection.

All children living in families where there has been a death from tuberculosis during the preceding two years are examined at the out-patient department of the Consumptives' Hospital, and are either assigned to open-air classes or, if found tuberculous, are sent to the hospital school at Mattapan. The school committee furnishes the school equipment and the teachers for the children assigned to the hospital. These children are permanent residents in the hospital, and do not return to their homes until cured.[1]

In Chicago the medical inspection of the public schools is carried on by the department of health. In 1913–14 there was a total enrollment in the 273 elementary schools of the city of 332,248 children and an average attendance of 261,447. To cope with the enormous task of inspecting this army of children a medical inspector and a school nurse are assigned to field work in each of the 100 districts into which the city is divided. Physicians are paid from $70 to $80 a month. They each give about three hours daily to the work. They must perform vaccinations and exclude for contagious disease, and they are expected to give each child an examination for the detection of physical defects. Each man has thus, on the average, over 2,500 children in his charge.

Experience demonstrated the fact that these doctors, already overburdened with their own duties, could not take time for the detailed examinations and daily supervision required for the successful operation of the open-air schools. Accordingly, the Elizabeth McCormick Memorial Fund, a private foundation which had borne all the expense of the open-air schools other than teacher and school equipment since the establishment of the work in Chicago, volunteered to employ the physicians. In 1913–14, 13 physicians on the salary list of the McCormick Foundation did the medical work for 19 open-air schools. Three of these men were chosen from the staff of the Municipal Tuberculosis Sanitarium; the other 10 were school physicians on the staff of the department of health; already assigned to schools where open-air schools were located. The monthly reports of these men give an average for the year of 19.6 hours' work for each school month, or practically an hour a day.

[1] Boston School Committee, An. Rep., 1913, pp. 55–60.

During 1913–14 six visiting nurses were assigned to open-air school duty by the dispensaries of the Municipal Tuberculosis Sanitarium and seven by the department of health. The Municipal Sanitarium nurses gave an average of two and a half hours daily to the open-air schools. The school nurses of the department of health found their own duties too heavy to enable them to spend much time in visiting the homes of the open-air pupils, and occasionally attention to the remediable physical defects was delayed, but their hearty support and cooperation never failed.

The medical staff met bimonthly with an advisory staff of representative physicians. The general conclusions they reached regard-

FIG. 54.—On a day like this, physician and teacher need to see that children are warmly clad.

ing the class of child to be admitted to the open-air school and the best way of caring for the pupils after admission are typical of the opinions held in other cities, and perhaps give as fair an idea as can be obtained of the health standards toward which the open-air schools are tending. These conclusions are embodied in the following outline for the medical and nursing organization of open-air schools of Chicago. This outline was prepared by the supervising physician in conference with the attending physicians, the medical staff, and the director of the Elizabeth McCormick Memorial Fund.

the superintendent of schools, and the president of the Chicago Municipal Sanitarium.

REQUISITES OF MEDICAL NURSING SERVICE.

Original medical examinations require about 30 minutes. Preliminary to such examinations the nurse should visit the home; secure, on form provided by the school, written consent of parent for examination of child and admission to school; should acquaint herself with sleeping arrangement, cleanliness of home, health of other members of the family, and arrange, if possible, to have one of the parents present at the medical examination. For accurate diagnosis the child should be stripped to the waist.

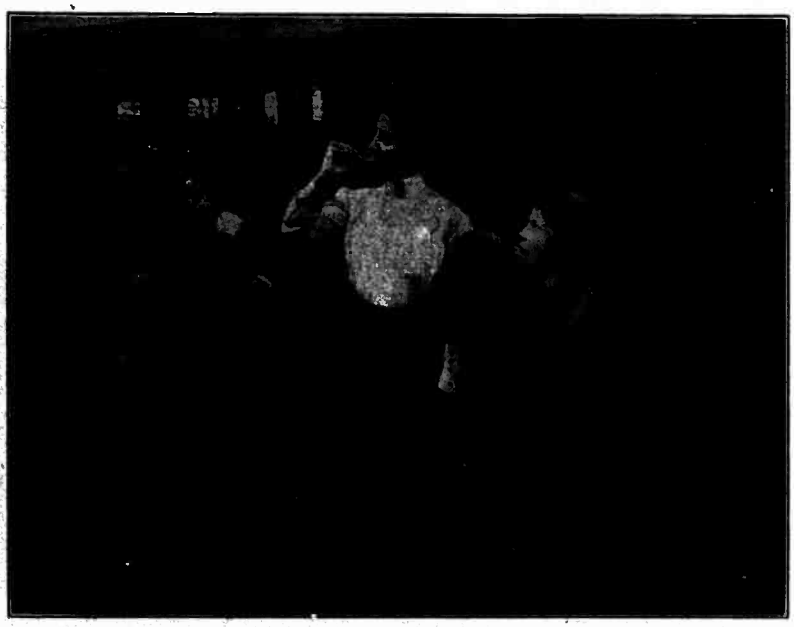


FIG. 55.—Personal hygiene, Chicago Open-air School.

There should be a reexamination at the end of the first term or the beginning of the second, at the end of the year, or when the child leaves the open-air school, and at other times if conditions warrant. Findings should be carefully recorded.

At all examinations a parent, nurse, teacher, or matron must be present.

Duties of attending physicians in open-window rooms: Visits should be made about 9.30, giving the nurse opportunity to make observations of temperature, pulse, and respiration, before his arrival.

Daily routine will be about as follows:

1. Conference with the principal regarding truancy, insubordination, requests for transfer, complaints of parents, granting of work certificates, and any condition bearing on health.

2. Conference with the nurse regarding children needing special attention on account of new symptoms.

3. Examination of emergency cases or children suspected of having infectious diseases.

4. Throat cultures should be made in diphtheria suspects if this has not already been done by the nurse, and a written notice left for the school inspector, so that other children from the same family may be inspected.

5. Daily conference with teacher with particular reference to children who seem to be lagging in their school work. Children will often begin to show incapacity for school work or irritable disposition several days before development of definite symptoms. The teacher having the children constantly under observation can be of great assistance to the attending physician in picking out children who need special medical care.

6. Physicians should daily inspect classrooms, sleeping rooms, and dining-rooms—

(*a*) With special reference to ventilation.

(*b*) With reference to temperature.

(*c*) With reference to odors which may suggest lack of sufficient ventilation.

7. Thermostats in open-window rooms and rest rooms should be inspected frequently to see that the maximum amount of heat is turned on, so that air currents in the rooms will insure the maximum change of air.

Too high a temperature is evidence of failure to obtain sufficient outside air, and should be regulated by opening windows at the top rather than by shutting off heat.

8. The outlet ducts should be frequently inspected to see that they are kept constantly closed. These outlet ducts, if left alone, permit bad air from other rooms to enter open-window rooms.

9. The clothing of children should be observed to see that none are too lightly or too heavily clad for the temperature. This should receive daily attention as it is often found that on mild days children have sufficient extra clothing to keep them in mild and constant perspiration.

10. Children who show frequent elevation of temperature, inability to fix attention upon studies, or unusual fatigue, should be placed on all-day rest. It will frequently be found that all-day rest a whole week will bring about sufficient improvement to render this treatment unnecessary of repetition for many weeks.

11. Children with acute colds should be kept on all-day rest and isolated from other children until completely recovered.

12. Reduction in the amount of school work should be prescribed by the physician for all children whose physical condition unfits them for the regular routine of study.

13. Observations of departure from normal are valueless unless they lead to medical treatment which will correct these conditions. The physician alone should decide just what particular modification of the usual routine should apply to a particular child.

14. The first requisite of an adequate physical examination is a complete personal history, which should be obtained by the nurse in the home and should cover all the infections and illnesses from which the child has suffered, with the dates of each. This should be followed by as much more detailed information as can be obtained regarding the family history, with particular stress upon exposure to infection. When tuberculosis is known to exist in the family it is important to discover whether the disease existed during the lifetime of the child and whether the child came in contact with anyone who may be assumed to have been an open case. Accurate observation should be made of height, and the degree of departure from the normal should be recorded.

15. Single observations of pulse, respiration, and temperature are of little value, and conclusions should not be drawn regarding these factors until a sufficient number of observations have been made.

16. In recording general appearance of the child, note pallor, fatigue, and relaxed muscular balance as indicated by the way the child stands.

17. *Teeth.*—Number of decayed teeth should be recorded.

18. *Eyes.*—In addition to defects of vision, records should be made of inflammatory conditions, and careful search made for keratitis, which will often lead to the discovery of tuberculosis. Trachoma should be promptly detected.

19. *Ears.*—Aside from defects of hearing, careful observations should be made for ear discharges, and these being discovered, very definite effort should be made for the removal of the cause, and plans for the effective carrying out of treatment.

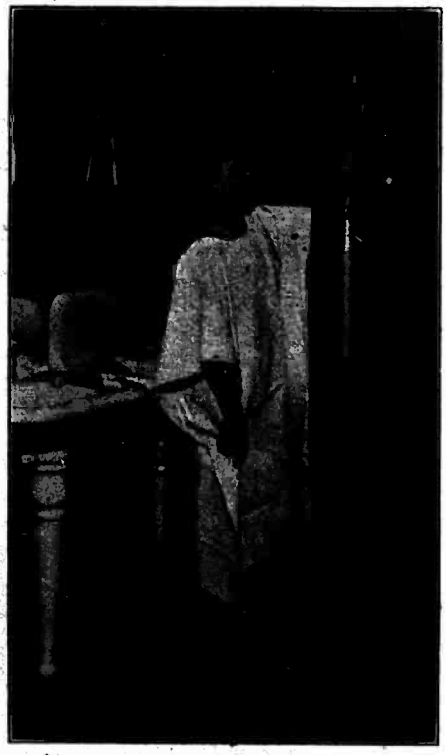


FIG. 56.—Weighing in a specially devised slip. (Chicago, Ill.)

20. *Nose.*—Nasal obstructions should be a matter not merely of record, but should be followed up continuously until the defect is corrected in a way not detrimental to the child's health.

21. *Adenoids.*—If present may cause the velum to stand away from the posterior pharyngeal wall, and the pressure of this growth behind the velum prevents the reflexes of this region which are normally present upon depression of the tongue.

22. *Tonsils.*—Enlarged tonsils should be classified according to the degree of enlargement and interference with respiration and the pressure of pus in crypts. The normal distance between tonsils is 1 to 1.2 inches.

23. *Glands.*—More definite standards should be adopted for the observation of enlarged glands and their classification as to size and number, so that different observers recording enlarged glands will mean the same thing. Any palpable glands should be recorded. Submaxillary glands escape notice unless head is thrown forward.

Numerous small palpable cervical glands are more suggestive of tuberculosis than a few glands of large size.

Large bronchial glands often produce a systolic murmur at the border of the sternum between the first and third rib when the head is thrown back (Smith's sign).

24. *Heart.*—The discovery of adventitious sounds in the heart should lead to repeated examination, and careful differentiation should be made between functional and organic murmurs.

25. *Lungs.*—First examination of the lungs should be sufficiently detailed to determine marked departure from the normal condition, leaving more detailed examination for subsequent and repeated observation.

26. *Sputum.*—Sputum examinations should be made as frequently as there is acute increase of cough.

27. *Blood.*—A Tallquist hæmoglobin estimation should be made at least twice a year.

Nurses should observe: First, evidence of acute infection and new symptoms as they appear; second, signs suspicious of contagious diseases (this should include observation of the hair, nose, eyes, mouth, and skin); third, throats on complaint, or changes in voice which might arouse suspicion; fourth, temperature, pulse, and respiration; fifth, suitability of clothing; sixth, cleanliness of teeth and skin; seventh, home conditions, covering all the observations on the family and social history chart, and should note on the chart changes which occur in home conditions, particularly acute illness in the family or other conditions of transitory character which have a bearing upon the present condition of the child, in order that additional rest may be prescribed for the child in the school to counteract temporary unfavorable conditions in the home and to elucidate present conditions; eighth, temperature and hygrometer readings in open-air rooms.

FIG. 57.—Weighing in the regular open-air suit. (St. Louis, Mo.)

Teachers should observe: First, the adjustment of windows and screens; second, that no child is unduly exposed to drafts; third, that children are properly clad—(*a*) that heavy sweaters, Eskimo suits, coats, and heavy underwear are not worn in mild weather; (*b*) that children are sufficiently clad when weather suddenly turns cold; (*c*) that children are properly attended to when they have wet feet; fourth, which children have had glasses prescribed and that they wear them; fifth, which children fail to hear readily, and especially failure of hearing on part of children who usually hear well; sixth, the development of acute colds and nasal discharges; seventh, development of signs of nervousness and irritable disposition; eighth, development of listlessness and inability to concentrate; ninth, failure of interest in school work; tenth, increased interest in school work, and whether it is due to elevation of tem-

perature or to general improvement of physical condition; eleventh, evidence of chilling if children's hands are cold, for children will often suffer without complaint; twelfth, evidence of weariness in the morning, and should learn if due to late hours at home; thirteenth, cleanliness; fourteenth, personal habits of children; fifteenth, restlessness during rest period; sixteenth, extreme lassitude and inability to waken; seventeenth, evidence of failing appetite; eighteenth, that on returning from bath the hair is thoroughly dry, and observe caution not to permit the children to return to schoolroom too soon after bath.

Efficient nursing service is absolutely indispensable for carrying out this program.

"The school nurse," says Dr. Leonard P. Ayres, "supplies the motive force which makes medical inspection effective." This is particularly true in an open-air school, where parents must understand what is done and cooperate in the work to an unusual degree, if good results are to be obtained. The nurse may be asked to help the mother plan an outdoor sleeping porch; she may need to teach her that milk and cocoa are better than coffee for a child's breakfast; she must see to it that a boy goes to bed early and sleeps with his window open, instead of sitting until 10 o'clock in the foul air of a motion-picture theater; she must often show how to guard against infection through a tuberculous member of the household; and in all these instances she must be prepared to meet with unfailing tact and cheerfulness a frequent lack of comprehension which will yield only to repeated efforts and a sympathetic approach.

The duties of the nurse in an open-air school and the points which she should especially observe in her daily visits are outlined in the preceding section. In addition she should be free to visit the homes of any children who are absent from school, and, if possible, on the day on which the absence occurs, unless information on the cause of absence can be obtained from a reliable source. If a child is absent from school for trivial causes, or if frequent visits to the home do not rectify conditions, a written report of the case should be made to the physician in charge. Each child in the schools should be visited in his own home by the nurse at least once a month and oftener if the case demands.

Chapter VI.

RECORDS AND FORMS.

It is the purpose of this chapter to present some detailed information touching the kind of records usually kept for open-air schools, and to make certain suggestions on records in general.

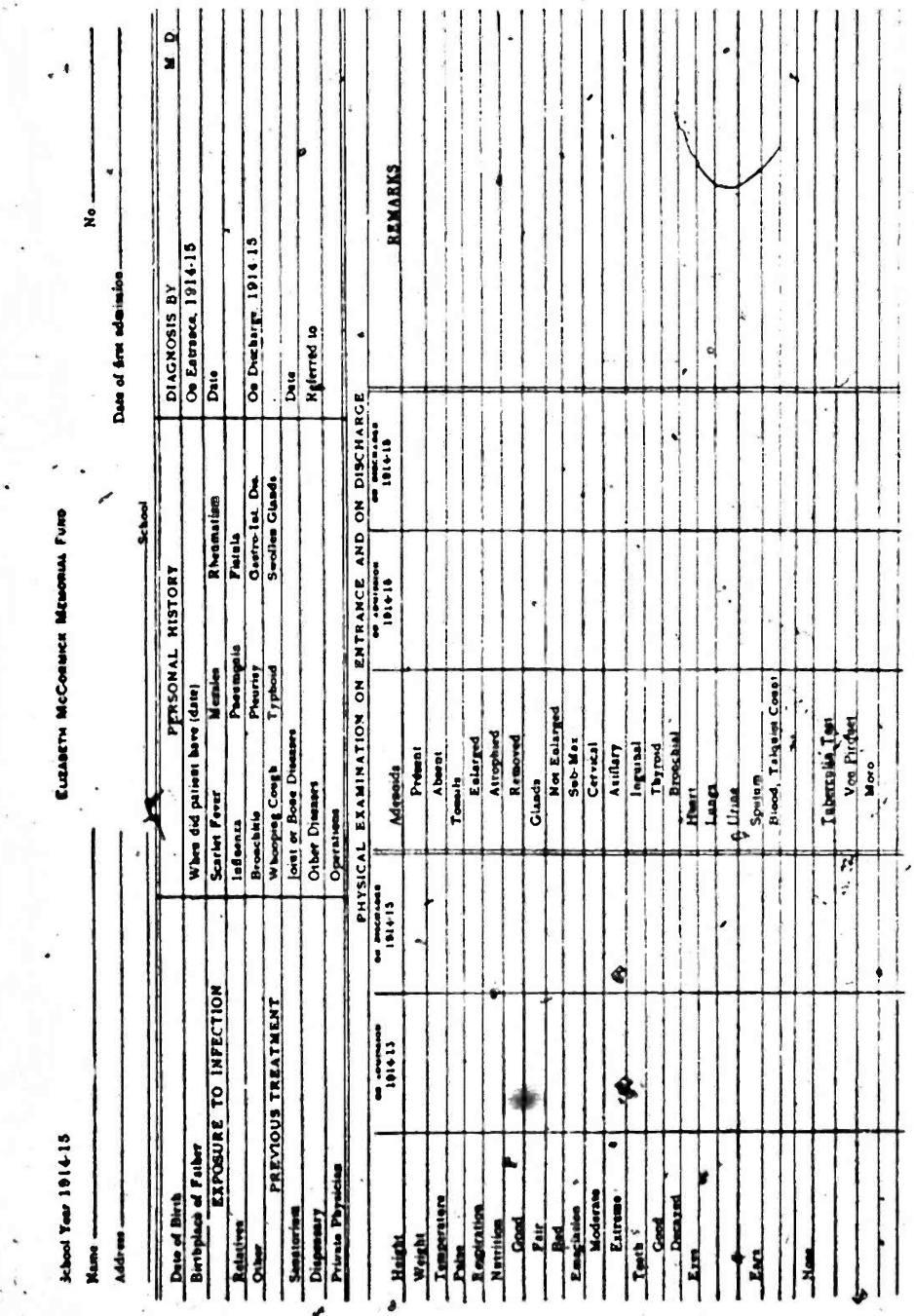
The record card should serve not only as an aid in the treatment of the individual child while he is in school, but taken together with the other records it should be so kept as to be of social value to the community. The physical examination should be thorough. All points should be accurately covered and recorded at the time the examination is made, and not trusted to memory with the expectation of entering them at some future time.

The open-air school usually has certain record cards and forms in addition to those used in regular school work. Form 1 is the physical-record card used in the open-air schools in Chicago. It is 7 by 10 inches. It is an evolution developed from forms previously used. Before its adoption it was submitted for criticism and suggestion to different schools and to many social workers. The card has given satisfaction. A commendable feature is that it makes possible a comparison of the child's condition on admission and on discharge. It is an advantage to have this in easily comparable columns.

The social-history card shown in Form 3 is kept by the nurse, and the aim is to give a picture of the child's home and environmental conditions. The difficulty to be corrected often lies in the home. The teacher and those responsible for the child's educational work can much more intelligently perform their duties toward him if they have an understanding of the conditions covered in this card.

In Chicago and in many other open-air schools it has been found desirable to have a parents' consent card. As has been said, the physical examination of open-air school children is ordinarily much more thorough and painstaking than that given through health inspection in the regular indoor schools. Moreover, there is usually an immediate need of correction of physical defects. The uniform

use of a parents' consent card makes it certain that the parent is apprised of the fact that his child needs some kind of special attention. This card should authorize the physician to make such examinations and tests as may be required to reveal the exact physical condition of the child and to determine steps necessary to cure de-



School Year 1914-15 — Elizabeth McCormick Memorial Fund — No ____

Name ____ School ____

Address ____ Date of first admission ____

Date of Birth — Birthplace of Father — Where did parent have (date) — EXPOSURE TO INFECTION — Relatives — Other — PREVIOUS TREATMENT — Sanitarium — Dispensary — Private Physician

PERSONAL HISTORY

Scarlet Fever — Measles — Rheumatism — Influenza — Pneumonia — Pleurisy — Bronchitis — Pleurisy — Gastro-Int. Dis. — Whooping Cough — Typhoid — Swollen Glands — Joint or Bone Disease — Other Diseases — Operations

DIAGNOSIS BY — M D

On Entrance, 1914-15 — Date

On Discharge, 1914-15 — Date — Referred to

PHYSICAL EXAMINATION ON ENTRANCE AND ON DISCHARGE

	On entrance 1914-15	On previous 1914-15		On entrance 1914-15	On previous 1914-15	On discharge 1914-15	REMARKS
Height			Adenoids				
Weight			Present				
Temperature			Absent				
Pulse			Tonsils				
Respiration			Enlarged				
Nutrition			Atrophied				
Good			Removed				
Fair			Glands				
Bad			Not Enlarged				
Emaciation			Sub-Max				
			Cervical				
Moderate			Axillary				
Extreme			Inguinal				
Teeth			Thyroid				
Good			Bronchial				
Decayed			Heart				
Eyes			Lungs				
			Urine				
Ears			Sputum				
			Blood, Talquist Coag.				
Nose							
			Tuberculin Test				
			Von Pirquet				
			Moro				

FORM 1.—Face of physical history card used in open-air schools in Chicago. To be filled by examining physician.

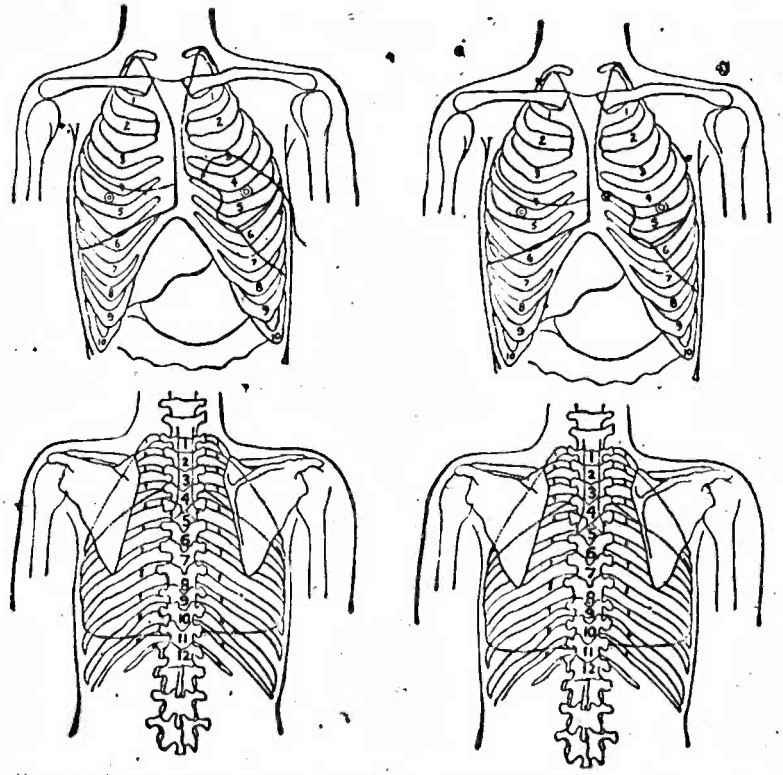
fects, and should be signed by the parents. Forms 4 and 5 illustrate parents' consent cards used, respectively, in Chicago, Ill., and Newark, N. J.

In order to make the physical examination thorough, the child should be stripped to the waist. Figure 58 illustrates a slip that has been devised in the open-air schools of Chicago, to be used in this

connection as well as in weighing. It is the practice in the Chicago schools to have the mother or the nurse present at such examinations.

Forms 6 and 7 represent the face and reverse sides of the record card used in Cleveland, Ohio. The provision of this card for comparing the weight of a given child with the normal weight of a child of his or her age, sex, and height deserves attention.

Weighing should be carefully done. In the first place an accurate pair of scales should be secured, and they should be kept balanced. It is difficult to secure accurate weights unless the children are



FORM 2.—Reverse side of physical history card used in Chicago open-air schools.

stripped. In Chicago the slip, already referred to, is used (see figure 58). This serves the double purpose of making accuracy possible, and of meeting the sanctions of modesty. If children are weighed with their clothes on, there are numerous variables which make for inaccuracy. The weight of clothing is different in different seasons. It may also vary the same day or week, if children have been out in a storm and had their clothes wet. Sometimes children's pockets are full of jackstones and marbles and other possessions of childhood, and at other times they are empty.

In selecting a standard for the normal weight, one should be sure of a number of points. For instance, the standard worked out by

SOCIAL HISTORY CARD

ELIZABETH McCORMICK MEMORIAL FUND

Name _____ Part of House _____ School _____

Address _____

FAMILY (living and dead)	Age	Nativity (State or Country)	Race	Physical Condition	Occupation or School	Wage	Other Income (Boarder, Roomers, Etc.)	Rent	No. Rooms
Man									
Woman									
Children									

HOME CONDITIONS	Bed Room	Facilities for Open-Air Treatment	Registered with: . . . Receiving Aid from: X	FAMILY STORY
Neighborhood	Size	None	Church I. A. S.	
Street	Exposure	Porch	Union V. N. A.	
Yard	Windows	Yard	Benefit Assn. I. P. A.	
House: Light / Medium / Dark; Class: Medium / Dirty	Number	Roof	County Inf. Wd.	
	Open at night	Good Bed Room	U. C. Relatives	
	Sunlight		I. C. R. Other	
Room closed	Carpet			
Work done in home?	Sleep alone?			

FORM 3.—Social history card used in Chicago open-air schools. This card is filled by the nurse. The reverse side is blank and provides for the running history. Pulse and temperature records are usually taken by the nurse. These records are taken daily in some schools, weekly in others, and on special indications of children in still others. Space for pulse and temperature readings can be allowed on the reverse side of the social history card. In many of the schools these records are kept in a book similar to a teacher's register.

Dr. Emmett Holt, in his "Diseases of Childhood," varies somewhat from that of the standard arrived at by the Chicago Board of Educa-

tion in its study of weights of children. In Holt's standard both the weight and the height are taken with clothes and shoes on. The allowances for the weight of clothing for boys and girls, and for various ages, as set by Holt and by the Chicago Board of Education, are as follows:

Weight of clothing given by Holt and by the Chicago Board of Education.

[Based upon Holt's figures.]

Ages.	Boys.		Girls.	
	Holt.	Chicago Board of Education.	Holt.	Chicago Board of Education.
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*
5 years	2.8	2.4	2.8	2.1
6 years	2.8	2.6	2.8	2.3
7 years	3.6	2.9	3.5	2.5
8 years	3.5	3.2	3.5	2.8
9 years	3.5	3.5	3.5	3.0
10 years	5.7	3.9	4.5	3.3
11 years	5.7	4.2	4.5	3.7
12 years	5.7	4.6	4.5	4.2
13 years	7.4	5.1	5.6	4.7
14 years	7.4	5.8	5.6	5.2
15 years	7.4	6.4	5.6	5.5
16 years	9.7	7.2	8.1	5.9

FIG. 58.—Accurate weight taken regularly in open-air schools of Chicago.

Forms 8 and 9 are the face and reverse sides of the record card used in Newark, N. J. This card is 5 by 8 inches, and will record a great deal of information in a small space. One point on the

reverse side, the percentage of weight for height, is especially significant.

Syracuse, N. Y., also has a 5 by 8 card which is compact and well arranged to show the results of attendance upon the open-air school.

DEPARTMENT OF HEALTH—CITY OF CHICAGO

DIVISION OF CHILD HYGIENE—PARENTS' CONSENT CARD

PLEASE SIGN THIS CARD AND RETURN IT TO THE SCHOOL

To the parent of_____

Address_____ Attending_____ School

In the interest of the present and future welfare of school children, the Department of Health is making physical examinations of the pupils in the Public and Parochial Schools.
Please sign this card giving permission to have your child examined.
When signed, return the card to the school.
Parents can be present at the examination if they desire.

G. B. YOUNG, Commissioner of Health.

The school doctor is hereby granted permission to make an examination of the above named child.

Parent's Signature_____

Date_____ 191____

Ill. D.-M.501a. 50M 11-14

FORM 4.—Parent's consent card used in Chicago open-air school.

Forms 12 and 13 illustrate a card used in the open-air schools in New York City.

A uniform card is probably not possible or desirable for all open-air schools, because conditions vary in different places; but there are

Form 801

BOARD OF EDUCATION

NEWARK, N. J.

DEPARTMENT OF MEDICAL INSPECTION

_____ 191____

I, parent of_____

living at_____ herewith request that the nurse of the Department of Education adopt such procedures for the proper care or treatment of such diseases or defects as in her judgment are necessary for the cure of my child.

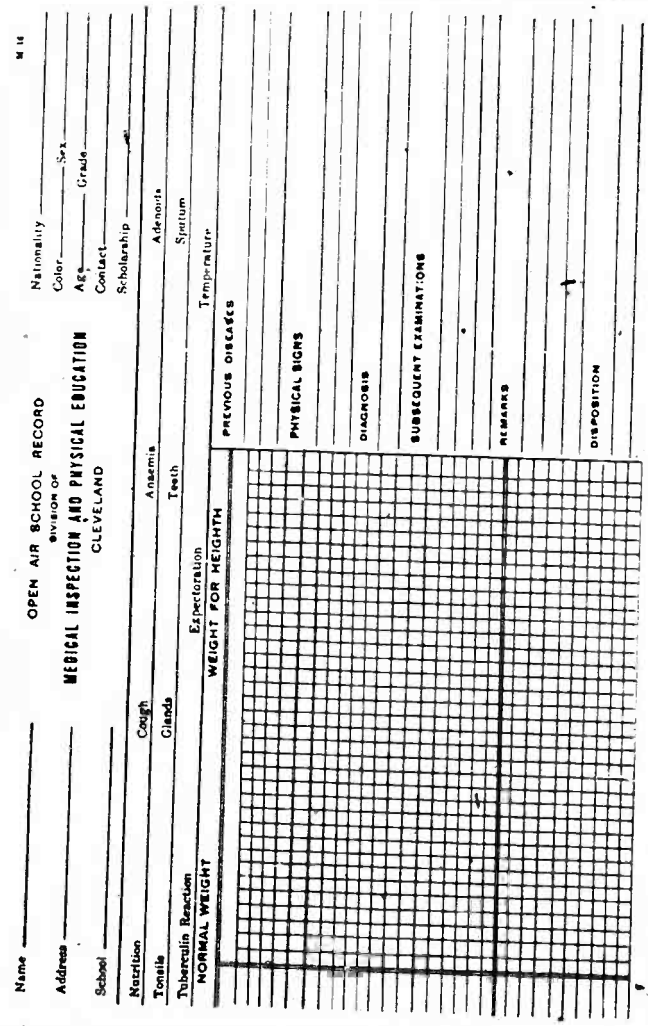
Signed_____

FORM 5.—Parent's consent card used in Newark, N. J.

a number of points which all records should cover; viz, name, age, sex, height, weight, condition of lungs and heart, defects of eyes, ears, nose, throat, and teeth, orthopedic defects; number in the

family, number of rooms occupied, character of dwelling, rent, income, communicable diseases in the home.

In many schools, especially those abroad, chest expansion is recorded, and the Tallquist hemoglobin test is made. In the Charlottenburg school and other foreign schools, systems of physical

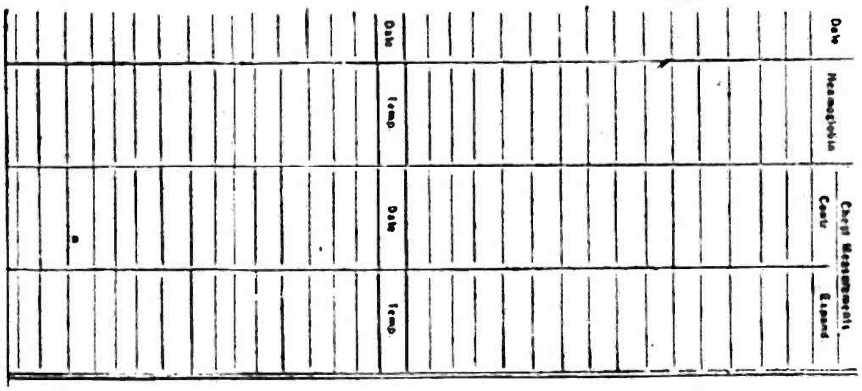


FORM 6.—Face of record used in open-air school work in Cleveland, Ohio. An excellent feature of this card is the provision for comparing the weight of a given child with the normal weight for his or her age, sex, and height.

exercises for the correction of orthopedic defects are a part of the school program and a matter of record.

Records need to be carefully and painstakingly kept. The friends of open-air schools should in every way urge upon their constituencies the importance of including records and record keeping as a

part of the necessary expense of the schools, and pains should be taken to get this information to the school board and to the public in usable form.



HOME INVESTIGATION

THE HOME

H. A. T. _____ No. Rooms _____ L. or D. _____

Plumbing _____ Cleanliness _____ Work in Home _____

Name and Address of Landlord _____

Porch, Roof, Tent, Garden, Woods Available _____

Recommendations _____

ECONOMIC CONDITIONS

Rent _____ Aid from Societies _____

Remarks _____

THE PATIENT

Careful _____ Careless _____ Temperate _____

Intelligent or Ignorant _____ Daily Quantity of Milk _____

Needed Food, Clothing, etc. _____

Sleep Alone _____ Separate Bed _____

Separate Room _____ L. or D. _____

THE FAMILY

Names, Ages, Health, and Occupation of Family _____

Remarks _____

FORM 7.—Reverse of record card used in Cleveland.

Name _____ School _____ Feeding _____

Address _____ Floor F B Grade _____ Date _____

Date of Birth _____ SEX MALE FEMALE COLOR WHITE BLACK NATIONALITY NATIVITY OF PARENTS SCHOLARSHIP

	ON ADMISSION	SUBSEQUENT EXAMINATIONS								ON DISCHARGE		
		DATE	GAIN OR LOSS	DATE	GAIN OR LOSS	DATE	GAIN OR LOSS	DATE	GAIN OR LOSS	DATE	GAIN OR LOSS	TOTAL GAIN OR LOSS
HEIGHT												
WEIGHT												
% BELOW WEIGHT FOR HEIGHT												
CHEST MEASUREMENTS												

HAEMOGLOBIN ON ADMISSION % ON DISCHARGE %

VON PIRQUET'S RE-ACTION POSITIVE NEGATIVE

PHYSICAL DEFECTS

	ON ADMISSION		ON DISCHARGE
NUTR.	B. G.	DEF. HEAR	Y. N.
ENL. CERV. GL.	Y. N. A. P.	DEF. NASAL BREATH	Y. N.
CHOREA	Y. N.	TEETH	B. G.
CARDIAC DIS.	Y. N.	DEFORM. PALATE	Y. N.
PULM. DIS.	Y. N.	IMPED. SPEECH	Y. N.
SKIN DIS.	Y. N.	HYPER. TONS.	Y. N.
DEF. SPINE	Y. N.	P. NASAL GROWTH	Y. N.
DEF. CHEST	Y. N.		
DEF. EXTREM.	Y. N.	MENTALITY	B. G.
DEF. VIS. R. E. V. /		TREAT. NECESSARY	Y. N.
DEF. VIS. L. E. V. /			

NOTE IN THE SPACE ABOVE ANY IMPROVEMENT THAT HAS TAKEN PLACE IN THE PHYSICAL CONDITION OF THE CHILD SINCE ADMISSION.

FORM 8.—Face of record card used in open-air school work, Newark, N. J.

WEEKLY WEIGHT RECORD

DATE	WEIGHT	GAIN OR LOSS	DATE	WEIGHT	GAIN OR LOSS	DATE	WEIGHT	GAIN OR LOSS	DATE	WEIGHT	GAIN OR LOSS

SOCIAL CONDITIONS

THE HOME	THE FAMILY	ECONOMIC CONDITION	THE CHILD
NO ROOMS CLEANLINESS GOOD FAIR BAD CHARACTER GOOD FAIR BAD VENTILATION GOOD FAIR BAD CHILD'S SLEEPING ROOM GOOD FAIR BAD VENTILATION GOOD FAIR BAD NO IN ROOMS NO IN BED	TOTAL NUMBER ADULTS CHILDREN BOARDERS PARENTS ALCOHOLIC YES NO ILLNESS IN— WHO? WHAT? ATTEND CLINIC?	RENT INCOME CHARITY RECEIVED WHO WORKS?	FOOD WHAT? FRIED? BEVERAGE TEA COFFEE WINE BEER WHISKEY SLEEP HOW MUCH WORK YES NO WHAT? PLAY-OUT HOW MUCH? BATH HOW OFTEN?

ACTION TAK

BOARD OF EDUCATION,
NEWARK, N. J. Form 503

FIGURE 9.—Reverse side of record card used in open-air school work, Newark, N. J.

Name

Address School Class Age Nat. Date

Recommended by Reason Diagnosis

Past School History

Past Physical History

PHYSICAL EXAMINATION	ON ADMISSION		ON DISCHARGE
Muscular Sys.	Teeth	Defect. Hearing	Date
Lymph. Sys.	Tonsils	Def. Nasal Breathing	
Osseous Sys.	Adenoids	Mentality	
Nutrition	Vision	Von Pirquet	
Chest			

ON ADMISSION	On Discharge	Gain or Loss	SUBSEQUENT EXAMINATIONS											
			Date	Hgt.	Wgt.	Hem.	Date	Hgt.	Wgt.	Hem.	Date	Hgt.	Wgt.	Hem.
Height														
Weight														
Hemoglobin														
Chest: Circum														
Chest: Insp														
Chest: Expir														

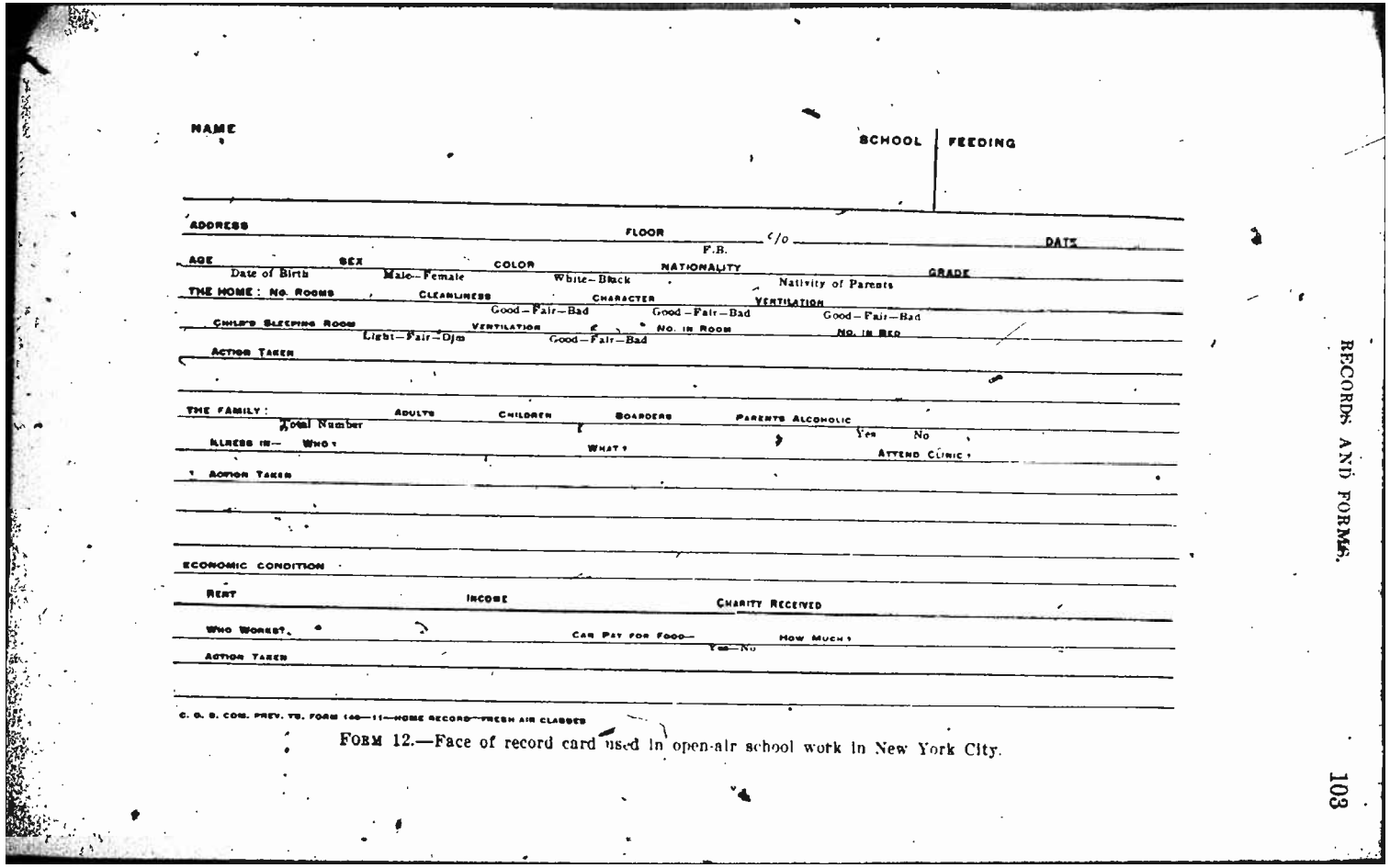
FORM 10.—Face of record card used in open-air school work, Syracuse, N. Y.

WEEKLY WEIGHT RECORD

Date	Weight	Gain or Loss	Date	Weight	Gain or Loss	Date	Weight	Gain or Loss	Date	Weight	Gain or Loss

REMARKS:

FORM 11.—Reverse side of record card used in Syracuse, N. Y.



NAME

SCHOOL | FEEDING

ADDRESS FLOOR c/o DATE

AGE Date of Birth SEX Male—Female COLOR White—Black F.B. NATIONALITY Nativity of Parents GRADE

THE HOME: No. ROOMS CLEANLINESS Good—Fair—Bad CHARACTER Good—Fair—Bad VENTILATION Good—Fair—Bad

CHILD'S SLEEPING ROOM Light—Fair—Dim VENTILATION Good—Fair—Bad No. IN ROOM No. IN BED

ACTION TAKEN

THE FAMILY: Total Number ADULTS CHILDREN BOARDERS PARENTS ALCOHOLIC Yes No

ILLNESS IN— WHO? WHAT? ATTEND CLINIC?

ACTION TAKEN

ECONOMIC CONDITION

RENT INCOME CHARITY RECEIVED

WHO WORKS? CAN PAY FOR FOOD— Yes—No HOW MUCH?

ACTION TAKEN

C. O. S. COM. PREV. TO. FORM 140—11—HOME RECORD—FRESH AIR CLASSES

FORM 12.—Face of record card used in open-air school work in New York City.

THE CHILD: FOOD—WHAT? FRIED? BEVERAGE Tea-Coffee-Wine-Beer-Whiskey

SLEEP— How Much? WORK What? PLAY—OUT? Yes No How Much? BATH How Often?

PREVIOUS ILLNESSES

ACTION TAKEN

NOTES:—

FORM 133—Reverse side of New York City record card.

Chapter VII.

OPEN-AIR SCHOOLS IN GERMANY.

Founding and development.—In the school year 1902–3 the Charlottenburg Board of Education undertook, more than it previously had undertaken, to adapt its school organization and methods of teaching to the physical needs of the children. Discussions with the school physicians resulted in an agreement that physically debilitated children needed care in special classes along lines already followed in Germany's school system for a number of years with mentally subnormal children.

In considering the particular needs of such children it seemed important both to the schoolmen and to the physicians to transfer them from the city to the pure invigorating air of the country. In the early discussions of this problem, the establishment of a school sanitarium where children might stay day and night seemed to offer the only feasible solution. Dr. Baginsky, who had devoted much of his time to the needs of physically subnormal children, had advocated such a plan for many years; finally, however, the discussions led to the idea of a school for delicate children where both educational and health needs might be provided for, and the result was the Charlottenburg Forest School.

While the discussions that developed this plan were in progress, the leaders of the movement were active in other lines. One committee was searching for a site. In their quest they turned naturally to the Grünewald, a wooded tract extending for many miles in the vicinity of Charlottenburg. An attractive site was found, and the real estate company which owned the land was easily persuaded to put a tract at the disposal of the school for a period of years.

The domestic management of the school was another problem which was receiving attention. Dr. Neufert and Dr. Bendix secured the cooperation of the Charlottenburg branch of the Vaterländische Frauenverein, a nation-wide woman's organization affiliated with the German National Red Cross. This group undertook the housekeeping and nursing service and also provided a Doecker housekeeping shack, thereby saving $1,125 to the municipality.

In May, 1904, the detailed plan was presented to the Charlottenburg Board of Education and was accepted by unanimous vote. On

June 7, 1904, the school physicians gave their assent, and within a week the bill creating the forest school passed both houses of the municipal government, accompanied by an appropriation of $8,000. On July 5, 1904, the representative of the royal Government at Potsdam gave his approval, and on August 1, 1904, the Charlottenburg Forest School was opened. Already the educational campaign which led to action by the different branches of the government had attracted nation-wide attention to the school.

Site and equipment.—This first site of the Charlottenburg Forest School was in a vast forest of pines and firs, about 8 minutes' walk

FIG. 59.—General view of the buildings and grounds of the Charlottenburg Open-air School.

from the nearest street-car station. On one side a mound of earth formed a natural boundary. The ground was covered with grass, ferns, raspberry and blackberry bushes. The air was pure, and absolute quiet gave relief to the over-wrought nerves of city children. The school building was a shack made of waterproof pasteboard and wood. It contained two classrooms, a room for the superintendent of the school, another for the teachers and the school equipment. One side of the schoolroom was almost entirely occupied by large French windows reaching from the floor to the ceiling and swinging

on hinges outward. Additional windows and transoms were provided in the opposite walls and in the roof. At the ends of the room were two wardrobe closets, one for boys and one for girls. Each child had a hook for his coat, hat, and satchel, and a shelf for his blanket, each item of the set bearing the same number. In bad weather the classroom was used as a diningroom and playroom as well. Instead of desks, the room was equipped with folding tables and chairs in order that it might be readily cleared for this purpose.

At some distance from this building was a spacious floored porch or resting shed entirely open to the south, but protected against heavy showers by overhanging eaves. On the opposite side of the grounds was the housekeeping section. The main building was the five-room shack furnished by the Vaterländische Frauenverein. It contained kitchen, nurses' room, a pantry, and two rooms for servants. The nurses' room was also used for the medical examinations. The kitchen had a small porch where much of the household work was done. In front of the housekeeping shack was a gravel-strewn space to indicate the children's diningroom. As there was no roof, this was used only in good weather. Planks were laid to keep the dampness from the children's feet. In addition to its service as a diningroom, the children often used it as a place to play, study, and recite.

The supplies of the school were kept in wooden shelters near by. A cellar dug deep in the earth furnished a satisfactory place, even in the warmest summer months, to keep milk and other perishable foods. A big dog served as the guardian of the forest school at night. His kennel was near the supply shelters. The school was supplied with water free of charge by an extension of water pipes from the municipal plant at Charlottenburg. In still another shack were the lavatories and bathrooms—both showers and tubs—and in still another, separate toilets for the boys and girls.

Gardens for the children were another feature of the grounds, each child having an individual lot. Another feature was the outdoor gymnasium. Here by means of a high inclosure the children were given an opportunity for gymnastic exercises, affording sun and air baths for the whole body. This was used alternately for the boys and the girls. The site not only afforded additional space for all these features, but there still remained large areas where the original character of the forest was preserved. Small arbors were erected here and there, affording cosy spaces where the older girls especially loved to retire with a book or needlework. The immediate grounds comprised about 8 acres.

History.—The school opened with an enrollment of 95 children from the Charlottenburg public schools. The number soon reached 120; it remained at this point until October 1, when some of the chil-

dren graduated and others moved away. The school was closed for the year on October 29, 1904.

The teaching staff consisted of four teachers—three men and one woman. Other women teachers gave their services afternoons to supervise and share the recreation period with the children.

The school grew in numbers from year to year, and the period spent at the forest school was lengthened until at the present time it is open all the year excepting from Christmas until Easter. During that interval the children attend a special school in the city. The

FIG. 60.—Children at the Charlottenburg School resting under the trees. In rainy weather they use the resting shed shown to the back of the picture.

forest school now accommodates 260 children, and there are 9 teachers.

In 1910 the forest school was obliged to move, as the site it occupied was required for the extension of the municipal subway. In this emergency the board of education of Charlottenburg made a 10-year lease of an area nearly double the size of the original site from the Royal Prussian Department of Forests. This site is also in the Grünewald and is as easily accessible as the other.

The shacks containing the classrooms, the housekeeping department, the resting-shelters, and the open-air gymnasium were

transferred to the new grounds. The experiment had proved so satisfactory that the authorities gladly added new buildings and equipment for the plant.

Administration.—Even this brief narration of the establishment and development of the Charlottenburg Forest School indicates a corresponding deepening of the basic idea. Its founders realized that they were dealing with a vital problem and were not satisfied merely with having conceived the plan and provided the physical features necessary to its development. They realized that the real

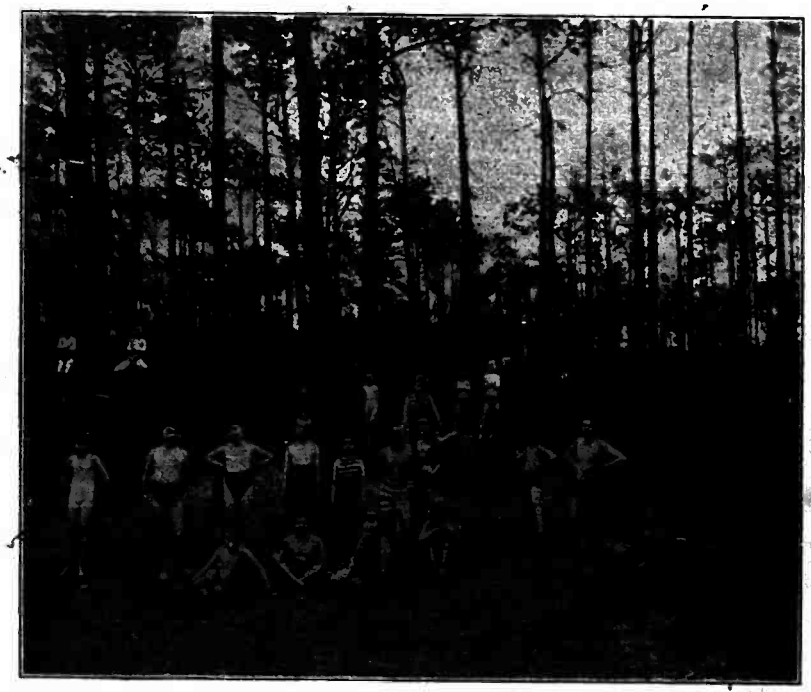


FIG. 61.—At the Charlottenburg Open-air School both boys and girls have separate walled-in spaces for outdoor gymnastics.

problem was evolving methods and principles. It is difficult to trace these steps, because inner progress and growth in an organization or institution like the spiritual development of an individual can not accurately be expressed by facts or figures.

Class of children to be admitted.—The first problem that pressed for solution was to determine and to set forth characteristics that made a child a suitable candidate for the forest school. The forest school afforded a new resource, and both teachers and physicians studied the children with that new interest which is born when an

added practice or invention in the world offers a new possibility for discovered need.

Both teachers and physicians decided upon much the same cases for this special treatment. The teacher was led to the conclusion because he wanted to advance the educational standards of the children, and the physician because the health of this type of pupils seemed to need special care. Thus it happened that the Charlottenburg Board of Education and the organization of school physicians agreed to make the forest school—

> a recuperating place for anemic, nervous, scrofulous children, and children with slight heart or lung troubles, who could not stand the usual five or six hour period, but were not sick enough to be entirely exempt from school attendance.

These children needed to be strengthened and their power of resistance increased by living as much as possible in the open air, by having sufficient exercise, by getting nourishing food, and if necessary, special baths. At the same time an adequate education had to be provided, so as to insure their keeping up with their grades in the public school.

According to this agreement the following classes of children are excluded from the forest school: Children with open tuberculosis; children with serious heart troubles; epileptic children; children with chorea and the serious forms of hysteria; children with open forms of scrofula; children with contagious diseases.

Management.—The school faced new administrative problems when it undertook to accomplish the twofold task of caring for both the educational and the hygienic needs of the children.

The school site and equipment have already been described. The mere description of the plant indicates that the educational problem in the forest school has to be handled in an entirely different way from that customary in the regular schools. The relations between the teachers and pupils are also different. In the forest school the children are kept not only during usual school hours, but all day long. They even spend Sundays and holidays "at school," and are therefore under the supervision and in the company of the teachers for seven full days per week.

The children originally admitted were pupils from the second to the seventh grade. Pupils of the first grade were not admitted, because 6-year-old children, so delicate and sickly as to render them candidates for the forest school, are exempted from school attendance. In 1912 this rule was broken by admitting from the first grade 20 children who had begun their school life on the previous Michaelmas.

The curriculum was the same as in the public school, with the modification, however, that only the essentials of every subject were taught. This made it necessary to shorten the periods considerably.

The time assigned to recitations amounted to 12 hours weekly for the second grade, 13 hours for the third grade, 14 hours for the fourth grade, 15 hours for the fifth, sixth, and seventh grades.

Such classes as natural science, gymnastics, and music were conducted out of doors whenever possible. During the recitations of two grades the other children rested, played, or busied themselves in various ways.

In 1912 the curriculum for the public schools in Germany was revised, and the daily program of the forest school was adapted to correspond to this revised curriculum.

The six grades represented from the beginning in the Charlottenburg Forest School had but two classrooms at their disposal; only two recitations therefore could go on at once. This made it somewhat hard to arrange the educational program for each day.

The lessons lasted half an hour; after each half hour there was a recess of 5 minutes; after each hour, a recess of 10 minutes. The children were never taught more than two hours at a time.

Program for the first year of the forest school.

		Classroom A.			Classroom B.		
Days.	Time.	Grade.	Subject (½ hour).	Subject (½ hour).	Grade.	Subject (½ hour).	Subject (½ hour).
Monday.	8.00– 8.55	8	Catechism and Bible study.	German.....	5	Catechism and Bible study.	German.
	9.05–10.00	8	Mathematics....	History.....	5	Arithmetic....	Writing.
	10.20–11.15	7	German.....	Catechism and Bible study.	3	Catechism and Bible study.	Arithmetic.
	11.25–12.20	7	Mathematics....	Geography....	3	German.....	Writing.
	3.00– 3.55	6	Catechism and Bible study.	German.....	4	Catechism and Bible study.	German.
	4.15– 5.10	6	Arithmetic.....	Writing.....	4	Arithmetic....	Writing.
	5.20– 6.15	8	Geography.....	Natural science.	5	German.....	Natural science.
Tuesday.	8.00– 8.55	6	German.....	Arithmetic....	5	.....do.....	Arithmetic.
	9.05–10.00	6	.....do.....	Geography....	5	.....do.....	Geography.
	10.20–11.15	7	.....do.....	Writing.....	4	Arithmetic....	German.
	11.25–12.20	7	.....do.....	Arithmetic....	4	German.....	History.
	3.00– 3.55	8	.....do.....	.....do.....	3	.....do.....	Arithmetic.
	4.15– 5.10	8	.....do.....	Writing.....	3	.....do.....	Local geography.
	5.20– 6.15	8 and 7	Music.....	Gymnastics...	6	Natural science.	
Wednesday.	8.00– 8.55	5	Catechism and Bible study.	German.....	5	German.....	Arithmetic.
	9.05–10.00	6	Arithmetic.....	.....do.....	5	.....do.....	Music.
	10.20–11.15	8	German.....	Arithmetic....	3	Arithmetic....	Gymnastics.
	11.25–12.20	8	History.....	German	3	German.....	German.
	3.00– 3.55	7	Catechism and Bible study.	Arithmetic....	4	Catechism and Bible study.	Do.
	4.15– 5.10	7	History.....	German.....	4	Arithmetic....	Do.
	5.20– 6.15	8 and 7	Gymnastics.....	.....	.....	.....	.....
Thursday.	8.00– 8.55	8	German.....	Arithmetic....	5	Catechism and Bible study.	Do.
	9.05–10.00	8	.....do.....	Writing.....	5	Arithmetic....	Writing.
	10.20–11.15	7	Arithmetic.....	German.....	3	Catechism and Bible study.	Arithmetic.
	11.25–12.20	7	German.....	Natural science.	3	German.....	German.

Program for the first year of the forest school—Continued.

Days.	Time.	Classroom A. Grade.	Subject (½ hour).	Subject (½ hour).	Classroom B. Grade.	Subject (½ hour).	Subject (½ hour).
Thursday.	3.00–3.55	6	German	Arithmetic	4	German	Arithmetic.
	4.15–5.10	7	do	Gymnastics	3	do	Writing.
	5.20–6.15	8	Geography	Natural science.	5	Natural science.	History.
Friday	8.00–8.55	6	Arithmetic	Writing	4	German	German.
	9.05–10.00	6	German	German	4	Arithmetic	Local geography.
	10.20–11.15	7	do	Writing	3	German	German.
	11.25–12.20	7	do	German	3	Arithmetic	Do.
	3.00–3.55	8	do	do	5	German	Do.
	4.15–5.10	8	Arithmetic	do	5	Arithmetic	Geography.
	5.20–6.15	7	do	History	6	Geography	Natural science.
Saturday.	8.00–8.55	8	Catechism and Bible study.	German	5	Catechism and Bible study.	German.
	9.05–10.00	8	Arithmetic	History	5	Arithmetic	Do.
	10.20–11.15	7	Catechism and Bible study.	Arithmetic	3	Catechism and Bible study.	Arithmetic.
	11.25–12.20	7	Geography	German	3	German	German.
	3.00–3.55	6	Catechism and Bible study.	do	4	Arithmetic	Do.
	4.15–5.10	6	German	Arithmetic	4	German	Catechism and Bible study.
	5.20–6.15	7	do	Natural science.	6 and 5	Gymnastics	

The average size of the forest school classes is 20 to 25 pupils, as compared with 40 to 50 in the regular classes of the public schools. The forest school teacher, therefore, is able to devote much more time and attention to each individual child. But these 20 or 25 children thus brought together in the forest school were selected from different public schools, and on account of their poor physical condition most of them had attended school irregularly. This meant that the teacher was obliged to spend considerable time in creating the uniform standard of attainment that is exacted in the regular public school.

Moreover, the method of teaching had to be modified to meet the special needs of individual children. Health considerations came first. Mental strain and crowding, at the expense of physical welfare, for the sake of passing examinations or making grades was not tolerated. Such considerations also governed the teachers' attitude in matters of punishment and discipline. It was, of course, out of the question to deny meals to a stubborn child or even to exclude him from the games in which all the children joined. Severe reproofs, reprimands, ironical remarks, and even jokes at a child's expense were scrupulously avoided. Encouragement and praise and as much parental kindness as possible were the means by which these children were to be ruled.

Despite all these difficulties, and the considerable shortening of the periods, the children were expected to keep up with their grades at

the public schools and to be able to reenter them on discharge from the forest school. If a child were slow in understanding, the teacher could not waste time during the period by further explanations. He would, rather, find an opportunity outside of school time for talking things over and removing the difficulties. In this regard it was a wonderful help that the intercourse between teachers and pupils was not confined to school hours. The everyday life afforded excellent opportunities for assisting backward children to conquer shortcomings.

The Charlottenburg Forest School, like nearly all the German forest schools, is based on the coeducational plan. While Germany as a rule does not favor coeducation in her schools, it is deserving of emphasis that no disadvantages whatever as a result of coeducation have been reported from the forest schools. On the other hand, beneficial effects were observed.

Says Dr. Neufert, writing of the Charlottenburg Forest School:

> Many a dull and listless lad was seriously disturbed if the bright girl at his side habitually raised her hand quicker than he in response to the teacher's questions; he soon tried very earnestly to equal her. The girls, on the other hand, were impressed by the boys' deliberateness and presence of mind and answered less impetuously. The manners of the boys were decidedly improved by the presence of the girls, who as a rule were neat and well behaved.

Medical care and supervision.—The selection of children for the forest school is made by the regular physicians of the Charlottenburg public schools, but the physician of the forest school examines each case and admits the children. Dr. S. Bendix has been in charge during the whole period of the school's existence. Special attention is given to heart and lungs and general condition as indicated by complexion, development of the muscles, nutrition, and similar indications. The findings are entered on a specially designed schedule. The weight of the child is taken on admission and fortnightly thereafter. Since 1906, height, chest expansion, and the Tallquist blood test have been made a part of the record. Urine is examined only on special indication. This same thorough examination is given on the discharge of the children.

During their stay in the forest school the children are under a continuous medical and nursing supervision. In the early weeks of the school the doctor pays a daily visit. The same is the case the last three or four weeks of school. In the intervening time at least three visits a week are made by the physician, and oftener if there is special need.

Little medicine is given. Almost entire reliance is placed upon the efficacy of pure air, sunshine, and a wholesomely regulated life. There are many things, however, to which the physician gives strict attention. He prescribes the dietary, advises as to the clothing the

children wear, gives careful supervision of exercise and recreation, prescribes warm baths for seriously anemic and nervous children and saline baths for scrofulous children. In 1905 32 children received three saline baths a week. Each child is given two or three shower baths a week and a cleansing tub bath at least once a fortnight.

Since 1911 special attention has been given to orthopedic defects. An examination by a specialist proved that many of the forest school children suffered from slight curvatures of the spine and other malformations. In the months of August and September, 1911, an experiment was tried with 40 girls who were suffering from curvatures and other orthopedic defects. The treatment consisted chiefly of specially devised gymnastic exercises. The results were so satisfactory that his scheme of exercises is now given to all the children who have such defects.

The physician is assisted in his work by a Red Cross nurse who is responsible for carrying out his directions. She weighs and takes the height of the children and gives whatever help may be necessary in emergency cases until the physician can be called. As the nurse gives her whole time to the forest school and stays both night and day, she is able to supervise the housekeeping.

The forest school's purpose is not alone to tide the children over a certain crucial period, but also to secure if possible a lasting improvement in health. Since the children are nearly all anemic and underfed, a most important factor in attaining this purpose is food. The managers of the school reasoned that they could not depend upon the chance of the children receiving the proper kind of food at home. If the results were to be of any permanent value to the child and if the school assumed the responsibility for the results, the feeding had to be provided by the school. It was consequently decided from the beginning that the feeding furnished by the school should render the child independent of further home feeding.

The following plan of meals was instituted at the school:

7.45 a. m. Porridge of rice flour or rye flour, rolls and butter.
10.00 a. m. Milk (average 1 pt.), buttered rye bread.
12.30 p. m. Meat (3.2 oz.), vegetables, potatoes, legumes (6.4 oz.).
4.00 p. m. Milk (average 1 pt.), rye bread with jam or marmalade.
6.30 p. m. Porridge of oatmeal, or cocoa or pie, buttered rye bread.

Care is taken to give the greatest possible variety. Sample dinner menus will show how varied a diet was supplied despite the simplicity that prevailed:

Macaroni and smothered beef.
Irish stew.
Mixed dried fruit, dumplings, and bacon.
Carrots and pork roast.
Porridge of barley and Frankfurts.
Noodle soup and beef.

String beans and roast of mutton.
Vegetable soup with boiled beef.
Rice boiled in milk and pork sausage.
Veal, potatoes, stewed fruit.
Meat loaf, potatoes, prunes.
Lentil soup with beef.
Pea soup with pork.

Both teachers and nurse are interested in persuading the children with small appetites to eat their portion. The appetite once aroused is very seldom discouraged. Many children ask for a second or even a third helping.

Since 1906 the attempt has been made to keep the most delicate children in the forest school until Christmas, and since 1909 these children have been retained in a special class and supplied with special treatment according to the forest-school plan. The forest school is open practically all the year around. The physicians of the forest school may admit the same child year after year. It is therefore possible for a very delicate child to enjoy the benefit of the forest school nearly all his school time, or at least as long as the physician thinks necessary.

The children reach school at 7.45 a. m. Some walk, but those living at a distance use the surface car line. The street car company provides a special car running on a regular schedule. A teacher and the children from a given district gather at the most convenient stopping place and go to the school together. On arrival, a breakfast consisting of porridge, rolls and butter is eaten. At 8 o'clock sessions open for two grades and last two hours. At 10 o'clock a mid-morning lunch consisting of one or two cups of milk and buttered rye bread is served. Then sessions begin for two other grades, while the rest of the children play about the grounds or in the gymnasium or are busy with needlework or books. At 12 o'clock a bell announces dinner. The diningroom under the high fir trees is a feature which never loses its appeal to the children. It has an especial attraction on Sunday, when a dessert is added to the dinner.

A rest period of one and a half to two hours is observed daily. For this purpose camp chairs and blankets are provided. At first the children objected to the rest hour, but they learned to keep quiet and after a few weeks nearly all the children fell asleep almost as soon as they settled in their chairs. At 3 o'clock the remaining two grades have their recitations. At 4 o'clock they have their afternoon milk, with brown bread and jam or marmalade. Some grades may have one or two periods after this lunch, but most of the children are at liberty to devote the whole afternoon to play and exercise and in the latitude of Berlin the summer afternoons are long.

In November some of the children return to the city. During the latter weeks it is often necessary to use the buildings for the play

periods. Practically the same régime is carried on in the special school which the children attend in the city from Christmas to Easter.

Results.—The Charlottenburg Forest School undertook to improve the health of its children, and it hoped at the same time that it might succeed in keeping them from losing in school standing.

In order to discuss physical progress it is necessary to understand the class of children dealt with. The pupils in the Charlottenburg school may be divided into the following groups:

1. Anemic children, i. e., children suffering from anemia and its consequences, rapid heart, headache, nervousness, nasal hemorrhages, etc.

2. Scrofulous children, i. e., children suffering from enlarged glands and other symptoms of scrofula, for instance, eczema, inflammation of the eyelids, etc.

3. Children with organic heart disease.

4. Children with positive pulmonary difficulties.

Between August 1 and October 29, 1904, 122 children attended the forest school; 15 of these had to be discharged for one reason or another after a short time. Only 107 children stayed three months, or nearly three months, in the forest school. Their physical gains are recorded in the following way.

Pysical results of three months' stay at the school.

	Number.	Per cent.
1. Anemic children	31	
Deteriorated	1	2.9
Unchanged	9	26.4
Improved	11	32.4
Cured	13	38.3
2. Scrofulous children	28	
Deteriorated	0	
Unchanged	8	21.0
Improved	22	57.9
Cured	8	21.1
3. Children with organic heart diseases	11	
Deteriorated	0	
Unchanged	7	50.0
Improved	7	50.0
Cured	0	
4. Children with positive pulmonary troubles	21	
Deteriorated	1	4.8
Unchanged	8	38.1
Improved	8	38.1
Cured	4	19.0

Of course it is not to be expected that either organic heart disease or lung troubles can be completely cured in so short a time. The children with heart troubles are recorded as improved if certain

symptoms, such as rapidity and difficulty in breathing, have decreased or disappeared. The same is true regarding the children with lung troubles. An improvement in nutrition has always been considered a most important factor.

The gains in weight are very striking; 118 children who were weighed on admission and discharge showed a total gain of 682.60 pounds, or an average gain per child of 5.78 pounds. Sixty-seven children who had been in the forest school fully three months were present on the first and last weighing day (Aug. 2 and Oct. 29). They showed a total gain of 444.35 pounds, or an average gain per child of 6.63 pounds. Eleven of these children showed a gain of from 10 to 16 pounds.

These results were attained by the plain and simple means of medical and nursing care, out-of-door life in all kinds of weather, exposure to the sun, baths, nourishing food, and a considerable shortening of recitation periods. The pupils looked like different children after the first week's stay at the forest school. Instead of being pale and listless with big, sad eyes, they had grown into youngsters with a tanned complexion, glowing cheeks, their eyes bright and eager. The usual question of visitors in these first weeks, "Is not the forest school a school for sickly children?" seemed entirely justified by the appearance of the children.

The improvement of the children's physical condition was subjected to a severe test during the rainy, damp days of the rather cold October of 1904. Although they stayed out of doors nearly all of the time, not one of them caught cold.

Educational results.—Data are lacking on which to base definite comparisons of school progress with the previous record of these children, but certain observations of progress and improvement while the children were in the open-air school, and also of their standing in the regular classes when they were returned to the city schools, have been made.

The difficulties to be overcome by teachers and pupils, due to previous irregular attendance of the children on account of ill health and to the fact that they were gathered from different schools and different conditions, have already been discussed. Increased eagerness and alertness on the part of the children became apparent within a short time after admission to the school. Lack of interest was complained of on the part of only 3 out of the 120 pupils. Most of the children were proficient in their studies; nearly all of them lived up to their abilities. Lack of advancement was observed in only 5 out of 120 pupils, but in some of these cases a special reason, attributable to the child's physical condition or his home environment, explained the difficulty. In 13 cases the advancement of the children in all or many of the subjects studied was considerably

improved. One child that the teachers were about to transfer to a subnormal center made such marked progress that even after having been returned to the regular school he made normal advancement.

The Charlottenburg Board of Education, however, desired to get information on the educational results in addition to the reports of the forest-school teachers. Some weeks after the children's return to the regular public schools the board asked the superintendents of three of these schools to report on the scholarship of the returned forest-school children. The statements were strongly in favor of the forest school. The greater eagerness and alertness of the children were particularly emphasized. Moreover, in the beginning of January, 1905, official reports on the scholarship of the forest-school children were required. According to these reports, the scholarship in 108 cases had remained the same or had improved. In only 12 cases had it deteriorated.

FIG. 62.—Exterior of open-air school building. Elberfeld, Germany.

In estimating the value of these results, it must be remembered that, owing to the limited capacity of the forest school, only the most needy, delicate, and sickly children could be admitted—children subjected to bad home conditions and some of them even to temporary illnesses. Moreover, a considerable time had elapsed between the time the children left the forest school and the time this scholarship test was made, and adverse conditions had again had their influence

on them. Their physical condition, therefore, was not the same as it had been on discharge from the forest school.

The results of this first year, therefore, show that the pedagogical purpose of the forest school—not to retard the child mentally—is attainable and had been accomplished with most of the children.

The intimacy in which the children lived with their teachers and with each other proved to be good training and helped to improve deportment. Mutual helpfulness developed, and the feeling of friendship and comradeship was strengthened. The discipline and directions necessitated by their daily life in the forest school made the

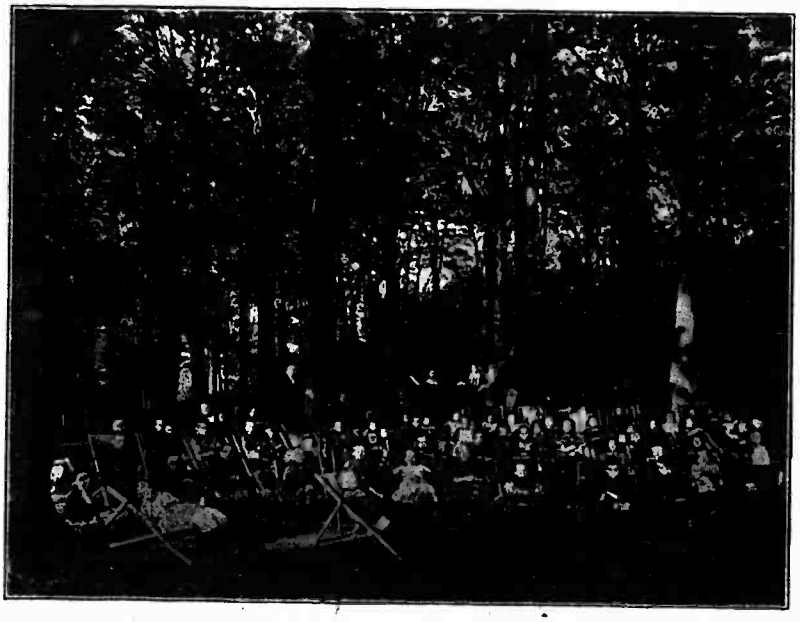


FIG. 63.—The delightful setting of the Elberfeld Open-air School is illustrated by this view of the children at rest.

children very helpful and created an esprit de corps which aided much in their management.

Public opinion.—Public opinion, influenced by the understanding attitude of the daily press and the pedagogical and medical periodicals, was from the beginning strongly in favor of the forest school. At first the parents of the children, however, met the new institution with a hearty distrust and could not easily be persuaded to have their children transferred to the forest school. But this distrust changed rapidly into the keenest interest. They came to visit the school from which their children returned full of life and spirits and refreshed after the days that had been sultry and oppressive in the city.

Visitors became so numerous that they had to be limited to certain hours of the day. Sunday afternoons are now set apart for visiting parents who, from distrustful opponents, have grown into the most ardent supporters of the forest school and are often very effective cooperators in the work. Besides the parents, the forest school had many other visitors. Representatives of municipal and State governments, organizations and individuals who were interested in social betterment, came not only from all parts of Germany and other European countries, but even from beyond the ocean. The forest-school children were greatly rejoiced when, on June 10, 1907, the German Empress spent a few hours with them.

The volunteer work that was heartily undertaken by some of the Charlottenburg public-school teachers has already been mentioned. Valuable help has been given by the street car company. Not only did they put special cars at the disposal of the school at certain hours, but issued tickets at a considerably reduced rate (75 cents a month) and carried 10 of the poorest children free of charge. The municipal government purchased tickets for 30 other children whose parents were too poor to pay.

Budget.—The forest school is entirely supported by the Charlottenburg municipal government. The expense for the establishment of the school in 1904 amounted to $5,259.37. Since then it has been necessary to complete and enlarge the plant and to renovate parts of it. The considerable amounts required have always been voted by the Charlottenburg municipal government.

The teachers in charge of the forest school get their board free of charge, and as they are required to give the whole day and Sundays to the school a monthly addition is also made to their salary.

The food has cost from 12 to 13 cents per day per child. Parents who are financially able are expected to pay, and a special record form is used in securing data on this point. At first difficulties were met with, but the more the parents grew conscious of the benefits their children derived from the forest school, the readier they were to contribute their share. In 1904, $250 was collected from parents.

Forest schools have been established since 1904 in the following cities:

Cities in which forest schools have been established since 1904.[1]

Name of city.	Name of school.	Date of opening.	Supported by—	Length of term.	Attendance.	Period for which children are admitted
I. PRUSSIA.						
Aachen (Rheinprovinz).	Waldschule Aachen.		Stadtgemeinde Aachen.	April to October.	120 during summer.	6 weeks.
Cassel	Kindererholungsstaette Cassel.		Walderholungsstaetten, E. V. Cassel.	All summer.		
Elberfeld (Rheinprovinz).	Waldschule "Burgholz."	July 17, 1907.	Rekonvaleszenten-Verein Elberfeld and Elberfelder Verein fuer Gemeinwohl, E. V.	April to November.	170	As long as physician thinks necessary.
Griesheim-Main.	Waldschule Griesheim.	Under construction summer of 1911.	Gemeinde Griesheim.			
Husum (Schleswig-Holstein).						
Muenchen-Gladbach. (Rheinprovinz).	Waldschule Muenchen-Gladbach.	May 28, 1906.	Stadtgemeinde Muenchen-Gladbach.	All summer.	350 to 400 during summer.	2 months.
Saarbruecken (Rheinprovinz).	Waldschule Saarbruecken.	July 1, 1913.	Stadtgemeinde Saarbruecken.	do.	50	
Ziegenhals (Schlesien).	Waldschule Ziegenhals.		Graeflich von Ballestrem'sche Gueter-Direktion, Ruda (Oberschlesien).	do.	240 to 280 during summer.	3 to 4 weeks.
II. BAVARIA.						
Nuremberg	Kinderwalderholungsheim Rueckersdorf.	July 7, 1910.	Verein zur Bekaempfung der Tuberkulose, E. V. Nuremberg.	All the year around.	About 200.	As long as physician thinks necessary.
III. SAXONY.						
Chemnitz (Sachsen).	Kinderwalderholungsheim Chemnitz.		Verein zur Bekaempfung der Schwindsucht in Chemnitz und Umgebung, E. V.	All the year around.		As long as physician thinks necessary.
IV. HAMBURG.						
Hamburg	Waldschule Bergedorf.	Under construction summer of 1914.			44	
V. LUEBECK.						
Luebeck	Waldschule Luebeck-Wesloe.			April to October.		As long as physician thinks necessary.
VI. ALSACE-LORRAINE.						
Muehlhausen (Elsass).	Waldschule Muehlhausen.	May 7, 1906.	Stadtgemeinde Muehlhausen.	April to October.		As long as physician thinks necessary.

[1] This list is doubtless not complete, since the beginning of the war made it impossible to secure further information.

Extension of open-air schools in Germany.—The experiences and successes of the Charlottenburg Forest School were strong incentives to other cities to make similar provisions.

In 1906, the secretary of the Royal Prussian Department of Education issued the following statement:

> In the Zentralblatt für die Gesamte Unterrichtsverwaltung in Preussen, September to October, 1905, a detailed account of the Charlottenburg Forest School is given.
>
> In regard to the dangers that exist in large cities and in almost all industrial places for the normal physical development of children and adolescents, all institutions are to be sincerely welcomed that will help to secure a higher degree of health and strength to the young people. The more satisfactory these measures are, the more they deserve the most careful attention and the most vigorous support.
>
> Among them the forest school, because of the peculiar connection of physical and educational purposes, commands keen interest. I therefore call the attention of those branches of the Royal Government concerned to the article above mentioned, and in compliance with a special order of His Majesty the Emperor and King, I request its widest consideration.
>
> Further, I desire to lend whatever help is possible to all cities and country places that plan the establishment of similar institutions, and desire to be informed when any such institutions should be founded in your district.

This served to give the greatest possible publicity to the Charlottenburg experiment, at least in Prussia.

Many schools, particularly those at Muehlhausen, Muenchen-Gladbach, and Elberfeld, have closely followed the Charlottenburg plan. Fundamental dissimilarities that appear are largely attributable to the fact that scarcely any of these schools—with the exception, perhaps, of Muehlhausen, Muenchen-Gladbach, and Aachen—are as purely municipal institutions as the one at Charlottenburg. Their establishment was due either to the initiative of some social-welfare organization, for instance, in Elberfeld, to the Rekonvaleszenten-Verein and the Verein für Gemeinwohl, or to the fact that a certain amount of money has been donated or bequeathed to the municipality and dedicated to this definite purpose. Responsibility in such cases is shared by the board of trustees of such foundations. The closest cooperation, however, of the municipal government is always required because of its right to supervise the public schools.

Under certain circumstances a forest school may be an entirely private institution. It may, for instance, be established by the management of some big industrial enterprise in connection with other welfare features for the benefit of its laborers. One of these schools is the forest school in Ziegenhals, Upper Silesia, which was established, owned, and managed by the Graeflich von Ballestrem'schen Gueter-Direktion, Ruda, Upper Silesia. As a rule the period for which the children are admitted is very short in these schools (in Ziegenhals three to four weeks). These schools, therefore, may

hardly be considered as a part of the public-school system, but provide a recovery place for the children where the danger of retardation is eliminated.

Nearly all of the forest schools have one great advantage over Charlottenburg in that they are locally connected with one or more special welfare institutions.

The institutions that are above all others fitted to have a forest school attached to them are the so-called recovery places in the woods. The plan to establish these recovery places was formed in 1899 by Dr. Wolf Becher and Dr. Rudolf Lennhoff after an investigation into the housing conditions of tuberculous laborers in Berlin.

FIG. 64.—Type of reclining chair used for the rest period in the open-air school at Nuremberg, Germany.

In some stages of tuberculosis the most important advice of the physician to his patient is to spend as much time as possible, not only out of doors, but in pure and invigorating air. No one knows how long such advice has been given and received without anybody being specially concerned as to the patients' possibility or opportunity of obeying instructions.

It is the purpose of the "Recovery Places in the Woods" to furnish the laborers in the large cities with this opportunity, despite the long distances and other apparently overwhelming difficulties. The recovery places had to be equipped for a whole day's sojourn; they, therefore, had to afford a shelter when it rained, a resting place

when the patients were tired, and an opportunity to get nourishing food when they were hungry. In 1900 the first recovery place in the Jungfernheide, near Berlin, was established for men. Soon after one was started for women. A natural development led to the establishment of recovery places especially for children as early as 1902.

The first children were introduced into the recovery places by coming along with their fathers. After the establishment of recovery places for women, many more children were brought, because their mothers could not come and leave their children at home alone and uncared for. Good results were shown in the children, but their presence was a drawback to their mothers. The next step was,

FIG. 65.—Dormitory for residential pupils, open-air school at Nuremberg, Germany.

therefore, to create the same kind of provision for the care of children, apart from the quarters of the men and women.

Now there are about 90 recovery places in the woods in Germany. They are sometimes managed by the municipality, but more often by some local organization for combating tuberculosis.

The site of these recovery places is always exactly what the site of a forest school ought to be. When, therefore, the plan of establishing a forest school was conceived in a community where recovery places in the woods existed, it seemed the only natural and economical thing to connect them. Undoubtedly the problem of equipment is much easier if, for instance, the housekeeping plant can be utilized

to its full capacity; the bathing facilities can be much more complete, and drainage and plumbing much more in accordance with the requirements of modern hygiene, if adequate machinery can be afforded.

Early in the experience of these recovery places it became evident that both night and day care was needed by certain of the patients. Accordingly, some of the recovery places installed conveniences for overnight care along much the same lines as that followed in night camps in America. The original recovery places were primitive and suitable for use in summer only. In time some of them extended their work over the whole year, and this, of course, required the in-

FIG. 66.—Interior of open-air school class room, Elberfeld, Germany.

stallation of light and heat and general provision for the hardships of winter weather.

Nearly all the recovery places are now under medical supervision. A physician is duly appointed, who has his office on the grounds. His duties are to examine and advise the patients. In the early days of the chidren's recovery places it was difficult to get the consent of the parents to leave the children in the recovery places as long as the doctors thought necessary. The fathers and mothers feared retardation at school. To meet this objection the recovery places introduced the idea of educational work. In this they had the example already set in the forest schools. This feature spread rapidly through most of the recovery places in Germany.

The fact that these recovery places were established with the sole purpose of improving the children's health keeps the emphasis entirely on the physical side. In most places the educational work does not pretend to take the place of school. Its main object is to keep the children from forgetting what they have already learned, and to keep alive and active the habit of study. For this purpose many children's recovery places, for example, that at Chemnitz, have introduced one hour's daily school time for all the children of school age who are not put on full rest by the physician. Some of the recovery places have kindergartners as teachers. Some, however, have developed the educational side to a degree that is very nearly equal to that at the forest school.

The Rueckersdorf children's recovery place, owned and managed by the Nuremberg organization for fighting tuberculosis, is typical. It was established in 1910. It has stood strongly for the principle that the length of stay ought to depend entirely on the child's physical condition, and that a long stay securing a lasting benefit is of far greater value in the fight against tuberculosis than merely temporary improvement. In this case, therefore, the educational problem has had attention from the beginning. In 1911 the recovery place was open all summer and educational work closely akin to the Forest School plan was provided for the children. Each child is expected to get one hour and a half of schooling a day, besides one hour devoted to physical culture and gymnastics.

The children's recovery places—though usually not managed by the municipal governments—found as a rule their readiest public support when they planned to develop a forest school. The teachers and the equipment of the schoolroom are mainly furnished by the municipal government, through its board of education. The regular supervision of the educational work to which the whole public school system is subject is also vested in the school board.

Some forest schools in Germany admit children under about the same conditions as described for Charlottenburg. Muehlhausen makes the probability or even the certainty with which permanent benefit can be predicted for the child a determining point in his selection. Despite this fact the children first admitted to the Muehlhausen Forest School seem to have been in worse condition than the Charlottenburg forest school children. Muehlhausen had, in consequence, more serious initial troubles with the adaptation of children to the unaccustomed conditions than Charlottenburg. Perhaps another circumstance may have proved disadvantageous in this regard. The Muehlhausen Forest School is situated on a hill, and the children, after a ride on the surface lines, have a steep hill to climb to reach the school. Fortunately the municipality could keep over night the children that suffered most from the exertion. A

Home for Convalescent Children occupied the second floor of the old manor, the first floor, basement, and grounds of which furnish quarters for the forest school.

The children's recovery places are always in closest touch with all the other organizations and institutions whose object is to combat tuberculosis, particularly with the so-called information and aid stations for tuberculous people. These organizations are comparable to tuberculosis dispensaries common in the United States. These stations select the children for the recovery-places in the woods and therefore for the forest schools connected with them. Without disregarding anemia and malnutrition, they consider first the exposure of the child to tuberculosis and his predisposition to possible infection. Cases of open tuberculosis are excluded in all these schools.

FIG. 67.—An open-air recitation at München-Gladbach, Germany.

Applications for admission always greatly exceed the capacity of the recovery places. These children are selected who are most exposed to the danger of tuberculosis infection and belong to the most needy families. The Rueckersdorf recovery place, for instance, formulates the conditions as follows:

1. Anemic, undernourished debilitated children.
2. Children exposed to tuberculous infection, or predisposed to tuberculosis.
3. Children with incipient or suspected tuberculosis.
4. Scrofulous children (suffering from tubercular glands).
5. Tuberculous children (closed cases).
6. Children with chronic bronchitis.

The school life of the children is guided everywhere by the same principles. Some forest schools, especially those in the recovery

places, make a stronger point than Charlottenburg of having all the recitations out-of-doors. Only in case of absolute necessity do their children retire into a more or less improvised classroom. After each recitation some of the recovery places have an intermission of the same length, instead of the 5 or 10 minutes' recess as in Charlottenburg.

The medical treatment is much the same as at Charlottenburg. Everywhere emphasis is laid upon strictly hygienic measures. The feeding also closely follows the Charlottenburg plan. In Muenchen-Gladbach the dinner is more elaborate than in the other forest schools, but the children are supposed to get their breakfast at home. The Muehlhausen school started with five meals a day, but after some time decided to omit the 4 o'clock milk or cocoa and to make the

FIG. 68.—Open-air shack used for rest hour at München-Gladbach, Germany.

supper a little more ample. The forest schools at Muehlhausen, Elberfeld, and Nuremberg decided from the beginning to provide accommodations for both day and night care for some of the most delicate children.

In 1913 Nuremberg made the attempt to keep the Rueckersdorf recovery place open during the winter. Definite data as to the results are not available, but the report for 1913, covering the first two months of the winter school, states that, judging by the short experience, the experiment seemed very promising.

The connection of the forest schools with the children's recovery places afforded the first opportunity to German children of having a forest school all the year round and to be taken care of in the most effective way.

The success of the forest schools is entirely satisfactory everywhere. All reports state that the percentage of forest-school children who are not able to keep up with their grade when returned to the regular school or who fail to make one grade in a year is no larger than that among the regular school children. The greater alertness of the children after their return from the forest school is frequently noted.

The improvement in the physical condition shows particularly in gains in weight. Elberfeld, for example, reports for the year 1912, after the forest school had been open for 195 days, an average gain of 3.4 pounds for 170 children whose attendance was between 21 and 195 days. Sixty-six children are grouped according to their attendance.

Gain in weight of children at the Elberfeld forest school.

Children attending.	Period of attendance.	Gain in weight.	Average gain.
	Days.	*Pounds.*	*Pounds.*
5	195	31	6.18
15	More than 100	63	4.2
46	21 to 100	111	2.41

The reports of Muehlhausen show the average gains of the forest-school children for all the years since the school was opened:

Gain in weight at the Muehlhausen forest school, by years.

Year.	Children attending.	Period of attendance.	Average gain.
			Pounds.
1906	100	May 7 to Oct. 31	4.6
1907	200	May 6 to Oct. 26	4.44
1908	200	May 4 to Oct. 24	4.26
1909	200	May 3 to Oct. 23	4.72
1910	200	May 3 to Oct. 22	3.98
1911	200	May 2 to Oct. 21	4.73
1912	200	May 1 to Oct. 19	5.45
1913	200	May 5 to Oct. 25	4.13

Gain at Muehlhausen, 1912 report.

Number of children.	Gain in weight.
	Pounds.
0	0 to 2.
44	2 to 4.
57	4 to 6.
43	6 to 8.
14	8 to 10.
12	10 to 12.
4	12 to 14.
1	15.

Judging from conditions governing admission, the physical status of children in the Rueckersdorf recovery place corresponds more nearly to that of the Chicago open-air school children than to that

of any other German school. The Rueckersdorf results may therefore be of special interest to those who wish to compare them with results obtained in American open-air schools.

Gains in weight in Rueckersdorf open-air school.

Years.	Children attending.	Average attendance.	Average gain in weight.
			Pounds.
1910	65	74.9	5.50
1911	108	74.08	5.88
1912	131	60	6.57
1913	158	69.84	6.91

The following tables showing improvement in general physical condition are taken from the annual reports of the Nuremberg-Rueckersdorf recovery place for children:

Physical condition at Nuremberg-Rueckersdorf recovery place.

Principal diagnostic findings.	Number of children.	Improvement.				Doubtful cases.
		Excellent.	Marked.	Good.	Moderate.	
1910.						
Anemia, malnutrition	29	5	6	15	2	1
Incipient tuberculosis	24	5	6	11	2	
Scrofulosis (thyroid glands)	8	2	3	3		
Tuberculosis	1		1			
Chronic bronchitis	3	1	2			
	65					
1911.						
Anemia, malnutrition	57	14	22	17	4	
Incipient tuberculosis	37	7	11	16	3	
Scrofulosis (thyroid glands)	3			3		
Tuberculosis	2		2			
Chronic bronchitis	6	2	6	1		
	108					
1912.						
Anemia, malnutrition	97	34	28	23	8	4
Incipient tuberculosis	23	6	7	7	2	1
Scrofulosis (thyroid glands)	4	1	2	1		
Tuberculosis	2		1	1		
Chronic bronchitis	2	1	1			
Other defects	6	1	2	2		1
	134					

Most of the schools record weight, height, chest expansion, and the Tallquist test. The results as indicated by these different points are equally satisfactory.

All the forest schools try to keep track of their pupils after they leave. The children discharged from the forest schools connected with the children's recovery-places remain under the supervision of the information and aid stations for tuberculous people, and therefore are under medical supervision indefinitely. As a rule children from the forest schools are reexamined within three months after

discharge from school. These reexaminations show that in most cases the improvement has lasted.

Other differences in the management of individual forest schools may be traced to different underlying ideas. Those who lay the greatest stress upon the permanence of the good that is done will, like Charlottenburg, tend more and more to secure for the children a long and uninterrupted stay at the forest school; while those who believe its benefits should be widely spread will tend to observe a shorter period and reach a larger number of children. Muenchen-Gladbach as a rule shifts her pupils every two months; Aachen every six weeks. Muenchen-Gladbach has a regular attendance of 90 to 100 children. By her system, which, however, is elastic, it is possible to make the forest school accessible to 350 or 400 children in the summer.

There is also a divergence of attitude on the question of tuition. As a rule forest schools are free of charge. But the different municipalities may take a different attitude as to the extra care the children receive. Some forest schools, for instance, Nuremberg, advocate giving the advantages of the forest school free of any extra charge. Others, like Charlottenburg, try to get at least the expenses for food defrayed by parents who can afford it.

Other forest schools—for example, Muenchen-Gladbach—try to be as nearly self-supporting as possible. Parents with a yearly income of $500 are expected to pay per day 20 cents per child; those with an income of from $500 to $750, 25 cents; with incomes of $750 to $1,000, 30 cents per child; where the income is more than $1,000, 35 cents per child. These rates, however, may be reduced for special reasons. Other children are paid for by welfare societies and the municipal government makes a grant of $1,250 a year for the schools.

The following will give an indication of the cost of forest schools in Germany: Muehlhausen, $3,012.05; Muenchen-Gladbach, $5,000; Elberfeld (buildings, etc., $4,545.29, other $790.45), $5,335.74.

The Muehlhausen report for the school year 1913–14 gives the following interesting tables on the running expenses of the forest school since its foundation.

Expenses of the Muehlhausen forest school, 1906–1913.

Years.	Number of children.	School days.	Total running expenses.	Expense for food.	Total expenses per child a day.	Expense for food per child a day.
					Cents.	Cents.
1906	100	150	$3,877	$2,698	26	18
1907	200	147	5,090	4,121	19	14
1908	200	147	6,027	3,892	21	14
1909	200	147	5,562	3,832	19	13
1910	200	146	5,915	3,858	21	14
1911	200	146	5,803	3,723	20	13
1912	200	145	6,283	3,925	22	14
1913	200	147	6,612	4,000	23	14

The expense for food per child a day is about the same everywhere. Luebeck reports 15 cents; Elberfeld, 17 to 18 cents. Forest schools are not inexpensive institutions. They not only require additional facilities of plant and equipment, but also an added amount of personal attention by people who are competent as teachers, physicians, and nurses. The schools should be regarded as an investment, the interest of which comes back to the community with the increased health and efficiency of its citizens. By this standard Germany has put her stamp of approval on the forest school. In her painstaking work with the children Germany learned that compulsory school attendance meant danger to the health of a considerable percentage of her school children. She set about to devise a plan that would not only avert this danger, but which would, on the other hand, build up resistance and overcome those weaknesses by the application of the best therapeutic measures known to her scientific men. The plan she devised robs the child of neither health nor education, one at the expense of the other, but for her pupils, whose needs have heretofore not been discovered, understood, nor reached, she evolved a plan which gives them both education and health.

Chapter VIII.

OPEN-AIR SCHOOLS IN GREAT BRITAIN AND IRELAND.

ENGLAND.

The publication of the first detailed report of the Charlottenburg Forest School early in 1906 immediately aroused the attention of European educators. Among those who spent some time at Charlottenburg was Dr. Frederick Rose, a medical expert employed by the London County Council. He returned from his first visit an enthusiastic convert to the cause of open-air education, and later made a second visit only to find his first impression verified and strengthened.

As a result of his report to the London County Council, that body, in 1907, opened an experimental open-air school in Bostall Wood, near London. One hundred anemic and physically debilitated children received care during the summer months, following practically the same daily program as the children at the Charlottenburg school, except that only three meals a day were given instead of five.

The success of the experiment led in 1908 to the extension of this work in three open-air schools, located at Birley House, Montpelier House, and Shrewsbury House, three private estates near London. The schools were in session from June 1 to October 31. School hours were from 9 a. m. to 7 p. m. each week day, except on Saturday, when school closed at 1 p. m. The children could remain Saturday afternoon if they wished for games, under the supervision of a teacher. One afternoon a week was set aside for visitors, and no one was admitted on other days except by special permission. About 80 children were on the roll of each school, and the average attendance for each was approximately 72.

Each school was fortunate in having for the exclusive use of the children large and well-wooded grounds, from 1 to 6 acres in extent. Kitchens, dining rooms, bathrooms, and offices were provided in the old mansion on each estate, but Doecker portable buildings, completely open on one side, were purchased for classrooms, and here or under the trees the children spent most of their time.

A two-hour rest period followed the noon meal. Each child had a steamer chair and an army blanket assigned to him at the school. Clogs and blanket coats were the only other articles of clothing regularly supplied.

The specimen time-table and dietary appended are typical of the arrangements still followed by most of the English day open-air schools.

Specimen time table.

Days.	9 to 9.30.	9.30 to 10.	10 to 10.45.	10.45 to 11.	11 to 11.40.	11.40 to 12.20.	12.20 to 12.45.	12.45 to 1.30.
Monday	Breakfast	Scripture or hymns.	Manual arithmetic	Recreation	Nature study	Drawing	Preparation for dinner (washing, etc.).	Dinner.
Tuesday	do	do	Arithmetic	do	History	Singing	do	Do.
Wednesday	do	do	Manual arithmetic	do	Geography	Composition (written)	do	Do.
Thursday	do	do	Arithmetic	do	Nature study	Drawing	do	Do.
Friday	do	do	Manual arithmetic	do	History	Singing	do	Do.
Saturday	do	do	Recitation	do	Geography	Composition (oral)	do	Do.

Days.	1.30 to 3.30.	3.30 to 3.45.	3.45 to 4.30.	4.30 to 5.	5 to 5.15.	5.15 to 5.45	5.45 to 6.
Monday	Afternoon sleep	Physical exercises	1. Needlework 2. Gardening (for older boys).	Reading or recitation	Pack up chairs, apparatus, etc.	Tea	Prayers and dismissal.
Tuesday	do	do	1. Gardening (for Class 1) 2. Basketwork (for Classes 2 and 3).	do	do	do	
Wednesday	do	do	Organized games, Old English songs and "Guild of Play."	do	do	do	Do.
Thursday	do	do	1. Needlework 2. Modeling in plasticine (for boys).	Reading or recitation	do	do	Do.
Friday	do	do	1. Basket work (for Class 1) 2. Gardening (for Class 2). 3. Modeling in plasticine (for Class 3).	do	do	do	Do.
Saturday	do	do	(Play for those who wish to remain.)	do	do	do	Do.

Specimen dietary table.

	MONDAY.	TUESDAY.	WEDNESDAY.
Breakfast...	Porridge and milk, sugar. Staff [1]—Same, plus tea, bread and butter, bacon.	Porridge and milk, sugar. Staff—Same, plus tea, bread and butter, eggs, bacon.	Porridge and milk, sugar. Staff—Same, plus tea, bread and butter, bacon.
Dinner....	Roast beef, peas, potatoes, sago pudding. Staff—Same, plus soup.	Boiled leg of mutton, haricots, potatoes, stewed prunes, custard. Staff—Same, plus soup.	Boiled cod, parsley sauce, potatoes, boiled currant pudding. Staff—Same, plus soup.
Tea.....	Milk and water, bread and jam, bread and dripping. Staff—Tea, bread and butter, bread and jam, toast.	Weak tea, bread and butter, cake. Staff—Tea, bread and butter, cake, toast.	Milk and water, currant and white bread and butter. Staff—Tea, bread and butter, toast.
	THURSDAY.	FRIDAY.	SATURDAY.
Breakfast...	Porridge and milk, sugar. Staff—Same, plus tea, bread and butter, haddock.	Porridge and milk, sugar. Staff—Same, plus tea, bread and butter, bloaters.	Porridge and milk, sugar. Staff—Same, plus tea, bread and butter, eggs.
Dinner.....	Boiled beef, dumplings, dried vegetables, potatoes, boiled rice and sirup. Staff—Same, plus soup.	Lentil soup, bread, boiled jam roly-poly. Staff—Same, plus steak, bread and butter, pudding.	Stew of mutton, barley, onions, potatoes, tapioca pudding. Staff—Same, plus soup.
Tea.....	Chocolate, currant and white bread and butter. Staff—Tea, bread and butter, toast.	Milk and water, white bread and butter, cake. Staff—Tea, bread and butter, cake, toast.	No tea.

[1] Instructors and officers.

The course of study was correlated with the natural surroundings of each school. The general features of the curriculum at the Birley House and Shrewsbury House (Shooter's Hill) schools are described in the chapter on Educational Organization and Curricula (see p. 205).

At the Birley House School, which is also conducted by the London County Council on a well-wooded estate near the city, the headmaster has organized the curriculum on a colonization scheme. His methods are thus described in a recent bulletin of the United States Bureau of Education:[1]

> At the Birley House School Mr. Green, the headmaster, has organized the curriculum on a colonization scheme. Various minerals—coal, iron ore, copper ore, lead ore, and gold quartz—are buried in different parts of the garden, and the children go out to prospect for these. The finders become captains of industry. To work the mines the captains of industry engage laborers at the labor exchange, which is managed by one of the pupils, or receive applications for work. Boring is then proceeded with, shafts are sunk, winding apparatus is constructed, and the mineral is brought to the surface. Here arises the need of coal, and a system of transportation in the form of a miniature railway is organized, furnaces are set up, factories are planned, the possible markets for the products are considered, and the importance of a merchant service is recognized. So much for the industrial side of the colonization plan. Side

[1] Kandel, I. L. Elementary Education in England. U. S. Bu. of Educ., 1913, Bul. No. 57, pp. 107-108.

by side with this, the agricultural plans are developed. A portion of the garden is cleared and a miniature farm of six fields is prepared, and the different modes of fencing are applied to these fields. The ground is plowed and crops are sown in rotation, including wheat, potatoes, turnips, barley, oats, clover, and cabbages. A thatched log hut is built and furnished to serve as a homestead for the farmers, and the necessary outhouses—barn, stable, wagon shed, pigsty, hen roost, and dog kennnel—are built around it. The nature-study scheme is correlated throughout with the work done on the farm and with the gardening operations. The general manual work is as varied as the activities which stimulate it. A rabbit warren, an aviary, insect cases, garden frames, cases for the weather instruments, etc., constitute the work in wood. Other media, involving puddling clay, making of concrete, and the mixing of cement, are employed in constructing a pond and making the garden and agricultural rollers on the basis of a drainpipe. Sufficient scope is afforded

FIG. 69.—Thackley Open-air School, Bradford, England.

in this scheme for the work in practical arithmetic in the measurement of lengths and distances, in estimating costs and quantities, in finding heights by means of simple measuring instruments, in making the graphical records of rainfall, barometer, thermometer, sunshine, etc., and in working out the other calculations required in connection with the garden and manual work. Provision is made in the time-table for the other subjects of the curriculum, i. e., geography, history, reading, composition, drawing, and singing.

The per capita cost of these schools for the summer of 1908, including salaries of teacher, nurse, attendants, rent, repairs, taxes, equipment, books and teaching apparatus, fuel, light, and water, exclusive of food, was about $120, as compared with a per capita cost of $30 in the ordinary school.

The education committee pays street-car fare when necessary. A fee of 50 cents a week is now charged each child who is able to pay, but the fee may be remitted entirely in cases of poverty.

The physical results are judged largely by gains in weight and height, by increase in chest development, and by the hemoglobin test. A medical examination takes place every two weeks, and great care is taken to tabulate the results carefully. The reports of English schools are particularly valuable in this regard. Several of these statements on results are included in the chapter on Results (pp. 229-232).

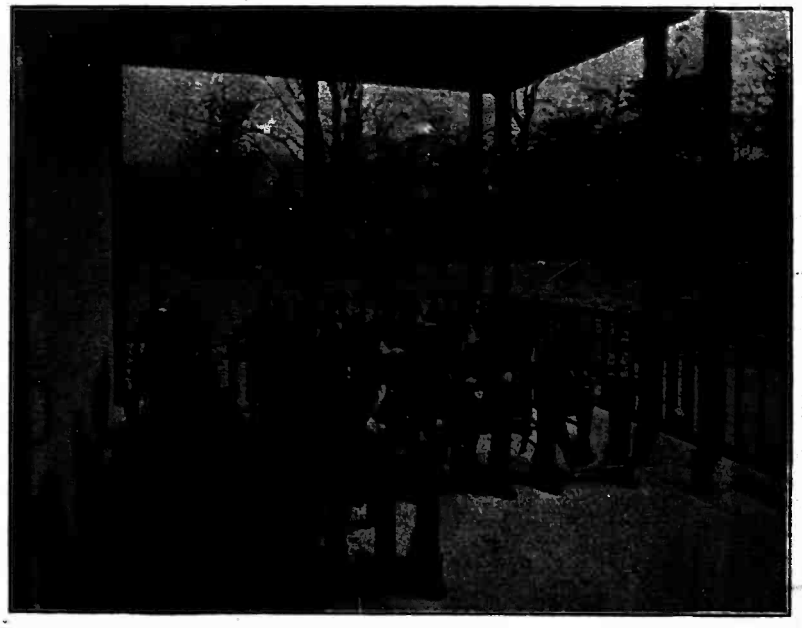


FIG. 70.—View of one of the porches, Thackley Open-air School, Bradford, England.

The elementary education act of 1899, under the section on defective and epileptic children, made special provision for the education of physically defective (crippled, tuberculous, anemic, etc.) and mentally defective children. The law states that the school medical officer must examine and select the children and that not more than 20 children be allowed to a teacher; that the curriculum must include manual training and that the hours of instruction be short. Provided these requirements are met and the school is properly certified by the education authorities, a grant of about $20 a child may be made from the taxes and will be paid by the board of education to the authorities of the school. There may also be a grant for medical

treatment and care under part 1 of the medical grant regulation of the board of education. This amounts ordinarily to about $40 a child. There are now 34 schools certified by the board of education for the reception of tuberculous and delicate children.

The tuberculosis legislation of 1911 provided a grant of $7,[illegible],000 for making grants in aid of sanitaria and other institutions of the United Kingdom for the treatment of tuberculosis—$500,000 of this sum was set aside for grants to sanitarium schools for children suffering from pulmonary or surgical tuberculosis. The tuberculosis legislation also provided for the compulsory notification of all cases of pulmonary tuberculosis and the school medical officers

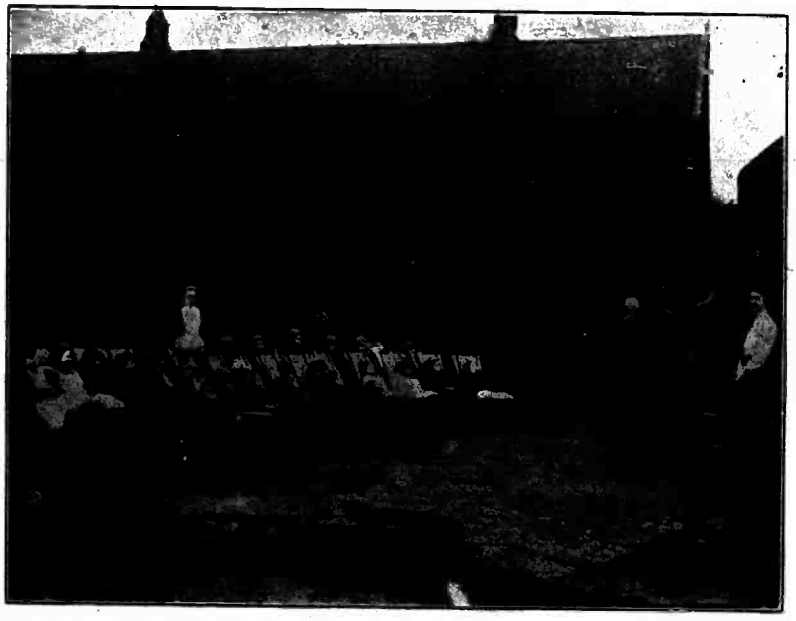


FIG. 71.—Open-air recitation, Barnsley, England.

have used these reports in tracing sources of infection and examining the children in houses from which tuberculosis has been reported.

Thanks to this generous provision for support and to the excellent results attained by the early schools, the development of the open-air school movement in England has been rapid. In the English yearbook of open-air schools and children's sanitaria for 1915 the following are listed:

Day schools for children suffering from pulmonary tuberculosis.

Barnsley (West Riding, Yorks)	Queen's Road Council School for Tuberculous Children.
Kettering (Northamptonshire)	Council School for Tuberculosis Children.

Day schools for children suffering from pulmonary tuberculosis.—Continued.

Norwich (Norfolk)	Clare House Council School for Tuberculous children.
Paddington (London)	Kensal House Council School for Tuberculous Children, Harrow Road.
Reading (Berkshire)	Whitley Council School for Tuberculous Children.
York (East Riding, Yorks)	Castlegate Council School for Tuberculous Children.

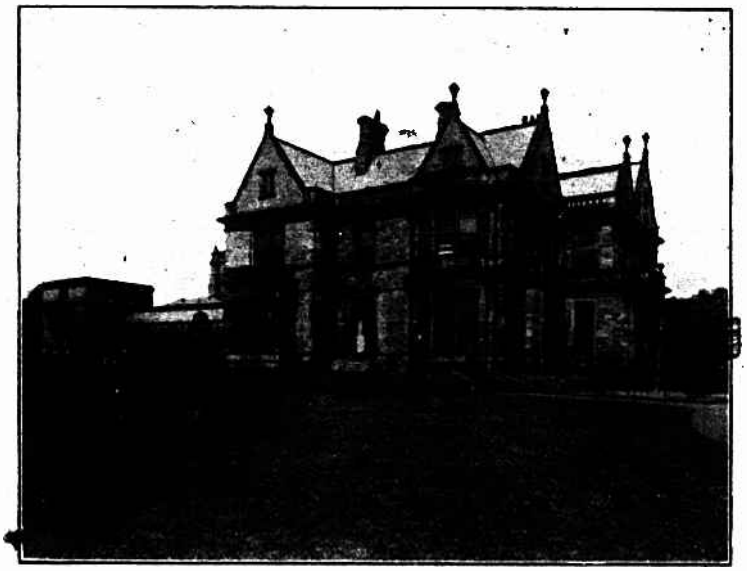


FIG. 72.—Bermerside, a residential open-air school supported by the city of Halifax.

Residential sanitarium schools for children suffering from pulmonary tuberculosis.

Harpenden (Hertfordshire)	National Children's Home Sanitarium School.
Holt (Norfolk)	Sanitarium School.
Peppard Common (Oxfordshire)	Kindercot Sanitarium School.
Nayland (Suffolk, West)	East Anglian Sanitarium School.

Residential sanitarium schools for children suffering from surgical tuberculosis.

Alton (Hampshire)	Lord Mayor Treloar Cripples' Hospital School.
Birmingham (Warwickshire)	Woodlands Sanitarium School.
Eastcote (Middlesex)	St. Vincent's R. C. Home for Physically Defective Children.
East Clandon (Surrey)	Alexandra Hospital School.
Heswall (Cheshire)	Royal Liverpool Country Hospital School.

Day open-air schools for delicate children.

Birmingham (Warwickshire)	Uffculme Open-Air Council School.
Bradford (West Riding, Yorkshire)	Thackley Open-Air Council School.
Bristol (Gloucestershire)	Open-Air School.
Darlington (Durham)	Open-Air Council School.
Halifax (West Riding, Yorkshire)	Bermerside Day Open-Air Council School.
Kettering (Northamptonshire)	Open-Air Council School.
Lewisham (London)	Birley House Open-Air Council School, Forest Hill.
Lincoln (Lincolnshire, parts of Lindsey)	South Park Open-Air Council School.
Norwich (Norfolk)	Colman Road Open-Air Council School.
Sheffield (West Riding, Yorkshire)	Whiteley Wood Open-Air Council School.
Woolwich (London)	Shooter's Hill Open-Air Council School, Plumstead.

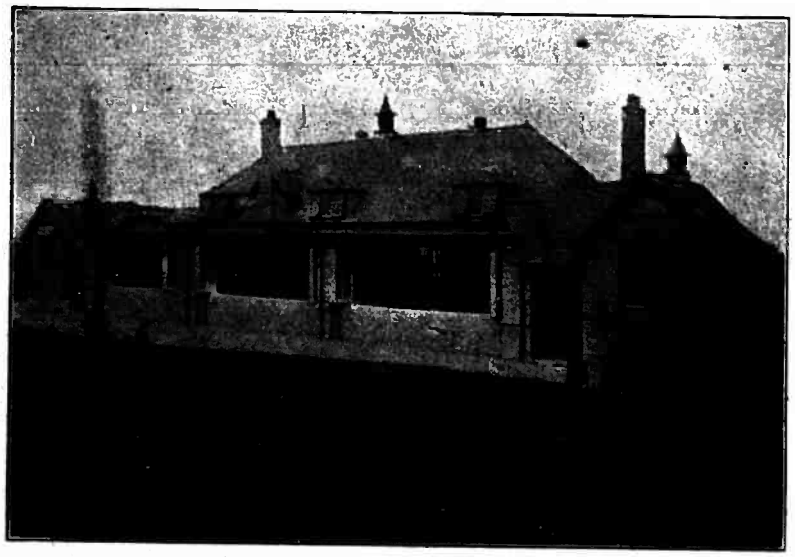


FIG. 78.—Open-air school for normal children at Carnarvon, Wales.

Residential schools of recovery for delicate children.

Clacton-on-Sea (Essex)	The Ogilvie School of Recovery.
Halifax (West Riding, Yorkshire)	Bermerside Residential Open-Air Council School.
Manchester (Lancashire)	Swinton House (Physically Defective) Council School.
Roby, near Liverpool (Lancashire)	Bowring House Council School.
West Kirby (Cheshire)	Convalescent Home for Physically Defective Children.

In addition to schools for sick or delicate children, many private open-air schools are being established for well children, and archi-

tects are experimenting with types of school-house construction which will make it possible to convert all schoolrooms into open-air classrooms. In general the open-air classroom conforms to one of three types:

(*a*) Increased open-window space.
(*b*) Removal of one side wall—veranda form.
(*c*) A loggia arrangement.

These ends may be met either by special classrooms attached to ordinary schools or specially constructed elementary schools on open-air lines. Examples may be found at Denton Holme, Carlisle, Burton Latimer, Bradford, Sheffield, and other places.

The country school.—Liverpool, Manchester, London, and other large cities are building country schools to which debilitated town

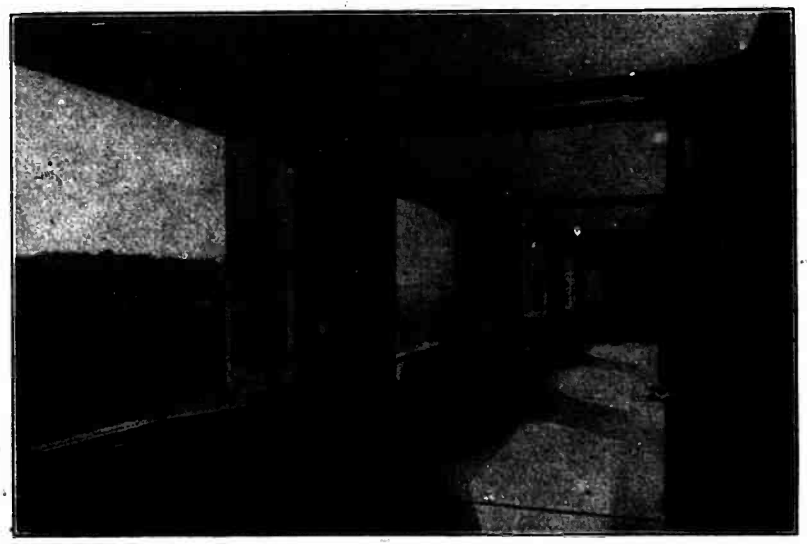


FIG. 74.—All class rooms in the Carnarvon School open into this marching corridor.

children may be sent for short periods during the summer months. There is practically no attempt at formal instruction, but the lessons which are provided are based on nature study, manual training, and domestic duties. (See p. 212 for description of curriculum at Roby House.)

Playground classes.—The report of the chief medical officer of the London Board of Education for 1913 records 88 playground classes in the city and classifies them as follows:

(*a*) A playground class established as a center for delicate children from neighboring schools, the class being formed of suitable children from these schools and working in the open air all summer. Four classes.

(*b*) A class of delicate children of various educational standards selected from one school. One class.

(*c*) A class of children in the same standard of one school only, the same class being taken out each day of the week. Fifty-three classes.

(*d*) A playground class in which the pupils are drawn from a particular school only, but various classes are taken out in the open in rotation. Thirty classes.

London started this system in 1909. It is now extended to Birmingham, Blackburn, Bournemouth, Halifax, Sheffield, and elsewhere. Some of the classes recite in playgrounds adjacent to public-school buildings, others in public parks and open spaces situated in easy walking distances of public-school buildings.

FIG. 75.—The open-air pavilion used as a schoolroom at Bermeraide.

The curriculum in most of these classes is planned to include extra physical exercises, manual work, and school gardening.

SCOTLAND.

Scotland has no special schools for tuberculous children, but many of her schools for physically defective children are conducted on modified open-air principles. Aberdeen, Dundee, Govan, and Paisley are among the smaller cities where this work is carried on.

Glasgow has established 18 centers for the education of physically defective children, but they are for the most part located in ordinary school buildings, without much possibility of introducing open-

air methods. The school board has recently built a large special school with open-air classrooms, which provides for physically and mentally defective children in entirely separate sections of the same building. Two other special schools of the same type are soon to be constructed. Children who need more day care are sent to the Biggart Memorial Home, Prestwick, Ayrshire.

Edinburgh, after experimenting successfully with the open-air education of physically and mentally defective children at the Willowbrae school, has joined with the Children's Holiday Fund Association in conducting an open-air school at the Children's Village in the high hill country at Humbie, about 20 miles from Edinburgh. There

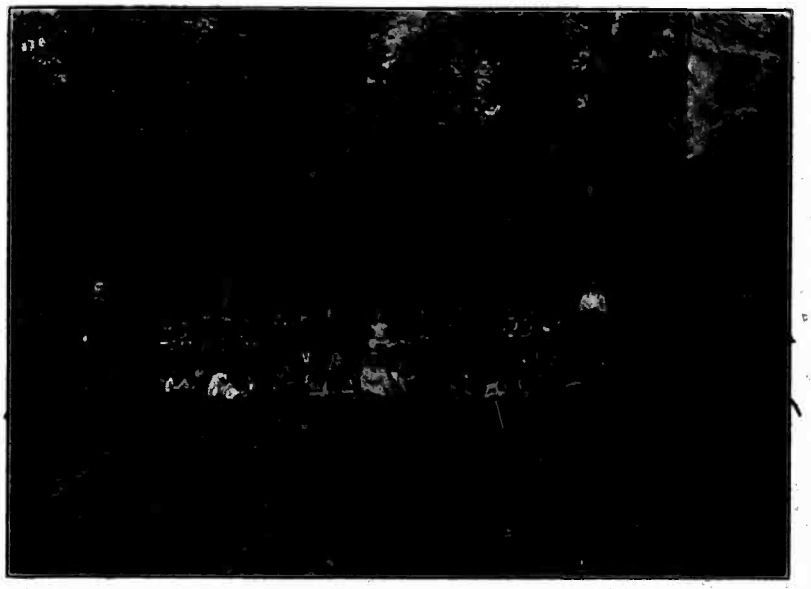


FIG. 76.—A recitation under the fir trees at Murthley, Perthshire, Scotland.

are five little cottages and a schoolhouse in the "village," which is used as a summer outing camp by the Holiday Fund Association. During the school year the board of education pays the holiday fund a certain sum per pupil for board and lodging and the parents of the children are charged according to their circumstances. Twenty pupils are sent out at a time, and the average stay during 1913 was nine and a half weeks. The school medical officers select the children from the delicate and physically debilitated pupils of the public schools. They react quickly to the healthy conditions in which they are placed, and last year the average increase in weight was found to be a half pound per week for each pupil. A quickening of intelligence and increased interest in work and surrouudings are frequently noted by the teachers and by the children's parents. The schoolhouse

is so constructed that one entire side can be thrown open, and practically all the classes are conducted thus in the open air.

The study of tuberculosis among school children in Scotland is receiving particular attention from several medical inspectors, and the general opinion of medical men seems to be decidedly in favor of extending open-air schools in Scotland in much the same way as in England.

IRELAND.

To the Woman's National Health Association, under the leadership of the Countess of Aberdeen, belongs the credit for attempting to introduce open-air schools into Ireland. During the Ui Bresail Exhibition, which was held by the association in Dublin in 1911, an open-air school was conducted as an object lesson, and since that time teachers in a few cities have regularly taken classes out of doors for recitation in favorable weather. There is as yet no medical inspection of schools in Ireland and very little on which to build a well-organized open-air school system; so, although the commissioners of national education are thoroughly in sympathy with the idea, no classes have as yet been organized. The National Health Association is laying the foundations for the work by establishing school playgrounds and summer outing camps and by aiding in preventorium and sanitorium construction.

Chapter IX.

OPEN-AIR SCHOOLS IN OTHER FOREIGN COUNTRIES.

ITALY.

Open-air school work in Italy was begun by the Anti-Tuberculosis Association of Padua in December, 1902. The head of the association at that time was Senator Achille de Giovanni, who was also a professor in the University of Padua. Through his efforts a site was secured at Barbarano, a suburb of Padua. The first colony accommodated 10 children and a teacher. Later the city of Padua gave a subsidy to assist in the establishment of two more pavilions, which increased the number of children cared for to 30. No attempt was made to make the teaching conform to that of the public-school system, and the experiment was called an open-air colony rather than an open-air school.

In 1905 a somewhat larger colony was opened on the outskirts of Padua, under the direction of Dr. Alesandro Randi, chief of the medical service of the city. The Red Cross Society furnished tents, and other benevolent associations secured the equipment and paid the current expenses. The children were chosen from the pupils of the primary schools by a special committee. They ranged in age from 5 to 12 years, and 54 were received during the two months in which the colony was open in the first year. During September they were kept out in the open air eight hours a day and were given two meals at school; in October the school day was shortened to six hours, and only one meal was provided by the school authorities.

These colonies have now developed into open-air playgrounds. In 1913 there was an average attendance of 200 children. The playgrounds are used for keeping children under observation until it can be determined whether they need additional care, and in building up those whose physical condition needs only the day open-air life. Children who need further attention are sent by the medical committee to mountain colonies or colonies by the sea or are placed out in suitable country families until their physical condition improves, when they are once more accepted in the open-air playground and remain until the medical committee considers them ready for discharge.

The Gymnastic Association of Padua has cooperated with the Anti-Tuberculosis Association in the management of these playgrounds. The president of the association has ruled that all the girls shall attend the lessons "without corsets, wearing broad-toed shoes, and without earrings." The classes were not at first intended for instruction, but merely for physical recuperation; it was not until 1907 that the city of Padua appointed a public-school teacher to take charge of the work. In this year the school medical inspectors began to separate from the other children in the public schools those who were physically less developed or whose health was in such condition as to require particular attention. Many of them were found to be children of families who were known to the Anti-Tuberculosis Association.

In 1908 four special classes, called the "classes for sickly children," were opened by the municipality. They were, from the beginning, allowed to have shorter hours of school; and the requirements of the program were somewhat reduced. When the weather permitted, they were sent to the open-air playgrounds for recitation. At other times rooms in the ordinary public-school building were used.

In 1911–12, 702 children, nearly 30 per cent of the first and second grade children in the city, were registered in these classes. In 1913, 15 classes for sickly children were conducted by the board of education, and it was considered that the actual needs of the situation in Padua were thus met.

In 1909 the city built a large and beautiful open-air structure for the use of the special classes. The style of building is that commonly seen in the European schools, a long shacklike structure, and as usual in Italy, open on all four sides, with canvas curtains which can be lowered if necessary. Most of the Italian schools are in session only from spring to fall, and the climate makes it possible to conduct them satisfactorily without more permanent buildings. The board of education is thoroughly in sympathy with the movement, and purposes to construct additional open-air school buildings until all who need such care are accommodated. The children remain in the open air from 8 o'clock in the morning until 6 at night, having one meal at 11 and another at 4. They spend the first hour of school day in rest, relaxation, and breathing exercises. About 600 children were thus benefited in 1912.

No statistical reports are available as to the results of the work; but the opinion of physicians and teachers is unanimous as to the remarkable improvement which the children show.

Traveling open-air schools.—Milan, Rome, Genoa, and Florence are also carrying on similar work. Rome has attained some fame because of the traveling open-air schools, or schools where the pupils carry a folding camp chair and books over their shoulders and walk from place to place under the direction of their teacher, holding

informal recitations wherever their fancy leads them to stop. There are certain objections to this method: First, that it is not practical for small or sickly children, since it is too fatiguing to carry along all the articles needed, especially when the roads are in bad condition; second, that they have insufficient protection in case of storm. It may further arouse complaint on the part of landowners if the children happen to trespass on private property.

The Florence open-air school.—The school in Florence is located in a large apple orchard, and a lemon conservatory with large windows is used as a schoolroom. It was opened on April 13, 1912, and has continued without interruption even during summer vacations. A class of about 30 children was chosen from the elementary schools by the physician of the board of health and the director of the clinic for children. Lessons were alternated with gymnastic exercises, games, short walks, and gardening. School hours were from 9 to 4 in winter and in summer from 9 to 6. Food was served three times a day. The physician in charge records a gain in weight superior in nearly every case to the normal increase in weight for the age of the child. Chest development also has been greater than normal. The expenses of the school are equally divided between the community and the anti-tuberculosis society. The teacher receives extra pay as compensation for the longer hours on duty, and during the period when school lasts until 6 p. m. he is relieved in the afternoon hours by a teacher paid by the municipality. The children receive warm milk and bread when they arrive at school, a warm lunch at noon, and a second lunch at 4. The breakfast and first lunch are furnished by the association and the second by the municipality. The school equipment is provided by the municipality, but the association gives each child a woolen raincoat and a winter cap and a large straw hat for the summer.

The purposes of the school have been to give assistance to sickly children or children predisposed to tuberculosis, and to make the institution an effective means of teaching prophylactics and the beginning of a rational reform in the hygiene of the elementary school.

Prof. Alberto Graziani made an extensive report to the Fourth International Congress of Physical Education, in which he summed up admirably the attitude of educators in Italy on the open-air school movement and the conclusions which they had reached. He believes that the congestion of cities, the poverty of the working classes, the lack of suitable amusements which would develop spirit and body alike, and the increasingly difficult struggle for existence compel a readjustment in the lives of many thousands of children if they are to be given a chance for healthy, normal development. "Growth of children in the open air," he calls the "last word in

modern educational methods," and points out that the open-air school originated in the necessity of bringing up children in a healthy environment and in the fact that this period of the development of children coincides with the period of their attendance at school. Weight, height, chest expansion, and condition of blood are the physical tests which he would have applied to the children in the open-air schools.

Wherever the natural conditions of the place permit, he thinks it is best to choose a hilly location for the open-air school, with woods and abundant water. There must be good drainage, and, if the site is not naturally wooded, many trees should be set out, preferably fir trees or resinous bushes. The size of the grounds should be proportioned to the number of pupils, but space should be left for the construction of sleeping sheds, general offices, garden, orchard, and playground. The schoolrooms should be formed by large pavilions, about 10 by 15 meters, with a cement floor, and open on each side and equipped with strong curtains or with folding doors. The roads and grounds ordinarily used by the pupils should be covered with a thick layer of sand or gravel, and the whole area should be fenced in.

School hours should be long enough to keep the pupils the greater part of the day. Three and a half hours of intellectual work is enough. Teachers should be chosen from those who volunteer to do the work, and those whose own condition demands open-air life should be given first consideration.

Meals should be given at regular hours, one immediately after arrival, the second at 12.30, and the third half an hour before dismissal. If only two meals are served, the first should be given at 11.30 and the second at 5. The two meals should represent two-thirds of the total nourishment and should contain a great portion of albumen. Meals should be followed by rest in the open air for not less than an hour and a half. After not less than three hours from the first meal the children may take a bath. Physical exercises are advisable, if properly supervised. Jumping, running, respiratory exercises, and modified singing are especially good. The children should wear clothing that permits full liberty of movement and leaves their bodies as unprotected as possible, so that air and light can act directly on their skin. Neck, arms, and legs must always be unprotected, and the pupils must wear short stockings and sandals.

Prof. Graziani sums up his conclusions as follows:

1. We must have faith in the advantages that may be derived from the open-air school, for our contentions are corroborated by sufficient experience.
2. The aim of the open-air school is to make possible the growth of the sick child in the open air.
3. All the large cities where congestion is great should have open-air schools.

4. The open-air school is the necessary supplement to the special classes.

5. The open-air schools should be completed by holiday playgrounds.

6. The open-air school should be a vast, shady space in which pavillons or porches may be erected to be used as schoolrooms.

7. The open-air schools will be preferably located outside the city or in its immediate vicinity. The children will walk to the school, or if the distance is excessive, means of transportation should be provided. It is not necessary, although preferable, that they be erected on the hills or in woods.

8. The open-air school ought to be a municipal institution.

9. The open-air school shall function only during the day.

10. The children of the open-air schools will be chosen among those physically needy, or among those whose parents have not the opportunity to take care of them properly.

11. The hours of the open-air school will be regulated according to local conditions, and the time devoted to instruction will be shorter than in ordinary schools.

12. The program to be followed in the open-air schools will be very simple and will be of a practical and solid character.

13. The physical education in the open-air schools should consist of exercises in running and respiratory gymnastics. A shower bath should be taken as often as possible.

14. In the open-air school proper food should be abundantly supplied, and the clothing should correspond to the requirements of the school.

15. The teachers of the open-air school should be chosen among those who spontaneously apply for such work, and preference given to those who offer particular qualifications.

16. The open-air school is to be preferred to the many other institutions whose object is prophylaxis through open-air life, because it is more economical, more practical, and the benefit may be extended to a larger number of individuals. In any case it may be considered as a useful supplement to the other institutions.

17. The open-air school should be constantly supervised by school physicians.

FRANCE.

Preventive work among the children of tuberculous parents had already taken form in two definite directions before the day of the open-air school in France. Grancher had put into operation his splendid plan of "preserving the seed corn of the Nation" by sending delicate children from the homes of the tuberculous poor into selected families of healthy peasant stock where they could get nourishing food and outdoor life through the critical years of childhood. His own statement of the purpose and methods of the work as stated in a report published in 1915 deserves reproduction:

When tuberculosis enters a small dwelling and attacks father or mother, the infection of the children is almost inevitable, and it has seemed to me that the best way to fight against tuberculosis was to snatch away its prey.

In this tuberculous family, the work of preservation takes the children who are still in good health, from 3 to 10 years, and places them in the country in the families of peasants equally healthy, where our pupils spend all their school life until they are 13; even longer, for we are sure that many remain in the country and found peasant families.

The pupils are put in charge of good physicians of the neighborhood, who select the homes of the peasants and care for our children without charge.

Men and women teachers vie in their interest in our pupils.

Each child costs the organization, all expenses included, from 1 franc (20 cents) to 1 franc 20 centimes a day, according to where he is placed.

This selection of the still unspoiled seed corn of the human race realizes the formula which Pasteur applied to silkworm raising.

An ideally simple and scientific formula, for it is for the child the best which can be opposed to the devastating scourge of tuberculosis; for, from the medical side, it gives a complete and radical solution. It suppresses, in fact, all the causes of tuberculosis; the remote causes, as the poverty and wretchedness of the large cities which prepare the soil, and the immediate cause, family infection.

From the social side, the child removed from promiscuousness of a dwelling infected with tuberculosis, and placed during a long period of his life in a good house, with plenty of fresh air and an abundance of food, becomes a new being, physically and morally. He reaches adolescence full of vigor, and may then choose between life in the country or return to the city.

According to our experience of the last four years, the country will be most often the choice.

Finally, saving these children, almost all condemned to become tuberculous, will destroy for the future so many centers of contagion and will little by little lessen the extent of tuberculosis.

All these advantages have not escaped the notice of those who are familiar with the work, and powerful friendships among statesmen, philanthropists, and physicians have helped to put it in the front rank in the antituberculosis campaign.[1]

Vacation colonies.—As a result of the second activity, the vacation colony idea, originated by Pastor Bion, of Zurich, in 1870, and promoted by many private philanthropic societies and by certain municipalities, 81,358 French children, in 1911, spent from three to six weeks at vacation colonies.

The scheme of operation which the city of Havre has developed at the municipal colonies of Grosfys and Montgeon may be taken as typical of others. Created by the city council on May 30, 1906, the management of the colonies is vested in a commission of 22 persons, who serve two years. Twelve are chosen from members of the city council, and they may add to their number 10 other persons "known to be interested in vacation colonies." The head of the department of public instruction is ex officio chairman of the association. The commission exercises full control over the selection of children for the colonies, the method of placing the pupils, the organization and supervision of the colonies, and the raising of funds for their support, if the city appropriation is not sufficient. Every year they must make a general report, which includes the financial statement to the city council.

The colony of Grosfys utilizes a country estate near Havre, with a great country house large enough to accommodate nearly 200

[1] From Prevention de l'Enfance contre la Tuberculose. Paris, 1912. pp. 1–2.

children at a time. The colony of Montgeon occupies specially constructed barracks in the forest of Montgeon close to the city of Havre and owned by the city.

The present plan is to use Montgeon for the less needy children and Grosfys for those who are more debilitated. A plan has just been undertaken, however, which provides for some 400 of the most needy and unfortunate children a stay in both colonies, which extends their vacation over the whole summer. In addition, many children are sent to Montgeon for the day only, leaving Havre by street car or on foot at 7.30 in the morning and returning in the evening. They are given a good dinner of soup, meat, vegetables, and desert at noon, but receive breakfast and supper at home. The children at Grosfys observe the following daily program:

A. M.

7.00 Rising hour; the children uncover the bed and open the windows and proceed to clean their shoes and make their toilets.
7.45 Breakfast; the children are required to remain at least 25 minutes at the table.
9.00 A walk through the woods.
10.45 Return.
11.00 Make the beds.
11.30 Luncheon; the children remain 40 minutes at the table; rest in the court.

P. M.

2.00 Luncheon in the open air.
4.20 Walk.
6.00 Return.
6.30 Dinner; the children remain at the table 40 minutes.
7.45 Hour of retiring.

Gymnastic exercises, different games, reading, and letter writing occupy the spare moments.

No visits can be paid the children by their families except by special permission, and great pains are taken to prevent too frequent guests.

The improvement in weight, height, and chest measurement, for both boys and girls, is marked.

The cost of food per day amounts to about 10 cents per pupil, and the total expense, including management and supervision, amounts to a little over 20 cents per pupil.

In the report made by the commission to the city council at the end of the season of 1913, the committee recommends that the attention of the municipal administration and the university authorities should be called to the advantages which would result from the establishment of an open-air school at Montgeon. The vice president of the commission, Dr. Profichet, has submitted to the commission a plan for receiving in an experimental way 100 sick children, 50 boys and 50 girls, who might be profited by the fresh-air treatment during the school year, leaving at Easter time if necessary. The

same recommendation was made for the colony of Grosfys, with the alternative suggestion that it might be used as a rest-recovery place for adults if not available for an open-air school.

Open-air schools.—The first open-air school in France was founded in 1904, at Montigny-sur-Loing, at the entrance of the forest of Fontainebleau, by M. Durot, a teacher who was moved by the delicate health of most of his little pupils to try to get them out of the poorly ventilated schoolrooms and their insanitary homes in the slums of Paris. He began the work without any help whatever, but it soon enlisted the support of physicians and educators, and in a short time he was able to erect a suitable building.

Lyon was the first city in France to have a municipal open-air school. In 1907 the Castle of Vernay, on the banks of the Saone, was thrown open to the work of caring for sickly children from poverty-stricken homes. Pupils are received in groups of 45 for periods averaging about three months. They follow the usual program of forest schools, and register the usual gains in health and mentality.

Nimes, Bordeaux, Toulouse, and Dijon have also excellent open-air schools.

League for open-air education.—The League for Open-Air Education was founded at Paris in November, 1912, by M. G. Lemonier, assistant editor of a school journal called "Hygiene in and through the school" (L'Hygiene à et par l'Ecole). Among its early members were M. Marcoux, prominent in antituberculosis work, and Mme. Jeanne Girard, school inspector of infant classes in Paris. The objects of the league are: First, to promote school hygiene and physical, intellectual, and moral education by conducting and popularizing open-air classes and school journeys. Second, to encourage, assist, and award prizes to all undertakings and experiences of this nature. Third, to promote, and if necessary, to found, playground classes, schools, and medicopedagogical establishments in the open air, whether through public agencies or private initiative. Fourth, to place members and pupils of the society free of charge in houses where the rules of hygiene are observed.

The association is supported by a membership created according to the size of the yearly contribution and ranging from the class called "founders," who pay a minimum fee of 1,000 francs yearly, to an honorary membership who pay 5 francs. No charge whatever is made the children who enroll themselves as pupils.

The annual income is to be spent in the following way: First, propaganda for education in the open air, by conferences, placards, bulletins, reviews, etc. Second, diplomas, prizes, and grants to persons and groups who shall have helped by their acts to develop theory into practice. Third, organization of school journeys, visits, walks, family excursions with studies and demonstrations in the open air and

playground classes. Fourth, the establishment and installation of open-air classes of open-air schools by the location or purchase of ground sites, or estates or by construction. Fifth, the organization of school restaurants to distribute strengthening food to the pupils of the association. Sixth, the organization of vacation colonies or rest recovery places.

The first undertaking of the league was to start school journeys in the Paris schools. The second was to undertake a study of open-air schools of various types, the results of which are to be published. Various other similar undertakings are being started.

Many organizations of like purpose are affiliating themselves with the league, and the plan is to call an "Open-Air Congress" as soon as the branches number 100.

SWITZERLAND.

The type of open-air school for which Switzerland is best known is that developed by Dr. Rollier, of Leysin, and Dr. Bernhard, of St. Moritz, in connection with the sun cure of surgical tuberculosis. Complete elementary education is now provided for the little patients, who sit with arms and legs exposed to the healing rays of the sun, reflected from fields of snow. Photographs of boys clad only in loin cloths, sandals, and shade hat skiing or tobogganing down the Alpine slopes have made the spectacular side of the treatment widely known. The details, however, are carefully and slowly worked out, and the most minute precautions are observed in beginning the work.

Admission to the sanitarium is followed by a period of rest in bed, during which time the doors and windows of the room are gradually opened until the patient is accustomed to prolonged contact with the high mountain air. Then he is wheeled out on the balcony for gradually lengthened periods of time. Every day temperature, pulse, and respiration are carefully recorded; and tests of blood and urine are frequently made, so that the individual reactions can be noted. When it is certain that the patient is really acclimated, he is dressed in some white material, given snow spectacles and a white hat or a white umbrella, and is taken to the solarium, or "sun parlor," to begin the real treatment. Exposure to the direct rays of the sun is always begun with the feet, which are uncovered only for five minutes at a time for three or four times the first day with an hour between each exposure. On the second day the leg is bared as high as the knee. It is usually a week or more before the head and neck are stripped of covering. As the treatment proceeds, the skin turns a copper brown, which gradually changes to a chocolate hue. This is called pigmentation, and is considered the best index of improvement. It is said to render the skin immune

from bacterial infection. This continued exposure to the sun is particularly efficacious with tuberculous abscesses and sinuses, for it kills the germs and does not injure the living cells. In time children enjoy from four to six hours' exposure daily, and can go on with school work while taking the cure.

Switzerland has five open-air schools of the ordinary type, situated at Lausanne, Geneva, Neuchatel, Bischofzell, and Zurich. Zurich is the most recently established and may be taken as typical of the rest. The town has taken a lease of 30 years on a wooded tract of about an acre and a half on the outskirts of the city. The main building includes on the first floor a large diningroom, with kitchen and office, and on the second floor a classroom for use in bad weather, and rooms for the housekeeper and teacher. A large veranda opens direct from the diningroom upon the playground.

The school physician and public-school teachers together choose the children who are debilitated and seem to need change and extra food. Tuberculous children are cared for in the sanitarium schools.

Each morning the children gather at the tram station in town and proceed to the school in groups under the guidance of a teacher. At 8 a. m. comes the breakfast of bread and milk; at 10 o'clock bread and fruit; dinner at 12; and supper at 6. After breakfast one-half of the children attend classes, while the other half play games, and after the morning luncheon the process is reversed. The class periods are 25 minutes each, with 5 minutes intermission between recitations, and there are four such periods during the morning. After dinner come two hours of complete rest, followed by two hours of play or excursions through the woods.

The local board of education pays the salary of the teacher and the cost of the school materials. Children who are able pay 1 mark a day and any deficit is made good by the Children's Benevolent Society. The school was started by the Anti-Tuberculosis League, and the cost of the building was raised by private subscription and contributions by various benevolent societies.

The famous holiday colonies or vacation homes which are now common in all the European countries were begun in Switzerland by Pastor Bion, of Zurich, in 1876. In 1909 more than 8,000 Swiss children spent three or more weeks on such trips at a total cost of 44 francs per head. At first the whole expense was met by voluntary contributions, but of late the municipalities have realized the value of the work and are beginning to assume the cost. The plan is to send the children in groups of about 20 and in charge of a married teacher, sometimes to an inexpensive hotel in the country, but more often to houses built or rented for the express purpose. Some towns have provided holiday homes of their own. In addition to the colonies, some children from the lower grades are sent to peasants' homes in

the country to help in the lighter forms of farm work, in watching the goats or tending the cattle.

The Guild of the Wandervögel consists of about 1,000 boys and girls over 14, who go off in separate groups under the guidance of a teacher on long tramps at least once during the year. Each group carries along a big aluminum pot which will boil a gallon or more of soup, and they camp at night wherever the fancy strikes them, often sleeping on hay or straw in barns or in the open. They now own three mountain huts, which are the centers from which the excursions start.

School gardens and day school journeys have also been developed by certain cities as a means for giving the children proper training in the open air.

DENMARK.

The open-air school movement in Denmark has developed from the summer vacation colonies, and is still conducted largely in connection with them.

Denmark has for years been in the habit of arranging exchange vacations between children living in the city and those living in the country. Groups of city children are taken to country homes and given a few weeks' experience of country life, while at the same time the country children are enjoying the sights of the city. The vacation colonies, however, are planned especially for sickly and malnourished children, who need definite physical care.

The open-air vacation colony for delicate children, organized by the Children's Aid Association of Copenhagen, illustrates the kind of work which is carried on. This association realizes that the cause of sickness and physical subnormality in school children is often largely due to the economic situation and condition of their homes. In many cases the homes are not able to restore the children to strength after a long sickness. In other cases children suffer from chronic undernourishment. Experience has shown that it is possible to restore such children to full strength by a stay in the country under good conditions for a couple of months during the summer, or at least to give them such a good start that the chances are favorable for a complete recovery.

The municipality of Charlottenburg has given to the Children's Aid Association free use of a farm owned by the city, at Lille Bellegaard. The farm buildings have been considerably remodeled, and free transportation is provided for the children on the street railway.

The colony was started in 1905, and since that time it has had under its charge 973 children. At present it is open from May 15 to September 16. During the summer 136 children are cared for, in

two divisions, with periods of two months each. A medical certificate is required from each applicant for admission, and these applications are then passed on by the examining physicians of the board of directors. Preference is given the children who come from the poorest homes.

The children meet at 8 o'clock in the morning and are sent home at 7 o'clock in the evening. They have four meals daily: Breakfast at 8, luncheon at 11, dinner at 3, and supper, including all the milk they can drink, before they are sent home. On birthdays the flag is raised, and the children have chocolate. The total number of days present in 1912 was 7,084, the total cost of the food was about $1,000, and the daily per capita expense for each child was about 13 cents.

The management of the house is in charge of a matron, assisted by the older children. The children are taught how to set the table properly, to wait on table, wash dishes, and perform other simple household tasks.

Shoes are bought for all the children and blouses are provided for the boys and aprons for the girls, in order to save their own clothes as much as possible. They are also given toothbrushes, nailbrushes, soap, and towels.

Except for the time necessary for meals the children spend the entire day in the open air. After dinner one hour's rest is given in reclining chairs. On rainy days the barn on the farm is used and the time is passed in play, dance, and song.

It is easy to see from the changed appearance of the children, from their greater liveliness, perseverance, and excellent appetite that such a life has an excellent influence on them physically and mentally.

They are weighed once a week, and the reports show that they make good gains.

Results of stay in the colony, on weight.

Number of children.	Total weight.	Increase in weight.	
		Total.	For each child.
First division (52 days in the colony):	*Pounds.*	*Pounds.*	*Pounds.*
35 boys	1,984	68	2.0
35 girls	1,982	98	2.8
70 children	3,966	166	2.4
Second division (54 days in the colony):			
34 boys	1,944	196	5.7
32 girls	1,792	177	5.5
66 children	3,736	373	5.6

In order that the children may not, during their absence from school, fall too far behind their class, an open-air school is conducted at the colony, in which lessons are given in Danish, arithme-

tic, nature study, and singing. The children are divided into six classes. Each class has two half-hour lessons daily in Danish and arithmetic.

There is abundant opportunity for nature study in field, garden, and farm. The children have small gardens in a corner of the common garden. They are supplied with plants, but the arrangement is left entirely in their hands. Most of them raise flowers, radishes, cabbages, and peas. Prizes are awarded to the best gardeners. In another corner of the garden the children are permitted to dig and work to suit their own pleasure. They build caves, castles, and fortifications. A sand pile, seesaw, and swing are highly popular. The day passes so rapidly with games and study that there is hardly time enough for all that needs to be done.

In the evening, after supper, the children stand in line in the yard while the flag is carried to the front; then, with drums and fifes playing, they are led to the street car for the homeward journey.

Each of the divisions has three day excursions—one trip on the steamboat to Elsinore, one visit to the zoological garden with luncheon, and one trip to the Deer Forest.

NORWAY.

The city of Bergen maintains an open-air school at Mjolfjell, to which 30 delicate children from the city are sent for a month's recreation and instruction. The community has appropriated 1,000 crowns ($268) for this experiment.

SWEDEN.

Sweden is said to lead the other nations of the Scandinavian group in respect to the provision of school gardens and vacation colonies. In many of the larger cities of Sweden it has been customary during the last few years to send school children who are in special need of building-up into vacation colonies during the summer. They were started in Stockholm in 1884; and 356 colonies, a total of 8,751 children, had been sent from that city between 1885 and 1900, exclusive of some colonies provided by certain industrial companies for children belonging to their workmen. Between 25 and 30 children were sent in each group. They remained about two months, and the total daily cost per child amounted to about 15 cents.

In 1907 Stockholm seriously considered the question of establishing a forest school. The municipality appointed a commission to make a general investigation into the teaching of sick and delicate children, and the decision was that it would be better to extend the work of the vacation colonies, rather than to proceed with the forest school at that time.

HOLLAND.

Various cities in Holland have interested themselves in summer colonies for needy children and in the school-journey movement. Recent information on but one open-air school has been secured. This is maintained by a private organization and is now located in the sand dunes near The Hague. The work was begun in 1905 on a very small scale in a private house and garden which had been given, rent free, for six weeks. The funds supplied were meager, and the 42 children who were admitted were compelled to bring their own forks, spoons, etc. The society supplied food and instruction.

FIG. 77.—Open-air school near The Hague, Holland.

In 1906 another house, with beautiful large gardens, was also given, rent free, to the society, and here the children stayed three or four months. As the work went on and increasing numbers of children applied for admission, the interest of the public grew until the city authorities became interested, and in 1913 gave the ground for the establishment of a new and larger school. The society bought several Doecker portable houses and prepared to accommodate 50 children. The pupils admitted are from 7 to 13 years of age. Children of tubercular parentage are given the preference.

The medical officer of schools of The Hague conducts the physical examinations. Children with heart disease, chorea, or other nervous complaints are not admitted.

All the expenses are paid by private contributions. Each child is supposed to pay 6 cents a day. Any deficit must be met by the society. At the head of the establishment is a social worker who gives her services without pay and directs the teachers as well as the household staff. She is assisted by a nurse, a cook, a cleaning woman, and two teachers. The responsibility for the children's welfare, however, is made to rest as much as possible upon the parents. As soon as any difficulty arises as to the child's health, character, or scholarship, the parents are consulted. Parents' meetings are held frequently, and the medical officer discusses with them the necessity of fresh air, cleanliness, and plain but abundant food. The physician visits the school daily for a short time, and once a week conducts a thorough examination of one-sixth of the children, so that once in six weeks every child gets a thorough physical examination. The amount of physical exercise which may be taken is designated by badges, which all children wear. A white badge is given the children who may run about and play and attend the lessons; a blue badge for those who may go to school, but are not allowed to run about or play vigorously; a red badge for those who are on complete rest and may neither play nor take part in school work. Such games as football are allowed only to those with white badges, and skipping is forbidden to all the children.

Twice a week each child gets a shower bath or a tub bath, according to the doctor's instructions. Toothbrushes are provided, and the teeth are cleaned regularly each morning at the school. Twenty minutes of breathing gymnastics are prescribed for each child daily, except for those who are on complete rest.

The children gather at 7.30 at the station in The Hague and are escorted to the school by the nurse. They arrive about 8 o'clock, and at 8.15 a breakfast is served, consisting of porridge, bread and butter, and milk. At 10.30 they are given a glass of milk and a piece of black bread, and at 12.15 a dinner of meat, potatoes, vegetables, and a dessert, sometimes a pudding and sometimes fruit. After dinner they rest from 1 until 2.45. At 3 they are given milk and black bread again, and at 5.30 they have supper of bread and butter or bread and jam, with milk. They leave the school at 6 and reach the city station at 6.30.

The lessons are given as far as possible entirely in the open air. Each child has instruction for 2 hours in the morning and 45 minutes in the afternoon. The needle work and gardening are done by both boys and girls, and add greatly to their enjoyment of the school. Otherwise the curriculum corresponds to that in use in the regular schools in The Hague.

After leaving the open-air school and returning to their own school in town, the children are kept under careful supervision, and

at Christmas and Easter, following their stay at the open-air school, they are again examined by the medical officer, and if necessary enrolled for a second summer in the open air.

Up to this time the school has been open only from the 1st of May to September. It is the plan of those interested to hold sessions the year round, as soon as finances will permit.

The purposes of the school, as its promoters outline them, are:

First, physical education. The restoration of health to weak children predisposed to tuberculosis, by fresh air, rest, cleanliness, and good food.

Second, intellectual education. By teaching during shorter hours and with smaller classes.

Third, moral education. By cultivating the feeling of unselfishness, readiness, and responsibility, perseverence, and tolerance.

Fourth, home education. By giving each child a small but responsible task in the household—as clearing away and washing up breakfast and dinner things, preparing vegetables for the table, waiting on table, etc.

Fifth, love for nature. By giving the children small gardens, and by making them responsible for the care of the whole place, and by taking them on nature study walks in the woods, among the dunes, and along the seashore.

HUNGARY.

The first open-air school in Hungary was established at Szombathely, by the Anti-Tuberculosis Association of Vas County, in 1908. This association was also the first to conduct a free dispensary for the treatment of the tuberculous poor, and the open-air school arose in part from its knowledge of the conditions in which children in the families under its treatment were growing up.

The city of Szombathely placed at the disposal of the association a 10-acre tract of wooded land, on which the association built a small frame structure consisting only of kitchen, office, and a large open-sided room used for recitation and rest in bad weather. During the first summer the school session lasted only six weeks, but even in this time the gains in weight, in hæmoglobin, and the improvement in appearance and mental vigor were so noticeable as to convince the city authorities of the value of the school.

Accordingly, in 1909 the municipality constructed a larger building with two dormitories, two verandas, kitchen, provision room, and living quarters for the matron. The building has a southeastern exposure and is located on the edge of the forest, where the growth is not too heavy to prevent free access of the sunlight to all the rooms. A good spring provides water for all purposes. There are accommodations for 50 children, 20 of whom remain all night.

The head physician of the Anti-Tuberculosis Association and the chief dispensary physician select the children who are to be admitted. Only physically debilitated children are chosen, and those with

tuberculosis and anemia are given preference. They must come from needy families who are unable to get for them open-air treatment in any other way. No children suffering from advanced tuberculosis or having any contagious or organic diseases and no epileptics are admitted.

The children meet at 6.30 in the morning at a school building in Szombathely and proceed to the forest school under the guidance of a teacher. The teacher is expected to look them over before starting, and if any one appears to be ill, to send him home. Even in case of bad weather the children are expected to meet at the city school noted above, as the teacher alone decides whether it is wise to

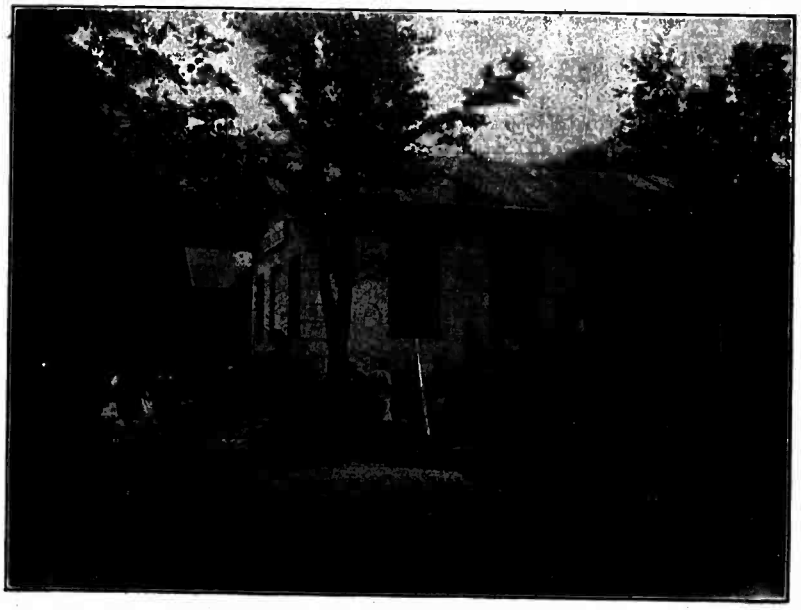


FIG. 78.—Open-air school, Szombathely, Hungary.

attempt the trip to the forest school. If they do not go, they are taught in the school building in town.

The daily program is similar to that in other forest schools. It includes a two-hour rest period and the daily cold-shower bath. Each pupil receives a blanket, underwear, a gymnastic suit, and shawl or collar made of a material called "loden," which are all numbered and may not be taken from the school. Even plates and drinking cups and other table utensils bear numbers and are used by the same pupils each day.

The matron has charge of the dormitories at night and is expected to instruct the resident pupils on days when the teacher can not bring

the others out from town. Under her direction the older girls assist in setting the table, washing the dishes, and making the beds, taking turns in the assignments from week to week. The boys at the same time care for their own dormitories and work about the school grounds. During the months when the school is not in session the matron visits the parents of the children who have attended the school and prevails upon them to keep the children in attendance at the dispensary. She explains to them the value of home sanitation, including heating, lighting, and general hygiene. If small operations are necessary, she will secure the written consent of the parents for such an operation, and take the child to the hospital or dispensary to have it done. She is expected to keep a record of this follow-up work and turn over the notes to the Anti-Tuberculosis Association.

The teacher is supposed to be governed by the regulations issued by the city board of education. He appears at the meetings of the school board of the third district and reports on conditions at the forest school, thus keeping the supervisors informed of the progress of the work. He is instructed to pay special attention to individual instruction and to give plenty of manual work. He must see to it that the children do not overexert themselves mentally or physically, and try to direct their education in such a way as to render punishment unnecessary. He must make a written report regarding the progress made by the pupils to both the board of education and the Anti-Tuberculosis Association.

Many educators and officials in Hungary have gone on record in favor of open-air schools. Dr. Sandor Gerlitz, in a lecture delivered before the Hungarian association for child education at Budapest on January 11, 1913, said:

> It will not be surprising to note that the diseases caused by poor housing, especially tuberculosis, are lessening the population when we consider that 58,000 children are living in overcrowded rooms in Budapest, in some cases with 6 others in the same room. More than 60,000 children have died of tuberculosis in Hungary within the last 10 years. The number of those who contracted the disease, no one is able to judge. The largest number of children naturally are the victims of immediate contagion on account of poor housing conditions and on account of contact with other consumptive relatives. * * * For this reason and for the sake of affording protection against tuberculosis until such a time when we will be able to eliminate the healthy children from families affected by tuberculosis, education in the open air must have an enormous importance. * * * By following this method we will be able to save many children, who otherwise would become sure victims of the disease, for society and the nation, and will succeed in gradually wiping out this great peril.

CANADA.

In Canada the antituberculosis movement has been largely responsible for establishing the earliest open-air schools. They have sprung up in connection with hospitals, dispensaries, and sanitaria, and in only one instance has the board of education been directly responsible for the work.

This exception is at Toronto, where a true forest school has been conducted by the board of education in Victoria Park since 1912. The park is close to the town and easily accessible by street car, and the Toronto Street Railway Co. gives free transportation to the open-air school pupils. Wooden shacks were erected which give protection to equipment over night and in which the children can recite,

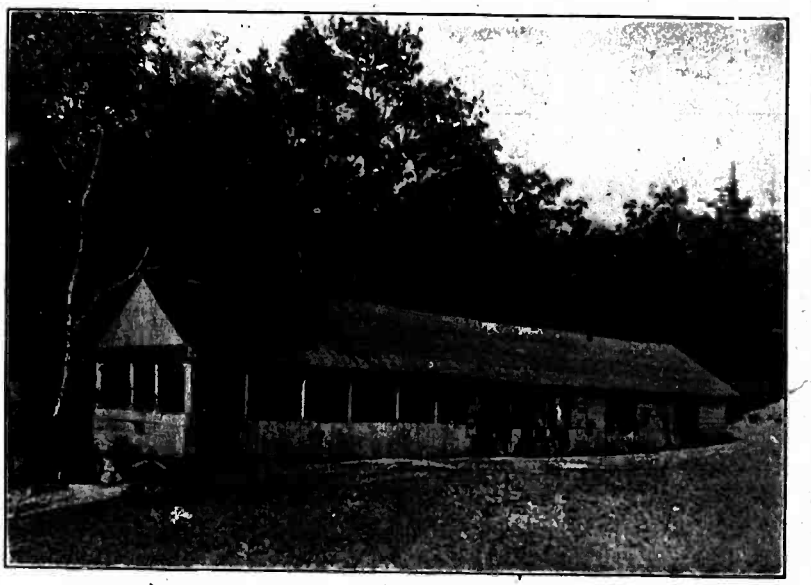


FIG. 79.—The Forest School in Victoria Park, Toronto, Canada.

and rest in rainy weather. The children arrive at 8.30 and leave at 6.30. Upon arrival they have a breakfast of cereal and bread and butter; at 10.30 a glass of milk, with bread and butter; at 12 a dinner of soup, meat and potatoes, a vegetable and a dessert; and at 5.30 a light supper of milk, bread and butter, jam or cookies is served. At 1 o'clock all join in a two-hour rest period, for which the board of education provided wooden cots with woven wire springs, a single blanket, and a small pillow. These articles are all numbered, and each child is responsible for the care of its own.

Teacher and nurse camp in the park over night, while the man principal and 10 or 12 of the most needy boys camp in army tents.

The nurse teaches the children how to use a tooth brush, and each child is required to clean his teeth after each meal. She gives talks on cleanliness, care of the body, wholesome food, manners, deportment, and nature study, and also requires breathing exercises. Every day a certain number of the pupils take a tub bath. The teeth of all the children are put into good condition by the dental inspector, who removes stains and tartar, takes out jagged roots, and fills the decayed teeth. At the close of the school year 1913 he reported as follows:

> I wish to draw your attention to the beneficial results of the regular and careful brushing of the teeth by the children under the nurse's guidance. At the close of the school the mouths of these pupils were, in practically every case, models of cleanliness. If the same regular care that was practiced in the forest school could be carried out in all our public schools it would revolutionize the mouth conditions among children.

The testimony of the principal touching the changed dispositions in the children is significant. He says:

> The children came to the school dull, stupid, and unresponsive, with but little evidence of developing mentality. It was a great pleasure to watch the awakening and quickening intelligence; to see apathy, dullness, and stupidity replaced by intelligent alertness and activity; to note the bright eye and quickening movements; to see the natural interest in everything that surrounds the child, which evidenced an awakening mind, but even this quickened mentality is not the only result, for the child has learned something in deportment—to lift his hat to a lady; to smile back "thank you" for a service rendered; to eat and drink decently at the table; to appreciate the beauty of a view, wild flowers, the lure of the woods and majesty of the rolling sea; to recognize his Creator in the things of nature. There has been an uplift to the whole moral being, the effect of which I believe will never entirely pass away.

The school was in session from June to September in 1912, and from May to November in 1913. Seventy children were in attendance the first year. In the second year the number had increased to 100, and the board of education voted to establish a second school for 125 children in another part of town.

Open-air schools in connection with preventoria are conducted at the Mountain Sanatorium in Hamilton, Ontario, which is maintained by the Hamilton Health Association, and accommodates 20 children; at the preventorium of the Imperial Order of the Daughters of the Empire, in Toronto, with a capacity of 60 children; and at the preventorium of the London Health Association, of Byron, Ontario.

The Royal Edward Institute for the Study, Prevention, and Cure of Tuberculosis, at Montreal, has an open-air school for 35 children, on a second-story porch of the dispensary building. The pupils are all under the supervision of the dispensary at home as well as in school. School is in session the year round, and the curriculum

follows that in use in the Montreal city schools. In the first year of its existence all but 4 of the children successfully passed the city school examinations for their grade. The medical officer reports the following results for the year 1912–13:

Of the 37 cases treated in the open-air school during the year, there are 3 pretubercular, 19 early cases, 11 advanced, and 4 far advanced.

The results may be classified as follows:

(1) Pretubercular patients—These attended only a short time, but were improved in health.

(2) Nineteen early cases—8 have been sent back to other schools as being cured; 5 dropped out before a conclusion had been reached; 6 are at present attending school.

(3) Eleven advanced cases—8 of these have been returned to other schools as cured; 1 case left showing improvement; 1 case left not improved; 2 dropped out; and 4 are at present at school.

(4) Four far-advanced cases—2 of these are still at school; 1 left improved in health; and 1 has since died.

The cases which have been discharged as cured and sent back to the other schools show no active disease whatever in the lungs, all signs of the disease having disappeared. The future of these will depend a good deal on their home conditions, but given suitable hygienic surroundings and reasonable attention at home, I feel sure that they will be able to resist any further encroachments of the disease.

The Sick Children's Hospital, at Toronto Island, in 1910 opened the Heather Club Pavilion for tuberculous children, where an open-air school with a capacity of 50 is carried on for six months of the year. In 1913 the National Sanitarium Association opened an excellent hospital and open-air school for 80 tuberculous children at Weston, Ontario.

With so favorable a start and with the public interest constantly stimulated by the public-health association and the anti-tuberculosis leagues, open-air school work in Canada bids fair to establish itself as an integral feature of the public-school system of the Dominion.

AUSTRALIA.

The climate of Australia is particularly favorable for open-air work. The supervisors of grammar school work throughout the various districts of Australia report that the custom of taking classes out-of-doors for recitation is increasing, and strongly advocate its extension, particularly in geography and arithmetic classes. School gardening and out-of-door nature study are features of the curriculum in all parts of the island.

Open-air classrooms of the type shown in figure 80 have been erected near Sandringham, Victoria. They accommodate 50 children each and cost about $650. They are built of wood and roofed with iron. Three of the walls are boarded to a height of 3 feet, and above are filled with navy canvas blinds which are adjustable and can be

opened to any height. The fourth side of the building is entirely inclosed. The buildings are constructed on sleeper plates and are thus easily portable.

Many schools have play pavilions of similar construction which are used as open-air recitation rooms in fair weather.

RUSSIA.

Early in 1914 a letter was received from Moscow, Russia, stating that it was the plan to reorganize the Prince Peter Georgievitch

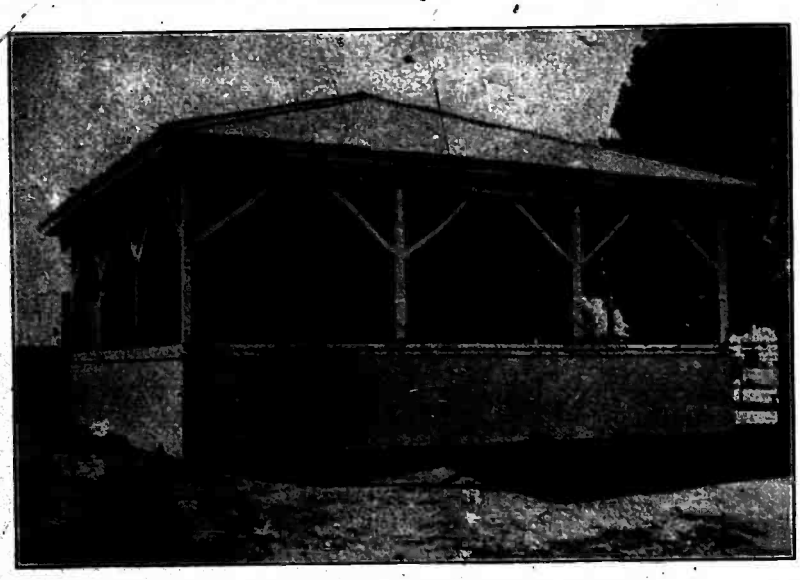


FIG. 80.—Open-air pavilion at Sandringham, Australia.

Oldenbourgsky Elementary School into a forest school, and asking for information on methods of management and programs of work. It has been impossible to secure any further information about the progress of the school.

MISCELLANEOUS.

Requests for information on open-air school work have come from Japan, China, India, and South America, but no definite undertakings have been reported.

Chapter X.

THE OPEN-AIR SCHOOL MOVEMENT IN THE UNITED STATES.

When the news of the Charlottenburg school reached the cities of America, it found many people thoroughly alive to the fact that every community has its share of physically backward, anemic, and tuberculous children, and that something should be done for them.

New emphasis on the problem of the debilitated child has resulted from every new movement in the social service field in the last quarter of a century. One of the distinguishing features of this period has been its emphasis on human values and the constructive agencies which have been set to work to improve conditions.

In aiding needy families, social workers have helped to secure hospital, medical, and other service for physically subnormal children. Visiting nurses have given them physical care and endeavored to adjust the home to their needs. Truant and probation officers have found such children a difficult part of their problem and have tried to keep them in school or to befriend them in trouble and get them out of court.

The social settlement has become an important factor, and its workers have taken such children into their clubs and classes and endeavored to supplement their fragmentary education. Country outings and the Boy Scout movement took such children for vacations in order to give them fresh air and to improve their physical tone. Vocational guidance workers have undertaken to find them jobs and to make them secure in industrial pursuits. Social workers have found, too, that this type of child is father to the man without a job—who requires charitable assistance, almshouse care, hospital and sanitarium treatment, or possibly a correctional institution.

Experiences gained in these and other fields had crystallized public opinion and created a sentiment that at once recognized the open-air school as a resource that was needed to help solve the problem of the debilitated child. Two lines of work deserve a special mention in this connection, for, more than any other influence, they created a background for the open-air school movement—health inspection in public schools and the antituberculosis crusade.

Health inspection.—This work began in a systematic way in the city of Boston in 1894.[1] Its original purpose was to control the spread of contagious diseases. It had been observed that compulsory school attendance often meant compulsory contagion, for outbreaks of such diseases were of frequent occurrence on the opening of school each autumn. In an effort to control this problem the city was divided into 50 districts, and a medical inspector chosen for each. The physician's duty was to detect and eliminate from the schools those who were suffering from communicable disease. This experiment proved so successful that it was copied by other cities. It was soon discovered, however, that mere elimination of contagious disease was only one phase of a very large problem. The child who called attention to himself by such communicable disease was often found to be suffering from other defects which needed attention. Defective vision and hearing, inability to see the blackboard or hear the teacher's voice, nose and throat difficulties, and many other ailments were found by these medical inspectors, and many of the children were suffering to such an extent that their educational progress was seriously handicapped.

In this way health inspection, now almost universal in the larger cities, came into existence as an educational measure. Everywhere this work detected large numbers of children who needed attention which the schools as ordinarily conducted were not prepared to give. The retarded and badly classified child as a problem in school management and efficiency was discovered. It was found also that children of this type are among those who early fall out of school to become applicants for blind-alley jobs and to swell the ranks of those who make unsuccessful efforts at filling their places in society.

The summaries of health-inspection work in the public schools have called attention of the public to the problem of the physical welfare of the whole school population as no other movement has ever done.

Antituberculosis crusade.—Perhaps the influence that has most pointedly challenged attention to the needs of school children has been the antituberculosis crusade. Tuberculosis has for years been recognized as one of the most prominent causes of poverty. Consumption has appeared on death lists since the time of Hippocrates. Social workers in numerous agencies have been called upon to aid in the fight against this disease. Tuberculosis was regarded as hereditary, and the attitude toward it was one of helplessness and resignation until, in 1882, Dr. Robert Koch isolated the tubercle

[1] Elmira, N. Y., had a school medical inspector as early as 1872. See annual report of the board of education, 1912–13, p. 12.

bacillus and proved that the disease is contracted only by taking the tuberculosis germs into the body. Then in 1885 Dr. Edward L. Trudeau established his cottage sanitarium in the Adirondack Mountains and by the application of therapeutic measures demonstrated that sufferers from incipient tuberculosis can be restored to their families and friends, to earning capacity and usefulness.

These inspiring and revolutionary facts laid a new obligation upon society. The antituberculosis crusade was one of the results. A rapidly increasing number of societies—National, State, and municipal—undertook to convey this news to the world through a campaign of education. These societies have carried on one of the most

FIG. 81.—The first open-air school in the United States, Providence, R. I.

definite and effective crusades that has ever been waged against any disease. It has had two objects in view: First, to acquaint the people with the new facts and to preach the gospel of fresh air, sunshine, rest, nourishing food, and wholesome living; and second, to establish sanitaria, hospitals, and other relieving agencies, for there was not alone the problem of prevention, but also that of caring for those who were already victims to this disease.

One of the most important agencies in this field is the tuberculosis clinic. This feature of the work places at the disposal of people, especially in the congested districts, a station properly equipped and manned with efficient doctors and nurses. To these stations anyone

who suspects he has tuberculosis may come for examination and treatment. It early became the practice in these rapidly multiplying clinics to examine all the children in homes where some adults were afflicted with tuberculosis. The result has been that more than 30 per cent of all the children from such families examined in these clinics show signs of infection. While tuberculosis is no respecter of persons or economic conditions, it is nevertheless most prevalent in crowded districts and homes of the poor. The income is reduced because the breadwinner is stricken and the family is obliged to live in cramped quarters, not infrequently in two or three rooms. Under these conditions it is almost inevitable that infection should spread to

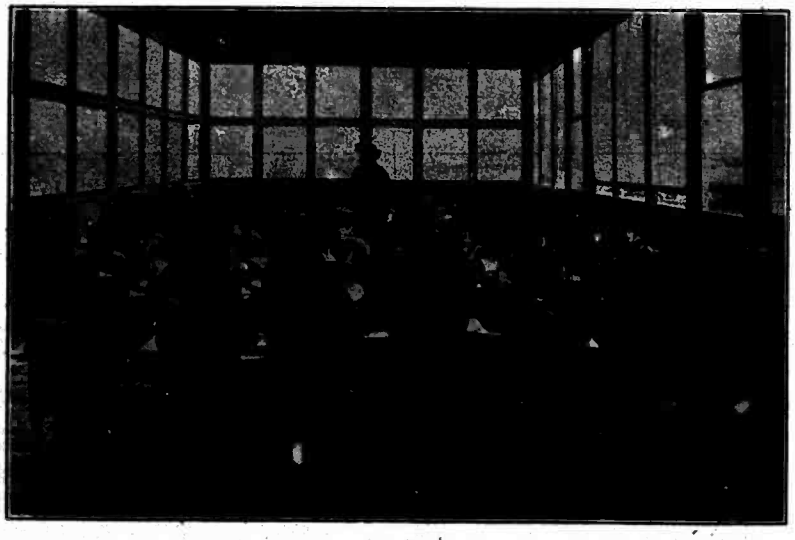


FIG. 82.—An open-air school room in Allentown, Pa., which is used for both recitation and rest. The cots are folded and stacked in the rear of the room. For the rest period the chairs are moved forward, the cots then occupying the main floor space.

the children, especially when their resistance is weakened through improper nourishment and care. While the doctrine of hereditary consumption has been exploded, improper housing, overcrowding, and low wages make the spread of the disease almost as inevitable as if it were hereditary.

When it became known that tuberculosis is a community-born disease, that it is fed to the children in their food, taken into their bodies from contact with the clothing of a sick patient, or from sputum carelessly scattered, a new obligation was laid upon these workers, and they became aggressive in their efforts to create institutions and agencies for the proper treatment and care of children from homes where the disease prevailed.

No definite census has ever been made of the number of children needing treatment in open-air schools. There have, however, been many local studies and estimates, and these place the number of children needing such care at from 2 to 10 per cent of the total school population. The following estimates are taken from studies made in many different places.

The Municipal Tuberculosis Sanitarium of Chicago, which conducts 10 clinics scattered over the city, has on its books a list of 3,000 children who are tuberculous. The commissioner of health of the city of Chicago in 1914 instructed the health inspection staff of the Chicago schools, consisting of 100 physicians, to make a study of the children in need of open-air school treatment in their respective districts, and to report to him at the end of the school year. This inspection, which was casual, but which was nevertheless a conscientious effort on the part of the doctors to discover the children, resulted in a list of 5,248, or approximately 2 per cent of the total school population.

According to Dr. Leonard P. Ayres,[1] for the year 1909–10 in the city of Boston the candidates for open-air schools were selected by room teachers and nurses and submitted to the medical inspectors for final decision. There were then approximately 90,000 children in the Boston schools. The children selected by the teachers were reexamined by the school physicians, and 4,489 children, or almost 5 per cent of the entire membership, were found to need such care. Dr. Ayres also quotes from figures in Atlanta, Ga., where health inspection showed that children suffering from malnutrition, anemia, and cardiac diseases were 5.18 per cent of the total number. From St. Paul in 1909, 2.7 per cent were suffering from cardiac disease and tuberculosis. At Appleton, Wis., 3 per cent were suffering from malnutrition.

Dr. Ayres also quotes Dr. Henry R. Hopkins, of Buffalo, chairman of the committee on open-air schools of that city, who said in 1910 that about 7 per cent of the children in the city needed the same sort of treatment.

F. L. Hoffman estimates that 12,000 children of school age die annually from tuberculosis in the United States.

Sidney and Beatrice Webb, in their book on Prevention of Destitution (Chap. IV, p. 66), have the following to say about medical inspection in England:

> When we get the child to school, knowledge of its condition becomes forced upon the community. The first results of systematic medical inspection are bringing home to our minds what every teacher knows, namely, that a large proportion of the children are not in a fit state to have the public money spent on teaching them, because they are suffering to such an extent from neglect as

[1] Open-Air Schools.

to be unable to obtain full advantage of the instruction. What emerges from the cautious summaries of the chief medical officer of the Board of Education for England and Wales (Scotland and Ireland being at least as bad) is that out of all the 6,000,000 children in the elementary schools about 10 per cent suffer from serious defects in vision, from 3 to 5 per cent suffer from defective hearing, 1 to 3 per cent from suppurating ears, 8 per cent from adenoids or enlarged tonsils of sufficient degree to obstruct the nose or throat and to require surgical treatment, 20 to 40 per cent suffer from extensive and injurious decay of the teeth, 40 per cent have unclean heads, about 1 per cent suffer from ringworm, 1 per cent are affected with tuberculosis of readily recognizable form, and one-half to 2 per cent are afflicted with heart disease.

FIG. 83.—Anemic girl.

If one takes the lowest estimate, 2 per cent, as the number of children in the total population whose physical condition is such that it interferes with the school work, it would mean 400,000 such children in the United States; if 10 per cent is correct, it would mean 2,000,000.

The original purpose of the open-air school was to secure outdoor life for the delicate child. Then came the plan of providing a shelter against inclement weather, to extend the period beyond the sum-

mer months. Later came the idea of bringing the "outdoor" into the school by throwing the windows open wide. The open-air school aims to so conduct the school life of the physically subnormal child that it will tend to restore him to normal physical and mental vigor.

Class of children generally admitted.—On account of the large number of physically debilitated children in the public schools the open-air school, especially in the United States, has endeavored to care, first, for the children who are anemic, undernourished, or whose general appearance indicates lack of resistance to disease; children

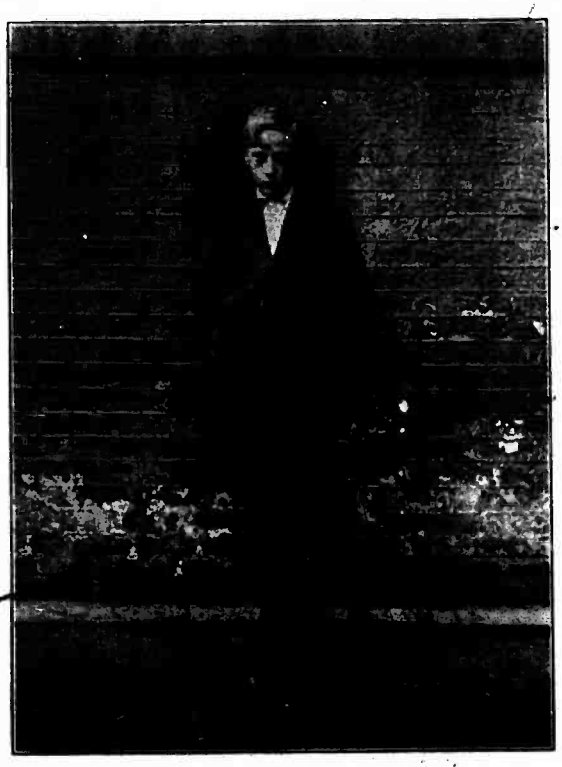


FIG. 84.—Anemic boy.

exposed to tuberculous infection by members of their own homes and who themselves show signs of infection by reaction to the tuberculin test, by elevation of temperature, by enlarged glands, and other similar signs.

Class of children generally excluded.—Those suffering from any communicable disease, and with severe diseases requiring absolute rest or hospital treatment; the mentally defective; children with open tuberculosis, i. e., forms of tuberculosis in which the tubercle bacilli are given off in the bodily excretions; children suffering from

tuberculosis of the bones, joints, and glands, which can not be protected by proper dressings, are usually excluded.

Characteristics of the open-air school.—Children should be admitted to the open-air school or open-window room on the basis of a thorough physical examination. Moreover, the period in the school should be covered by a medical and nursing service which undertakes to correct physical defects and handicaps and to adjust the work of the school to individual capacities and needs. Efforts should be made to secure the most advantageous cooperation of the home with the school work.

A smaller number of pupils to each teacher.—The open-air school aims to give a small number of children to each teacher—from 20 to 30 has been agreed upon as the proper size of class. This enables the teacher to understand her children better and to deal with them more nearly as their needs require.

Fresh air and sunshine.—The open-air school gives the child the physical advantage and mental stimulus afforded by an adequate amount of fresh air and sunshine. The school is characterized by a greater freedom of movement and a more elastic program than is usual in the schoolroom.

Food.—The anemic and undernourished condition of physically subnormal children is largely due to insufficient or improper food. The open-air school undertakes to supply this lack by furnishing food in sufficient quantity and variety and wholesomely cooked. A well-ordered meal is in itself a spiritualizing and refining influence as well as a body builder. No other hour of the school day has greater possibilities for the wise teacher than the one which concerns itself with the preparation and serving of food and the breaking of bread.

Rest.—Many of the children are suffering from conditions which call for an unusual amount of rest. Most children get too little sleep, and the irregular hours and lack of adequate sleep among tenement-house children are well known. Open-air schools generally have adopted the plan of giving all the children a period of an hour or more rest each day. In special cases the rest period extends to a day or more, until temperature subsides and physical condition improves. This can be done at school. It is often impossible at home.

Curricula.—The work in the open-air schools is generally characterized by greater freedom and elasticity. It should be more along motor and sensory lines—manual training, gardening, handwork of different kinds. The more intimate relationship of the teacher makes it possible to apply stimuli in more original and less technical ways than she is able to do in regular indoor school work.

Personal hygiene.—Personal hygiene is emphasized, dental needs are cared for, while frequently decayed teeth and diseased mouths are corrected. Bathing, regular habits of cleanliness, regularity of meals, the acquiring of a taste for proper kinds of food, and right habits of eating are taught. The aim of the school is "to weave together these different features in a process of education and hygienic living."

The open-air school came into existence to meet the needs of this army of distressed children.

It is significant that nearly all the civilized countries came upon the problem in very much the same way, and almost simultaneously

FIG. 85.—The health that comes from the out-of-doors.

reached similar conclusions as to the necessity of action. The results obtained in the open-air schools have been such that the movement has had a rapid development in the United States. The original school was established in Providence, R. I., in 1908. By the end of that year there were 3 such schools; in 1909 there were 7; in 1910, 15. So far the number of schools has doubled each year until now there are more than 1,000 open-air classes in 168 cities of 32 different States. The presence of an open-air school in a community is always a stimulating influence for better general health. Directly or indirectly it helps to move the public to action, looking to better ventilation, not

only in the schoolrooms generally, but in homes and public places as well. It is an object lesson of strong educational value.

Nobody has ever questioned the adequacy of the total supply of fresh air. The open-air school stimulates the community to see that each one gets his share. There is fresh air outside every building, and the efficiency of every schoolroom in the land can be increased by the periodic opening of windows and letting some of it in. The friends of the open-air school movement believe that in time the community will be satisfied with nothing short of right conditions of ventilation and hygiene for the whole 20,000,000 school children in the United States.

These pupils spend 100,000,000 hours each school day in schoolrooms. This means 11,415 years each school day, or 2,283,000 years

FIG. 86.—An open-window room.

in the 200-day school year. One of the greatest possibilities for loss of time and efficiency is in the listlessness, inattention, and the half-asphyxiation of school children, due to overheat and bad air in the schoolrooms.

The vitality of this movement is illustrated by the permanent buildings which are being constructed for open-air school purposes and by the attention which is being paid to health considerations on the part of school authorities. Still more significant is the fact that programs covering the whole field of physical welfare of school children are in process of evolution in different cities.

In Boston the school committee is committed to the following policy:

1. The extension of open-air schools until every child needing such treatment is provided for.
2. A maximum temperature of 66° F. for all classrooms.
3. Windows open on one side of each closed room at all times.
4. Periodic flushing of each classroom with fresh air.
5. Physical instructors in high schools relieved of duties one day each week to inspect and report heating and ventilating conditions in elementary schools.

FIG. 87.—Rest period, Elizabeth McCormick Open-air School No. 2.

6. The use of parks for open-air classes. The park board and recreation commission have given the school committee permission to use buildings and parks suitable for open-air classes.

Cleveland, New York City, Pittsburgh, Providence, and many other cities are developing similar programs. In California whole cities are reconstructing their school buildings on the open-air principle. The movement is thoroughly under way. Its goal is not only to see that each physically debilitated and backward child is cared for, but also that all the children of all the schools are given their full fresh-air and hygienic rights.

Chapter XI.

PREVENTORIA, SANITARIA, HOSPITAL, AND VACATION OPEN-AIR SCHOOLS.

The key to the solution of the tuberculosis problem is "safety first" for the children in the homes of consumptives.

The danger from tuberculosis is, and always has been, particularly great in the homes of the poor, especially in families living in two and three room tenement homes, with poor ventilation and lack of sufficient sunshine. A number of different agencies and institutions have been created to protect the children from the ever-present menace of such homes.

Germany established "recovery places in the woods." In France one of the most effective methods is that of placing children from tuberculous families in carefully selected country homes. They are kept in such places for a period of years or until their health is established. In the United States, and in many other countries as well, day camps, preventoria, sanitaria, and hospital schools have been called into service.

It is this class of agencies and their relation to the open-air school that will be discussed in this chapter.

PREVENTORIA.

A preventorium is an institution established for the purpose of taking children who are under grade physically, and who come from homes where there is tuberculosis, and caring for them in such a way as to prevent them from falling victims to this disease. At the present time there are at least four preventoria of this sort in the United States: The Farmingdale Preventorium, in New Jersey; Ridge Farm, Deerfield, Ill.; the Lakeside Preventorium, near Hoxie, R. I.; and the Buckeye Road Fresh-Air Camp, near Cleveland, Ohio.

The first institution for the effective rescue of anemic, undernourished children in the families of the tuberculous poor was built in 1909 at Farmingdale, N. J., by the New York Association of Tuberculosis Dispensaries. Dr. Herman Biggs, then commissioner of health in New York City, estimated that there were 40,000 chil-

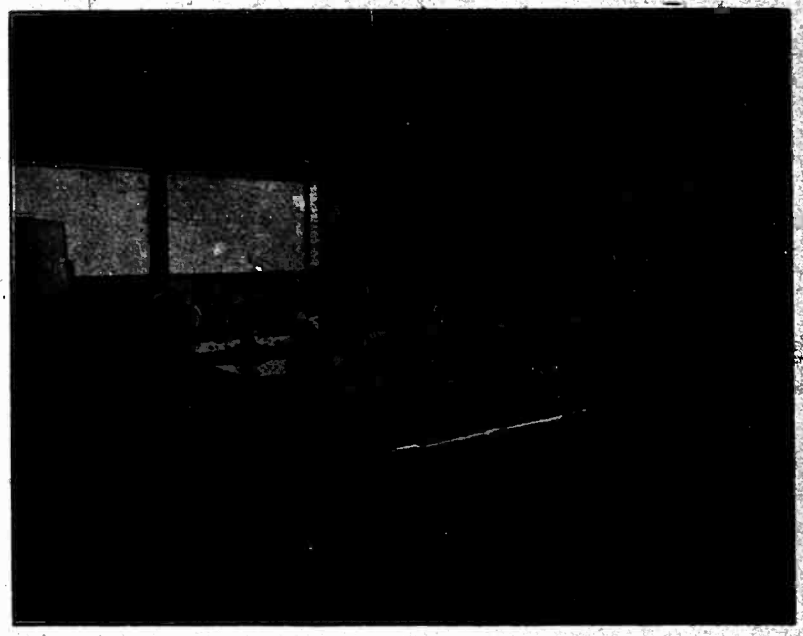


FIG. 88.—Interior tuberculosis preventorium at Farmingdale, N. J.

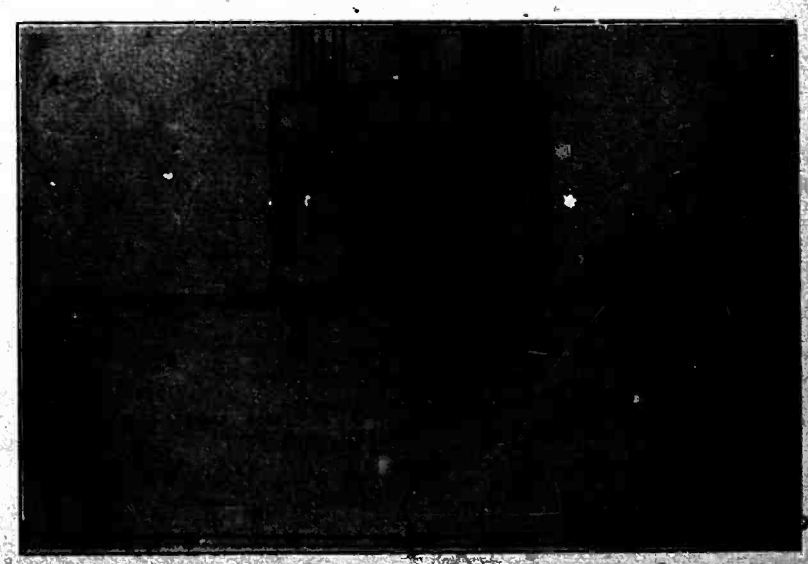


FIG. 89.—Plan of the tuberculosis preventorium for children at Farmingdale, N. J.

dren exposed to tuberculosis in poor homes in New York City alone. The tuberculosis dispensaries scattered over the city were in touch with thousands of consumptive patients. The majority of them were the fathers and mothers or older brothers and sisters of younger children who were in constant peril from infection in the two, three, and four-room tenement homes of the tuberculous poor.

The doctors and nurses found it impossible to safeguard these children by anything they could do in and for the homes. There was urgent need of some near-by institution where they could be sent that they might be entirely removed from the danger of infec-

FIG. 90.—Herman Kiefer Sanitarium Open-air School, Detroit, Mich.

tion and that their resistance might be built up. There was then no such place.

The summer-outing resources of relief societies and settlements were unable to meet the needs of tuberculous children, and, besides, their work was confined to two or three summer months and their children were sent usually for a stay of only one or two weeks.

Accordingly the Association of Tuberculosis Dispensaries purchased a tract of 170 acres of land in the sandy pine belt of Farmingdale, N. J., easily accessible to New York City, and on it built a sanitarium school. The plant consists of a reception pavilion, where all the children are quarantined for three weeks following admission,

a small infirmary, a school for boys, another for girls, and a large administration building, which includes a dining room accommodating 150 children.

The children are selected by the physicians of the Association of Tuberculosis Clinics and are taken from families in which there are patients under their care. The children are those whose physical condition makes them particularly susceptible to infection. The sanitarium school receives these children for a continuous period of night-and-day care. The average length of stay is about three

FIG. 91.—View from the veranda, Sea Breeze Hospital for Surgical Tuberculosis, Coney Island, N. Y.

months, and as the capacity of the institution is 150, about 600 children are dealt with in the course of the year.

The preventorium is partly supported by voluntary contributions and partly by a per capita allowance from the city. Thus far the cost, including all expenses, has been less than $1 per day for each child.

The observance of a simple, wholesome mode of life, which includes fresh air, sunshine, food, sleep, play, exercise, cleanliness, regularity, and a spirit of comradeship between teachers, nurses, attendants, and the children, is mainly relied upon for results.

The average gain in weight for the usual three months' period is 7 pounds. There are occasional records, covering a longer period, running as high as 25 pounds. The bearing, mentality, vigor, and spirit of the children—though there is no such definite instrument

comparable to weighing scales to provide a tangible measure for mental life—show every evidence of equal improvement. The examining physician says that it is almost impossible to recognize the children on discharge, so great has been the change in their appearance.

In such an institution as Farmingdale, where health is avowedly the first consideration, school life might be expected to take second place. On the contrary, it is so well provided for that the children lose nothing from their grade standing by their stay at the sanitarium. Three licensed teachers are provided by the New York Board of Education, and in a two-hour school period a day for five days a week they have found it possible to keep the pupils up to their pre-

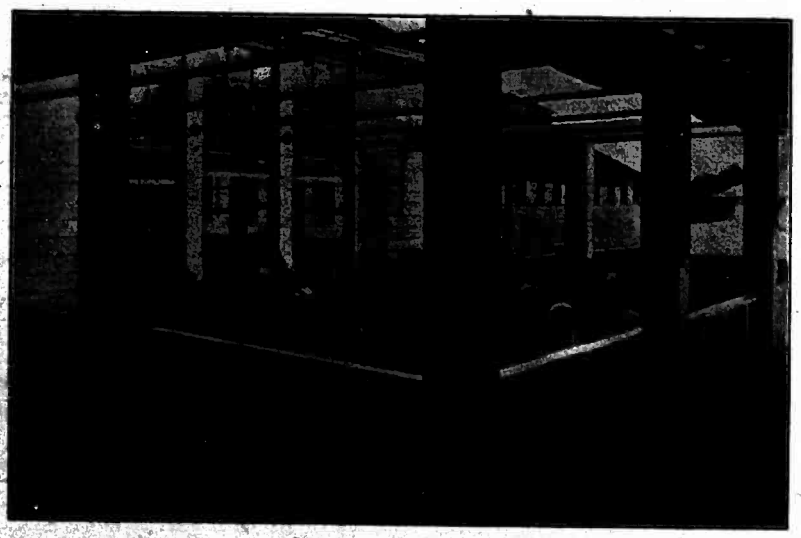


FIG. 92.—Massachusetts Hospital School, Canton, Mass.

vious school grade. Indeed, many children could advance a class during their stay at the sanitarium were it thought wise to increase the length of school hours. This is true in spite of the fact that the children received are, on the average, one grade in scholarship below the normal standing for their age, and many of them are even more retarded.

In addition to the regular school work, which corresponds to that of the grades in New York City schools, the girls are taught to sew, the boys to do gardening, and all the older children are assigned small household tasks in the sleeping shacks or in the dining room. They have free range over the broad acres of pine land and get a first-hand acquaintance with the fields and with the woods.

In the summer of 1914 a group of philanthropic women opened a small preventorium at Ridge Farm, near Lake Forest, Ill. In its construction and management they followed the Farmingdale experiment, and it is the plan eventually to introduce the work of the regular open-air schools as well.

FIG. 93.—Exterior, East River Homes. Half of the building to the right of the picture is leased by the New York Association for Improving the Condition of the Poor, and occupied by families where tuberculosis is one cause of dependency. Note open windows and beds on balconies.

A small institution of the same general nature was conducted near Hoxsie, R. I., by the Anti-Tuberculosis Association of Providence during the summer of 1913–14. A preventorium for tuberculous children has been maintained, but no school work is undertaken. The purpose here is chiefly to build up the resistance of specially needy children.

SANITARIA.

A sanitarium is an establishment where convalescents, or persons suffering from disease, may be received for medical treatment, rest cure, and the like; in recent usage the term is particularly applied to places where patients suffering from tuberculosis may undergo open-air treatment. A sanitarium school receives children in the early stages of tuberculosis, either of a surgical or pulmonary nature. These are definitely sick children, and, though they follow much the same daily program as in a preventorium, they are not allowed so much exercise and their hours of school are shortened. Many sanitaria, however, are doing what is really preventorium work.

Sanitarium open-air schools in England.—The sanitarium schools for children in England have already been described.[1]

Dr. Esther Carling, medical superintendent of the Kingwood and Maitland Sanitarium at Peppard Common, Oxon, England, makes

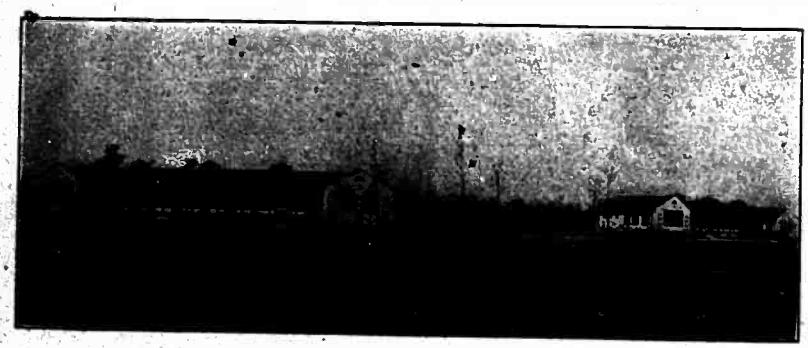


FIG. 94.—Children's cottage at Chicago Municipal Tuberculosis Sanitarium. Provides for 25 children. The school room is at the right end of the building.

the following suggestions on general arrangements for sanitarium schools:

First, it is well to provide for all classes of tuberculosis at the sanitarium, taking care that separate blocks be provided for the surgical cases and that the incipient and advanced cases of pulmonary tuberculosis be separated. This will mean separate wings or blocks for the following groups: (*a*) Little children; (*b*) sick children; (*c*) larger boys; (*d*) larger girls; (*e*) isolation or observation cases; (*f*) surgical cases, if included.

Second, a separate room must be provided for the schoolroom, if possible, preferably adjoining an open-sided central hall, which should be empty of all furniture save a piano and some simple apparatus for remedial exercises. This hall can be used for assemblies and for drill and play in wet weather. All "sitting-still" lessons can thus be followed by a march around the hall or a few minutes' drill and remedial exercises.

Third, the provision of simple apparatus for Swedish remedial exercises is essential for a sanitarium school. Many of the children are underdeveloped

[1] See p. 189.

and others have the beginnings of malformations, which careful remedial exercises may completely correct.

Fourth, a dental room or a surgery in which dentistry can be comfortably and effectively carried on is also essential. Any treatment of tuberculosis in children that does not make provision for dental care is faulty. It often happens that it is hard to get to a good dentist from a country sanitarium.

Fifth, there is less objection to a big ward for children than for adults, provided that about one-half of the children in each section are accommodated in small rooms of one, two, or three beds. This may be desirable for the sake of discipline or on account of noisy sleep or coughing; and small rooms also allow

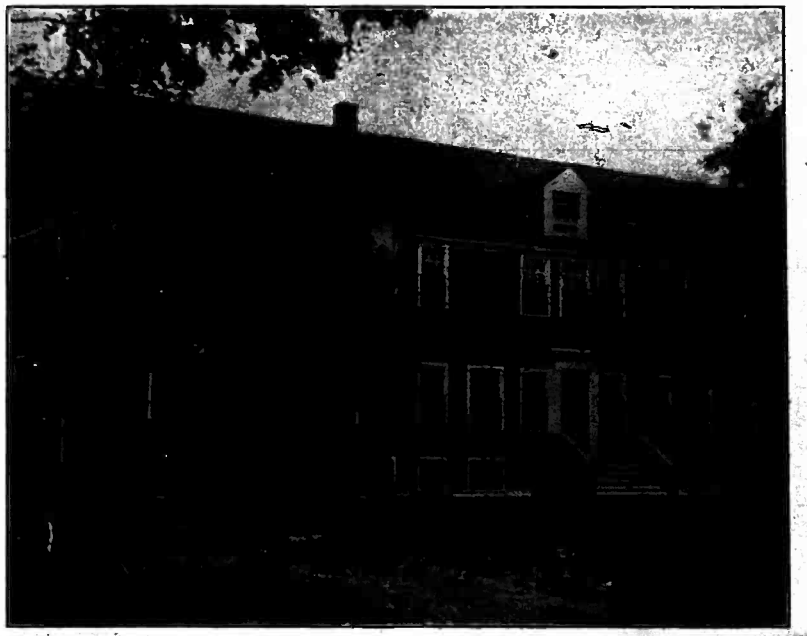


FIG. 95.—Ridge Farm Preventorium, Deerfield, Ill.

a certain amount of adjustment of the sexes, if there happen to be, for instance, more boys than girls in the institution.

Sixth, room should be left for children's gardens, and these will be better worked if each plat has a path around it and if a stand-pipe for water is available nearby.

Seventh, while the number of children that are to be provided for must vary with the needs of the locality, the essential thing is that the sanitarium school should be so arranged that every individual child should be known fully and personally to the responsible officers. A minimum of 60 and a maximum of 100 children is the best number to provide for.[1]

New York Municipal Sanitarium Open-Air School.—Reports have been received from 25 sanitarium and hospital schools in the United

[1] Carling, Dr. Esther. "Construction and Management of a Sanitarium School for Children." *In* Yearbook of Open-Air Schools and Children's Sanitaria. Edited by T. N. Kelynack, M. D. Pp. 18–24.

States. One of the largest of these schools is that connected with the New York City Municipal Sanitarium, located at Otisville, N. Y. In 1913, at the request of Dr. Lederle, health commissioner of the city of New York, and upon the recommendation of the board of superintendents, the Board of Education of New York authorized the organization of classes at the Municipal Sanitarium for the benefit of children of school age who came under the care of the above-named institution.

These classes were made an annex to Public School No. 14, Manhattan, and began work on November 3, 1913. For two years previous the sanitarium authorities had been attempting to conduct classes for the children who were patients at the institution, but they had been dissatisfied with the kind of work which was accomplished, and felt that it would be decidedly more advantageous to have the work done under the supervision of the educational authorities of the city.

The aim of the school work is to enable these children who are forced by ill health to leave the city temporarily to resume their school work without loss of time or standing upon their return to the city. The curriculum, therefore, is similar to that in use in the city schools, but modified, wherever possible, to meet the special needs of the individual child. Upon discharge from the institution each child receives a transfer card which entitles him or her to admission to any public school in the city in which there is a grade corresponding to the one indicated on the card.

In 1914 there were 92 boys and girls, ranging between the ages of 5 and 15 in the Otisville Sanitarium School. Two school sessions are held daily, from 9.30 to 11.30 in the morning and from 2 to 4 in the afternoon.

Other cities.—Louisville, Ky., Detroit and Grand Rapids, Mich., Boston, Mass., and Cincinnati, Ohio, have also successful open-air schools for tuberculous children in municipal sanitaria. Chicago has provided for 250 children in the beautiful cottages of the municipal sanitarium opened in 1915.

Open-air schools at State sanitaria.—The policy of State sanitaria with regard to open-air schools is in process of development. The experience of Massachusetts in this regard is therefore significant. Previous to 1910 Massachusetts had no sanatarium provision for tuberculous children under 14 years of age. In that year sanitaria were opened at North Reading, Lakeville, and Reading, and a few applications were made at each place for the admission of young children having pulmonary tuberculosis. They were admitted and cared for, but it was considered undesirable to have them in close association with the adult patients and it was found much easier to

care for several children together than for one or two. They were more contented when together, kept by themselves more, and they

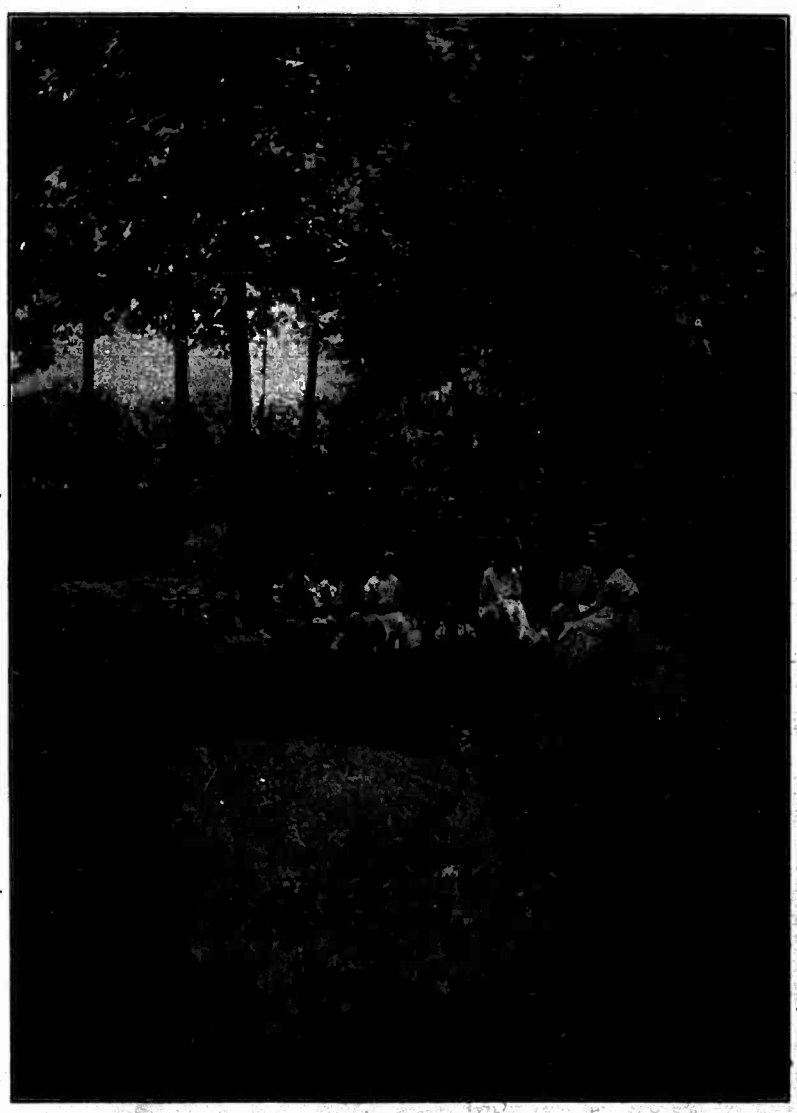


FIG. 90.—Harlowarden Preventorium, maintained by the United Charities of Chicago, near Joliet, Ill.

annoyed the other patients far less. It was therefore decided to send all the children to one of the sanitaria and make more adequate provision there for their care.

Westfield was chosen, and under the superintendency of Dr. Henry D. Chadwick, the school has rapidly increased in numbers and efficiency. In May, 1914, Dr. Chadwick wrote:

> We have about 125 children at the present time, all being sent to the sanitarium because of pulmonary tuberculosis. The school work is secondary to the sanitarium treatment. The pupils have fewer rises of temperature, and gain weight more steadily during the period when school is in session than during vacations. Each child attends but one session of two and one-half hours daily. The school is graded according to public-school standards.
>
> The four higher grades attend the morning session, and the first four grades the afternoon session. In addition to this a few children are continuing some of their high-school studies.
>
> Because they live in the open air so much and have widely opened windows in the schoolroom, they are always eager and alert and can accomplish in one session the average day's work done in the public school.
>
> Many of the children are backward in their studies because illness has prevented regular attendance at school before coming here.
>
> After a thorough review of their previous school work they are not only ready to go on easily with their proper grade, but in many instances have been able to go into an advanced class.

Iowa, Maryland, Missouri, New Jersey, New York, and Wisconsin are among the States which conduct open-air schools at State sanitaria for tuberculosis.

HOSPITAL OPEN-AIR SCHOOLS.

A hospital is an institution in which medical treatment is given to the sick and injured. A hospital open-air school is planned for those children who are bed cases or who require individual nursing care. Most cases of surgical tuberculosis are cared for in hospitals.

The earliest and possibly the best illustration of such a school in this country is to be found in the Sea Breeze Hospital for the treatment of surgical tuberculosis, maintained at Coney Island by the New York Association for Improving the Condition of the Poor.

The hospital was founded in 1904 "to demonstrate for American hospitals, and more especially for American city and State hospitals, the healing power of outdoor treatment in the salt air for nonpulmonary forms of tuberculosis in children." Such methods had long been familiar to European physicians. As far back as 1791 England had built the first permanent seaside hospital at Margate. Italy, France, Belgium, Holland, Germany, Austria, Denmark, Norway, Sweden, Russia, Portugal, and Spain have all made similar provision for their tuberculous children.

The hospital was planned to be in operation during the summer months only, but even in that short period of time its success was so marked that it was decided to continue the treatment through the winter. The New York City Board of Education assigned a teacher,

and an ungraded school was conducted for the children, at first mainly as a therapeutic measure.

A small frame schoolhouse was built and equipped with specially designed desks and chairs which could be adapted to the comfort of the deformed and crippled pupils, most of whom were in casts or on crutches. Blackboards and school equipment were provided by the board of education. No heat is furnished to the schoolroom, but the children are so accustomed to sleeping and living out-of-doors at the hospital that they seldom mind the winter winds. A room has now been fitted up in the hospital building for the kindergartners.

It is hard to raise flowers and vegetables on the sandy soil by the schoolhouse, but perseverance works wonders, and the tiny plat where blossoms do persist is one of the chief joys of the children. Manual work and gardening occupy a large part of the day. There are frequent recesses, and at intervals during the forenoon the teacher goes to the long verandas where other little patients are strapped on boards or held immovable in casts, and gives them 5 or 10 minute lessons in reading, history, or oral English.

It is surprising how much can be accomplished in so short a time. The patients are mostly young children or those who have never received any schooling at all prior to their admission to the hospital. Some of them have now been carried as high as the fifth or sixth grade, and do very satisfactory work.

The Massachusetts State Hospital School.—The Massachusetts State Hospital School for the care and education of the crippled and deformed children of the Commonwealth, at Canton, has been practically a residential open-air school since its opening on December 1, 1907. The school occupies 65 acres of rolling land on the shore of a beautiful inland lake. It has about 18 acres of woodland. The dormitories are really out-door pavilions, only closed and heated for a short time while the children are rising in the morning or retiring at night. The classrooms and dining rooms are always open to the air.

Three hundred children are cared for, and the percentage of sickness from tonsillitis, croup, catarrhal colds, and other foul-air diseases, usually so high in institutions of this sort, has been negligible, a fact which the superintendent attributes entirely to the open-air conditions.

Most of the pupils are able to attend school on an average of an hour and a half daily. They receive instruction in kindergarten and first-grade work, reading, writing, spelling, arithmetic, geography, history, language, drawing, nature studies, and music, according to their individual requirements, but special emphasis is laid upon the practical work which they are taught to do. The girls, in addition to receiving carefully graded instruction in sewing and cooking, do practically all the housework of the institution. The

boys have been taught to assist with the construction of new buildings, to do most of the farm work, and to assist the engineer in planning the plumbing and lighting of the buildings.

Sloyd work is given on three days of every week with printing and cobbling lessons in connection with it. Among the children trained in industrial work, a number have found steady work outside. One permanently crippled boy, who was instructed in the engine room found a good place as a first-class licensed fireman, with a prospect of advancement.

The study of forestry is also carried on with a view toward fitting the boys for future self-support.

Open-air schools for children with surgical tuberculosis are carried on at the James L. Kernan Hospital and School for Crippled Children at Baltimore, Md., and at the Chicago School for Crippled Children.

Home Hospital, New York City.—On March 18, 1912, the New York Association for Improving the Condition of the Poor inaugurated an important experiment in the combined home and hospital treatment of families in which tuberculosis was one cause of dependency. The association leased 24 apartments in the East River Homes, a model tenement building at Seventy-eighth Street and John Jay Park, New York City. The families who were moved into the apartments had already been receiving aid from the association, and each had one or more tuberculous members.

The association attempted to demonstrate the medical and economic practicability of treating as a unit a family in poverty and afflicted with tuberculosis. The results obtained during the first year were so satisfactory that on November 24, 1913, a second section of 24 apartments was leased, enlarging the hospital to 40 families with 120 patients. An operating room and a dental clinic have been established. Seventy-four families, containing 361 individuals, of whom 226 had tuberculosis, received medical care between March 18, 1912, and January 1, 1914. Thirty-five of the families have at the time of writing left the hospital; 23 of them sufficiently improved to bring about social and economic rehabilitation.

Since the association has realized that the great problem in the fight against tuberculosis is to prevent infection of new victims, the children are receiving the greatest attention. An intensive study of 196 Home Hospital children showed that about one-third of them already had tuberculosis and approximately another third were probably infected. At the Home Hospital the children are practically isolated from the infected adults. The food for the whole family is carefully planned by a trained dietitian, and the children receive extra nourishment twice daily. Two open-air schoolrooms and an

open-air kindergarten room have been constructed on the roof of the tenement building.

Teachers were furnished by the New York City Board of Education. At their admission over 75 per cent of the children were in very bad physical condition, most of them with such pathological symptoms as enlarged tonsils, adenoids, glands, etc. With defects corrected and their life in the open air, they have made remarkable improvement. But most important from the standpoint of economics the Home Hospital has proved that its methods of treating combined poverty and tuberculosis cost less than the plan of caring for the sick in hospitals or sanatoria, plus the relief necessary to maintain the remaining members of the family either in their homes or in institutions.

Preventorium care for children costs about 80 cents per day for each child. Care at such sanitaria as Ray Brook and Otisville costs $1.28 to $1.36 a day. At the Home Hospital the per diem per capita cost of supervision and administration was reduced to 18.8 cents, and the average cost per day per person for all expenses is about 66 cents.

VOCATIONAL TRAINING FOR TUBERCULOUS CHILDREN.

An institution which cares for children handicapped in their efforts at self-support by noticeable deformity or irremediable defects usually makes some effort at teaching trades. Little has as yet been done in this line, however, for the children equally, but less obviously, handicapped by physical weakness and susceptibility to infection.

Dr. Allan Warner, school medical officer at Leicester, England, suggests the establishment of an open-air agricultural college and labor exchange in connection with residential open-air schools. Instruction would include courses in stock raising, chemistry of soils, rotation of crops, tending of orchards, and the like. Forestry, landscape gardening, and dairy farming suggest themselves at once as suitable out-door occupations which offer prospects of a good livelihood.

It may be necessary to face squarely the proposition that certain children will never be able to endure the confinement of office or mercantile employment without constant danger of relapse and to plan their education along other lines than the ordinary academic work of the grades. The best instructions should be secured with a view to placing the whole undertaking on a vocational basis. Such an institution as an open-air agricultural college should within a few years become largely self-supporting by raising fine stock and food products, to say nothing of its social value.

Whether or not training of this kind is immediately available, no child of working age should be permitted to leave a residential open-air school to seek employment without having received definite advice as to suitable occupations for one in his condition. If there is a vocational guidance bureau of any sort in the community, he should be urged to avail himself of its guidance.

All children should be carefully watched during the first years of their working life to guard against the danger of relapse. They should return to the dispensaries of the school for frequent reexaminations until their health gives evidence of ability to withstand the strain of continued work.

English schools have developed what they call "voluntary after-care committees," which keep in touch with such working children, try to secure them suitable employment, see that their home life is kept up to standard, urge them to return for examination, and make a written report to the school yearly or oftener on their condition.

Qualifications of Teacher for Institutional School.—In no other form of open-air school work does more depend upon the personality of the teacher than in the institutional school. The pupils are isolated from normal family life and find themselves in an environment totally different from anything in their previous experience. They are frequently undergoing much physical suffering. Some of them have only unpleasant recollections of school, because of irregular attendance, difficulty in learning, possible ridicule of schoolmates, and physical discomfort. Many of them have never attended school at all. Their first attitude toward things educational is apt to be unfriendly. To win their confidence and awaken their interest requires patience and tact of a high order.

The teacher must, furthermore, hold all her plans of work subject to change at physician's orders; she must learn to expect frequent shifts in membership and adjust herself cheerfully to unexpected emergencies; above all she must have a wholesome sense of humor, abounding physical health, and an optimism that refuses to be shaken. Her training should be adequate along academic lines and should include speical preparation in manual work, hygiene, and nature study.

If possible, the teacher should live at the institution. She will have a clearer understanding of the real condition of her charges if she mingles with them out of school hours, and there will be more unity of action with nurses and physicians.

Essentials for the Hospital or Sanitarium School.—Wherever the work of the hospital sanitarium school has been successfully carried out in this country or abroad, certain facts have characterized the management.

1. There has always been a sufficient number of children to justify the employment of a teacher at a stated salary for specified hours of work.

2. The teacher has held a certificate from the local or State board of examiners and has worked under some kind of supervision by a higher educational authority.

3. In most cases it has been considered highly desirable, if not essential, that the teacher be able to give instruction in elementary manual training, and that she be capable of leading in nature study.

4. Since all ages and grades are apt to be represented at the sanitarium school, the teacher has been expected to qualify to instruct any grade between the kindergarten and the high school.

5. Some school equipment has been provided—in most cases desks or chairs, blackboards, books, etc.

6. There has been some fixed place for hearing the recitations, removed from disturbance by other patients. Various types of open-air structures, built or remodeled for this purpose, are illustrated in this chapter.

7. An attempt has been made to work out a curriculum which approximates that of the local school systems represented by the patients.

VACATION SCHOOLS.

The vacation period has for many years been a problem of peculiar interest, especially to social workers and to teachers. It has increased in importance with the development of industrial centers and the gathering of people into large cities. The "street and alley time" of boys and girls becomes increasingly important on the physical and moral side, as well as on the intellectual. With the end of the school year school buildings and grounds have closed and the children have been turned loose to the uncertain vicissitudes of the streets. Especial attention has been called to this problem through the rapidly multiplying juvenile courts, whose records show increased activity in the months when school is closed.

Among the most effective agencies that have been developed to help meet this need are the vacation schools and country outing work. The education committee of the London County Council in 1912 made a report on vacation schools and organized play. The report states:

> The first vacation experiment appears to have been made in Switzerland in 1878 by a clergyman named Bion, who took a number of children to the Appenzeller Highlands during the holidays. In 1883 this experiment was followed by the organization of health-vacation colonies at Amsterdam. In 1888 the first summer colony for primary school children in Russia was founded by Miss Orloff. The enterprise rapidly developed under the auspices of the Muscovite society. The type of colony was modeled on one of those of the

Swiss, and with the introduction in 1890 by the Moscow Educational Council of medical control in the ordinary day schools, the school doctors were asked to advise and assist in the scheme. * * * During the 28 years that the Muscovite association has been in existence 572 colonies have been founded, and 11,861 children have been sent to them, all of whom have gained in physical, mental, and moral well-being. It is estimated that 44 per cent of the children sent each year have never been out of Moscow before.

In 1896 the vacation-school movement began in Chicago, Ill., and Cambridge, Mass., and in 1898 in New York. The first vacation-school experiment in England was made in the summer of 1902. Through the energy and enterprise of Mrs. Humphrey Ward a vacation school was established at Passmore Edwards Settlement.

FIG. 97.—Country outings for city school children.

In June, 1905, the education committee decided that the practice of affording facilities for the establishment of vacation schools should be continued and that the education committee should submit proposals showing in detail the facilities it desired the council should afford for the establishment of not more than 12 such schools.

The vacation schools, both in European countries and in the United States, have become useful both for health promotion and conservation and suggestive as educational agencies. In Chicago and other American cities applications from children for admission are always in excess of the capacity of such schools. Perhaps the time will come when the schools will accept more responsibility for

the vacation period and have extensions in the parks and in the country.

The country-outing movement is closely akin to the vacation school. In nearly all the large cities of the United States and in cities abroad the summer season sees great activity in taking children off the streets and into the country to camps and to country homes. In the main it is a health and recreation movement. However, it has a marked educational value. The games and walks, the opportunities for observation and for becoming acquainted with a new set of surroundings and circumstances, the association with teachers and recreation leaders, make the outing work very beneficial from the educational point of view. Children come back from the country refreshed and invigorated. Outings are not restricted to debilitated children, but the aim is usually to take those who live in the most congested parts of the cities and from homes where there is a limited number of rooms and restricted income.

In all this work it is interesting to note how the education possibilities come to the front. Just as the teaching profession is becoming more impressed with the necessity of emphasizing health work, so those who started from the health side quickly become impressed with the desirability of affording appropriate educational facilities. It is the ultimate purpose of the open-air school to bring both of these activities to the most effective service of the children.

Chapter XII.

EDUCATIONAL ORGANIZATION AND CURRICULA OF OPEN-AIR SCHOOLS.

"More air! More air! More air in the schoolroom; more air in the lungs; more air in the curriculum!" was the concluding statement of a brilliant address on open-air schools delivered by Dr. Albert Mathieu at the third international congress on school hygiene held in London in 1907.

The fervent reception of this sentiment by the large audience gave convincing evidence that "more air in the curriculum" especially appeals to teachers.

The open-air school and the ungraded classes which have been introduced into the schools in recent years have given abundant proof that the interest, enthusiasm, and hearty support of teachers are readily enlisted in educational work which makes for better care of the individual child.

Advocates of the open-air school movement do not overlook the value and necessity of carefully planned curricula. The indoor public schools have the task of providing educational facilities for all the children. Grading, system, large classes, and mass dealing are necessities of the present situation.

The open-air school idea, however, is a plea for more definite knowledge about the needs and possibilities of individual children, and for an elasticity and sensitiveness on the part of the school management that will insure each child more certainly and in a greater degree the care and attention he needs. There are few traditions in this work to hamper a teacher or to impose standards which she feels she must meet or be counted a failure. She has more freedom, more chance for originality in striving for results. Open-air school work ought not to crystallize into a rigid system or routine, because its programs and activities should always be based on a thorough knowledge of individual children's capacities and needs.

Length of session.—Theoretically the length of the daily session in the open-air school corresponds to that in the public school; practically, it is somewhat longer, especially when daily cold-shower baths are given in the morning. The children arrive from 8 o'clock to 8.30, prepare for their bath, dress again, and put on the extra wraps or costumes provided for the open air. By 9 o'clock they

are ready for the schoolroom, where they remain until noon, but the session is broken by frequent exercises between recitations and often by a morning lunch at 10 or 10.30. Sometime during the forenoon a nurse comes to inspect the classes, to take temperatures, and to call certain children before the physician for special examination. Following the noon dinner, an hour is given to rest. The school period closes at 3 or 3.30, but the children have still to remove their school wraps and prepare to go home. During the winter months it is often 15 or 20 minutes after the close of school before they are ready for the street. It is estimated that the actual length of time given to recitation is shortened from an hour and a half to two hours in most open-air schools, but the children really spend a longer time at the school because of the unusual features of the daily program.

Only two or three open-air schools in this country are in session six days a week. When this is true, Saturday is usually given over to manual training, gardening, or other forms of hand work, and is often selected as the day for weekly weighing. Many persons feel that all open-air schools should be continued throughout the entire week, since children almost always lose in weight after two days at home. On the other hand, there might be difficulty in securing the consent of parents to the admission of children if they felt that the children would be away from home also on Saturday.

There seems to be no question but that it would be advisable to continue open-air schools through the summer vacation, except for such children as come from good homes and are assured of excellent care through the summer months. The work can be varied, with greater emphasis placed on the outdoor activities, and both physically and mentally the pupil will be better off than if he spent July and August at home or on the street. This is particularly true when the location of the school makes it possible to do considerable garden work and to have access to woods and meadows.

Size of class.—The regulations of the English board of education require that no more than 20 children shall be assigned to 1 teacher in an open-air school. The custom in this country has been to hold the number between 25 and 30, with 25 preferred. In towns where only one open-air school is conducted, or in cities where fresh-air classes are few and far between, it may happen that every one of the eight grades is represented among the 25 pupils. Under such circumstances flexibility of grading becomes a necessity, and the nonessentials are quickly eliminated from the curriculum. It will usually be true that such a group of children can be classified into three main divisions for purposes of study and recitation, rather than attempting to follow the ordinary grade distinctions. Promotion then becomes a very informal affair, based on mastery of a

subject rather than on time spent in a grade, and the bugbear of final examinations generally disappears.

It must be remembered, however, that the children who enter an open-air school are there only temporarily, and that on discharge they must return to the ordinary school to continue their studies in competition with children who have received the full training of the grammar grades. Parents sometimes object to letting a bright and ambitious child enter the open-air school for fear that he will

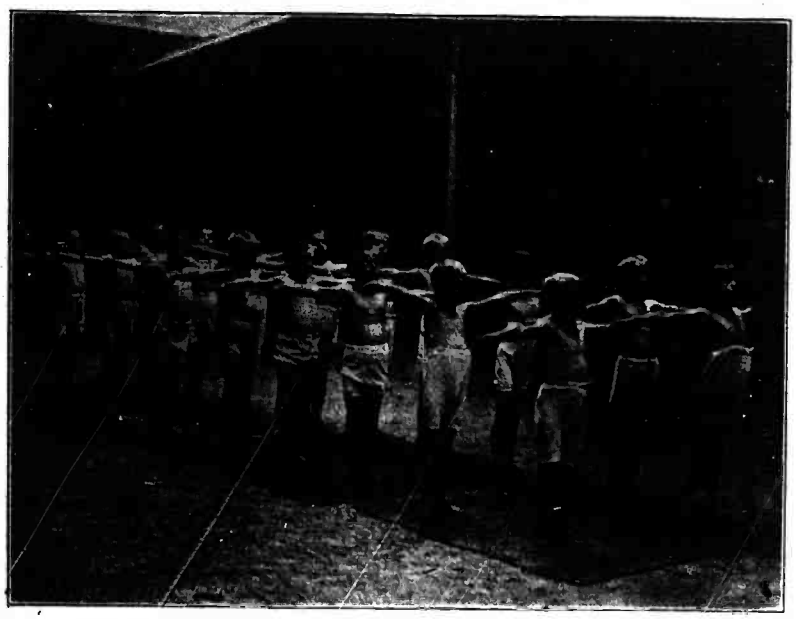


FIG. 98.—Breathing exercises at the Szombathely, Hungary, Open-air School.

lose valuable training and be at a disadvantage on his return to the public school.

It is true that the length of time spent on each recitation is considerably shortened and that some subjects, such as drawing and music, may be dropped from the curriculum, but the high-school records of the pupils who have graduated from the Elizabeth McCormick Open-air Schools, after some years of attendance under the modified school program, show that they more than hold their own in competition with schoolmates who have had the formal training of the grammar schools. This is also the testimony from foreign schools.

Parents need not fear loss of rank for their children. Rather they will find such an increase in ability to concentrate and in the power of sustained attention that an advanced study becomes easier instead of more difficult. A 10-minute recitation, with the child's mind really

concentrated on the subject at hand, is worth more than 30 minutes of desultory attention.

Number of grades to teacher.—The number of grades which a teacher can handle successfully will depend upon her ability and previous experience, and upon the number of children whom she is to manage. Some very successful schools have been conducted after the same fashion as the old-time country school, with the full eight grades under one teacher. The system of grouping referred to above will provide a much more satisfactory arrangement, however, and it is advisable, when possible, to plan for at least 50 children with

FIG. 99.—Goats and chickens are important members of the school family at the Bowring House Country School, Roby, Liverpool, England.

2 teachers in each open-air center, so that 1 teacher will not need to plan her work for more than four grades.

One feature which adds greatly to the difficulty of the work is the frequency with which children are transferred before the end of a school session. In a constantly shifting group in an ungraded school the teacher must plan her work skillfully if she is to do full justice to everyone. The tendency now is to retain open-air school pupils longer than was at first the custom, since it has been proved that temporary gains may often be lost by too hasty transfer to a closed schoolroom. The records of children who have been more than one year in an open-air class often show a decided improvement in the second year over the work of the first.

Daily Program.—No standard daily program can be worked out which will be of service to all teachers alike, since each must plan

her day's work according to her own special group of children and hold it ready for change when new pupils are admitted. The Boston School Committee, however, has made certain suggestions to the teachers of its open-air classes, which are of general significance and which are reproduced in full on page 258 in the Appendix. It is pointed out that the proper alternation of the periods of work with the periods of rest is the principle first to be considered in planning the daily program for an open-air school.

Arithmetic should be taught at periods following rest. The period suggested is between 9 and 10 o'clock in the morning. Mental arithmetic should not follow a lesson in history, writing, drawing, or sewing. Writing or drawing should be taught by means of large muscular movements, rather than through the sense of sight. Short lessons are better than long.

Physical exercises should be frequently given, but the possibility of fatigue should not be overlooked, and the physician should pass on the amount of exercise to be allowed each child. The time allowance for each subject should be so varied by the teacher that the pupils may have frequent periods of rest and relaxation. Subjects and exercises may be combined in such a way that the educational value is increased, rather than diminished, by the shorter period.

A typical daily program for one of the Boston fresh-air classes is given below. In studying this program it must be remembered that the classes are for physically debilitated children and not for tuberculous children. Thirty-six pupils are assigned to each class; no rest period is given; and the children go home for the noon luncheon. The daily program combines the requirements of the school committee, with the special requirements suggested above for open-air classes.

Typical daily program.

[From the Boston annual school report, 1913.]

Time.	Subject.	Grades.
9.00 to 9.10	Opening exercise	All.
9.10 to 9.20	Personal hygiene	Do.
	Medical inspection	Do.
	Hygiene and physiology teaching	Do.
9.20 to 10.00	Arithmetic (as outlined above)	Do.
10.00 to 10.10	Music	Do.
10.10 to 10.30	Luncheon	Do.
10.30 to 10.50	Recess	Do.
10.50 to 11.15	Elementary science, manual training, or household science	
11.15 to 11.30	Spoken English	Do.
	Reading and literature	Do.
11.30 to 11.40	Physical training	Do.
11.40 to 12.00	Written English	Do.
12.00 to 1.30	Home	Do.
1.30 to 1.40	Rest—relaxation—story-telling	I-II.
1.30 to 1.50	Sight arithmetic	IV-V.
1.50 to 2.00	Physical training	All.
2.00 to 2.20	Drawing	Do.
2.20 to 3.30	Free play—recess	I-III.
2.20 to 3.00	Geography	IV, etc.
3.00 to 3.10	Physical training	Do.
3.10 to 3.30	Oral arithmetic	Do.

[1] Alternate days with manual training.

The program in Utica, N. Y., shows the possibility of grouping when a large number of grades are included in the open-air school. Apparently the two divisions of the first grade might also have been combined.

PROGRAM, UTICA, N. Y.

9.00 to 9.20	Morning exercises.
9.20 to 9.40	D–E, reading; C, study reading; B, study reading; A, study geography.
9.40 to 9.50	Physical exercises.
9.50 to 10.10	A, geography; B, copy work; C, written number work; D, busy work; E, busy work.

FIG. 100.—Children on a school journey halting for the noonday lunch, France.

10.10 to 10.30	B, reading; A, written work; C, busy work; D, written number work; E, board work.
10.30 to 10.40	Recess.
10.40 to 11.00	Reading, C–E; A, B, and C, written spelling; D, busy work.
11.00 to 11.20	Oral spelling, A, B, and C; busy work, D–E.
11.20 to 11.30	Play time.
11.30 to 11.45	Arithmetic, C–D; written arithmetic, A–B; busy work, E.
11.45 to 12.00	Music.
12.00 to 12.30	Dinner.
12.30 to 1.30	Rest.
1.30 to 1.35	Chairs put away.
1.35 to 2.00	Language.
2.00 to 2.20	A–B, history reading; copy work, C; board work number, D; busy work, E.
2.20 to 2.30	Dismissal.

The St. Louis daily program indicates a possible arrangement when six grades are included in the school:

DAILY PROGRAM—OPEN-AIR SCHOOL, ST. LOUIS.[1]

8.00	Arrive at school.	11.45	Arithmetic, I, II, III.
8.30	Baths.	12.30	Dinner; handwork.
8.45	Lunch.	1.30	Rest, I, II, III; penmanship, IV, V.
9.15	School (reading, I, II, III, IV, V Grades).	2.00	Arithmetic, IV, V.
10.15	Language, I, II, III, IV, V.	3.00	Geography, IV, V.
11.00	Recreation; dancing.	3.20	Lunch.
11.25	Rest, IV, V; penmanship, I, II, III.	3.30	Go home.

Qualifications of teacher.—The teacher of an open-air class should be well trained in the ordinary grammar school subjects and should have special preparation in manual training and nature study. She must be adaptable, alert, genuinely interested in the health of her pupils, and alive to the possibilities of her position. The open-air school should not be considered a place of refuge for nervously exhausted women, or for arrested cases of tuberculosis, unless a physician's certificate has been obtained, showing that the teacher is fully capable of handling the heavy work of an ungraded class. Women with throat trouble or with Bright's disease should not undertake the work. Teachers of experience in open-air work agree in saying that they are more free from fatigue and backache at the close of the day than they have ever been in closed school work, since the tension of discipline is greatly reduced and the nervous strain of constantly forcing tired children to school tasks is done away with.

WHAT A TEACHER SHOULD OBSERVE FROM THE HEALTH SIDE.

1. The adjustment of windows and screens.
2. That no child is unduly exposed to drafts.
3. That children are properly clad.
   (*a*) See that heavy sweaters, Eskimo suits, coats, and heavy underwear are not worn in mild weather.
   (*b*) See that children are sufficiently clad when weather suddenly turns cold.
   (*c*) Know if children have wet feet.
4. Which children have had glasses prescribed and whether they wear them.
5. Which children fail to hear readily, and especially failure of hearing on part of children who usually hear well.
6. The development of acute colds and nasal discharge.
7. Development of signs of nervousness and irritable disposition.
8. Development of listlessness and inability to concentrate.
9. Failure of interest in school work.

[1] Two years' work by the St. Louis Society for the Relief and Prevention of Tuberculosis, 1910-11.

10. Increased interest in school work, and know whether it is due to elevation of temperature or general improvement of physical condition.
11. If child's hands are cold, and be watchful for evidence of chilling. Children often suffer without complaint.
12. Evidence of weariness in the morning, and learn if due to late hours at home.
13. Cleanliness.
14. Personal habits of children.
15. Restlessness during rest period on part of children who usually are quiet.
16. Extreme lassitude and inability to waken.
17. Evidence of failing appetite.
18. That on returning from bath the hair is thoroughly dry and that the children are not permitted to return to schoolroom too soon after bath.

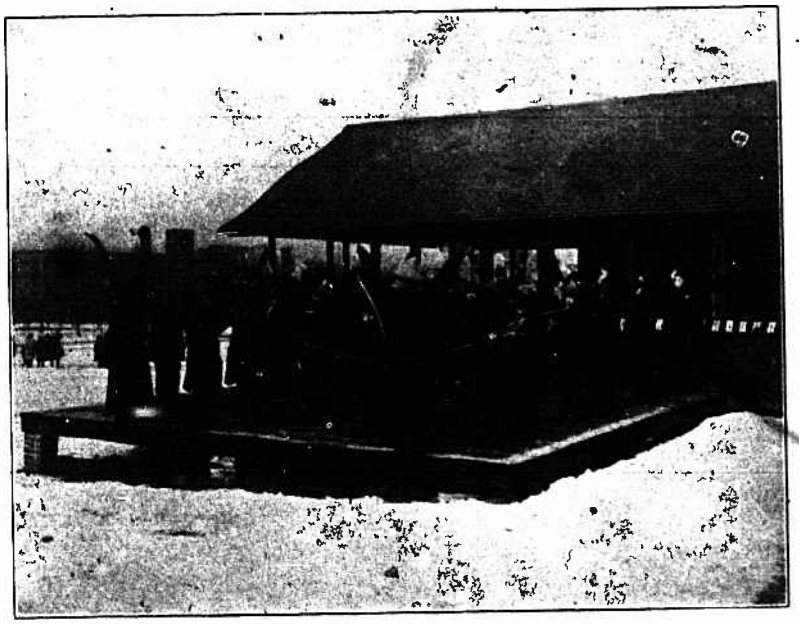


FIG. 101.—Breathing exercises on a wooden platform adjoining the school tent, Springfield, Mass.

Pay of teacher.—Because of the unusual features of the open-air school work, indicated above, fresh-air classes are frequently listed among the so-called special classes, and the teacher receives additional pay. In New York City, Brooklyn, and other eastern cities this additional pay amounts to $100 a year.

Curricula.—The curricula of American open-air schools, in contrast with those of the foreign schools, have adhered more nearly to the indoor school curricula. This has been due largely to their physical nearness to the regular public schools. It is difficult for a teacher in an open-window room to get away from the regulation program. Removal to a roof or to a separate building seems to release her

mind from the rigidity sometimes unconsciously acquired from the daily sight of four calcimined walls and five rows of immovable desks. If the school can be so situated that a partnership with nature is possible, it is the best guarantee against monotony in the curriculum.

A kindergarten teacher in a Sacramento, Cal., open-air school says:

> In the open-air kindergarten we find that in place of the old-time program, the week's thought and the changes in introducing morning talks come to us unsought rather than by our seeking. We seem to be in the very midst of nature's calls, for birds, butterflies, bees, caterpillars, and spiders appear on our window ledge, or pass through the room. Songs or stories are always suggested *by* the children *from* their environment.

Under such circumstances it is possible to allow the children more freedom of self-expression, and to cultivate their ability for doing and making.

The English reports emphasize the ease with which the elementary studies can be worked out along motor and sensory lines, and the foreign schools have carried this development much further than has yet been done in America, except perhaps at a few private open-air schools. This is partly due to the organization of the elementary schools in England, which gives much freedom to the headmaster of each school in planning the course of study. Teachers of open-air schools in England have been practically released from all restrictions as to curricula, and have been given a free rein in working out their own theories, provided only that the work is approved by the official inspector of the board of education.

Curriculum of Shooters Hill open-air school.—Thus at the Shooter's Hill School near London, the headmaster has made manual work, nature study, and gardening the basis of his whole curriculum. The boys fenced in the garden, built the tool-house and hutches for pets, boarded up an exposed end of the schoolroom, made the wooden slats for foot rests, constructed paths and a drainage system for the school garden, and even fitted up a small ornamental pond and sun dial.

Arithmetic, drawing, elementary chemistry, and botany were correlated with the actual manual work. The girls helped with the computations and with the lighter work, and had sewing in addition.

A most interesting feature of the course of study is the method of teaching geography. The school overlooks the river Thames and its shipping. The steamship companies whose boats dock at the London wharfs send to the school descriptions of the boats, their routes, and their cargoes. Soon the children learn to recognize the funnels, and it is a great event when an East Indian liner comes to dock. Geography becomes a living thing, with the whole world thus brought to the schoolroom door. In the same way history

lessons start with visits to the many places of historic interest within easy reach of the school. The complete course of study, which is full of suggestion for American teachers, is given below.

SYLLABUS OF WORK, SHOOTERS HILL OPEN-AIR SCHOOL.

RECITATIONS.

Study and, where possible, learn—

Class I—

Home Thoughts from Abroad (R. Browning).
My Heart Leaps Up (Wordsworth).
Lines Written in Early Spring (Wordsworth).

FIG. 102.—A school garden on a city roof, Horace Mann School, New York City.

To the Cuckoo (Wordsworth).
Reverie of Poor Susan (Wordsworth).
To a Butterfly (Wordsworth).
The World is Too Much with Us (Wordsworth).
A Wish (S. Rogers); Expostulation and Reply (Wordsworth).

Class II—

The Royal George (Cowper); The Daisies (Sharman).
The Rainbow Fairies (Hadley); Morte d'Arthur (Tennyson).
Selections from Hiawatha (Longfellow).
The Village Blacksmith (Longfellow).

Class III—

Baby Seed Song (Nesbitt); The Brown Thrush (Larson).
Daffydowndilly (Thompson); The Rabbits (Thompson).

How the Leaves Came Down (Mary Howitt).
Clouds (Sharman); selections from Hiawatha (Longfellow).

Class IV—

Song from Pippa Passes (Browning).
The Tree in Winter (Shakespeare); Little by Little.
Under the Greenwood Tree (Shakespeare).
What a Bird Thought; Noontide (Anon.).
Baby Seed Song (Nesbitt); The Babes in the Wood (Anon.).

READING.

Class I—

Hereward the Wake; Children of the New Forest; Treasure Island; Kent, Past and Present.

Class II—

Tales of the Court of King Arthur; David Copperfield; Highroads of History.

Class III—

Stories of Robin Hood; Seaside and Wayside Readers; Coral Island; Highroads of History.

Class IV—

Chambers' Effective Readers; The Golden Dawn Readers.

General—

Nature Tales and Myths; Simple Greek Myths.

COMPOSITION AND DICTATION.

1. Correction of common mistakes in speech.
2. Oral composition, including the telling and acting of simple stories.
3. Written composition chiefly on subjects dealing with the nature and history lessons.

ARITHMETIC.

Class I—

1. Measurement of length (foot rule, tape measure, chain, and hoop), area (square, rectangle, triangle, and circle), volume (cube, rectangular prism), and weight.
2. Easy decimals and a general knowledge of the metric system, with special reference to the children's height and weight.
3. Simple proportion.
4. Exercises in profit and loss, and percentages based on the cultivation and sale of school-garden produce, and on other familiar transactions.
5. Angular measurements to aid in determining heights of trees, diameter of pond, etc. Use of protractors and simple theodolites.
6. Exercises in reading thermometer, barometer, rain gauge, and anemometer.

Class II—

1. Revision of multiplication tables, and simple fractions.
2. Revision of and more difficult examples in the compound rules.
3. Long division; factors to be used where possible.
4. Measurement of length, weight, and volume; plans and scales. The objects considered to be chiefly those found in the neighborhood or met with in the children's daily life.
5. Simple exercises in fractions, with practical examples.
6. Exercises in reading thermometer and barometer.

Class III—

1. Completion of multiplication table.
2. Four compound rules involving small sums of money; these to be explained by means of coins.
3. Simple ideas of the commonest weights and measures, i. e., those that are used in ordinary shopping.
4. Simple fractions, such as ½, ¼, ⅓, ⅕, ⅛, ½; practical methods of obtaining them.
5. The clock face and how to read it; simple problems thereon.
6. Simple information respecting "degrees," to assist the children in reading the thermometer.

Class IV—

1. Composition of such numbers as 8, 10, 12, 14, 16, 18, 20.
2. Multiplication tables, i. e., 2, 3, 4, 5, and 6 times as far as 6.
3. The four simple rules, the numbers to be involved not to be greater than 100. Easy problems illustrated by free drawing.
4. Simple measurements dealing with inches, feet, and yards; practical work to be taken.
5. An elementary knowledge of money—bronze and silver coins. Some idea as to what articles can be purchased for ½d., 1d., 6d., etc.
6. Simple fractions (½, ¼, ⅛) taught by means of paper folding, clay modeling, etc. The clock face should also be introduced here.

N. B.—More difficult exercises may be used in the case of the more advanced children.

GEOGRAPHY.

General—

Special stress is to be laid on the fact that the soil, climate, environment, and other natural features of a locality are the factors which usually determine and limit the occupations of the people occupying that locality. Raised maps are to be made to illustrate the geography lessons. The chief local geographical features should be taught to all classes.

Class I—

The eight chief lines of ocean-going steamers (Allan, Orient, P. & O., British India Steam Navigation Co., Union Castle, New Zealand Shipping Co., etc.) which are connected with the Albert and Victoria Docks; the cargoes which they take from and bring to London; general facts concerning the countries in which they have ports of call; distances covered and time taken by steamers; models of their respective funnels and flags.

Class II—

1. Chief physical features and industries of England and Wales.
2. The imaginary purchase of British goods used in connection with the buildings, apparatus, meals, etc., at the open-air schools, and the probable methods by means of which they were brought to the school site.

Class III—

1. Geography of Kent, Essex, and the Thames, with special reference to their industries.
2. Interesting details concerning Greenwich, Woolwich, Plumstead, Charlton, Erith, Eltham, Chislehurst, Epping Forest, Shooter's Hill, and Bostal Hill.

Class IV—

1. Story of Father Thames.
2. Type of district that would be chosen by a hunter, a shepherd, a miner, a farmer, and a fisherman; reasons for their choice.

3. Methods of obtaining food (eggs, fruit, corn, meat, etc.) and shelter (trees, caves, huts, etc.).
4. Physical features of the neighborhood.

HISTORY.

The improvement in the social and industrial life of the English people as illustrated by the history of Kent. The following points are to be dealt with:

1. The first inhabitants of Kent.
2. Roman associations; roads, camps, and antiquities. Julius Cæsar.

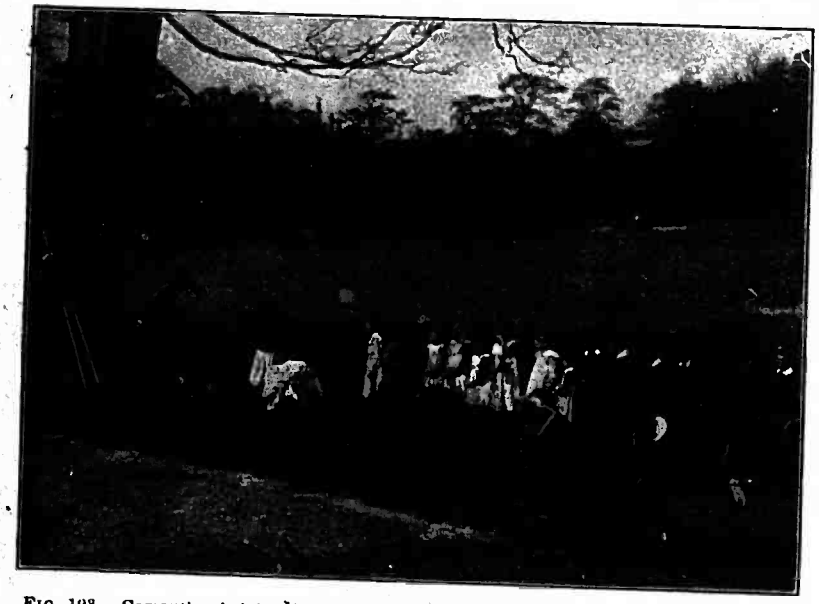


FIG. 103.—Computing height of trees at Uffculme Open-air School, Birmingham, England.

3. Saxon conquest of Kent. Introduction of Christianity—Coming of the Danes, and the beginning of the landlord system. Earl Godwin and Harold.
4. Norman invasion and Middle Ages, Domesday Book; Norman architecture; Lesnes Abbey; Thomas à Becket; Canterbury Pilgrims; King John's Palace at Eltham; Wat Tyler's Rebellion; Welhall and Sir Thomas Moore; Woolwich Dockyard.
5. Modern times; historical objects and men of Woolwich, e. g., Rotunda, Severndroog Castle, Gen. Gordon.

Where convenient, and especially in the younger classes, brief plays and tableaux should be introduced to illustrate various historical events.

The models to be made by the various classes are: British barrow, British hut, Roman camp, Saxon village, Norman castle, a part of Lesnes Abbey, St. Augustine's Cross, and an archery butt; ancient domestic and war implements should also be attempted.

NATURE STUDY.

The nature work should deal with the animal and vegetable life found at or near the open-air school, and with the local climate and soils. The various "subjects" should not be isolated, but special stress should be laid upon the interdependence of plant and animal life, these again being influenced by the soil and climatic conditions. A selection may therefore be made from the following, according to the powers of the children and the prevailing season, etc.:

1. *Earth knowledge.*—Lessons on various rocks, e. g., clay, sand, gravel, flint, chalk, and granite; the types of scenery produced by these rocks.
2. *Weather observations*—
   (1) Wind, rain, dew, hail, snow, and fog.
   (2) Information concerning the barometer, thermometer, rain gauge, anemometer, and sundial.
   (3) Clouds and cloud sketching.
   (4) Elementary information concerning sun, moon, and stars.
3. *Plant and animal life*—
   (1) Awakening in hedgerow and pond—seeds, buds, primrose, coltsfoot, birds' nests, frog, dragon fly, etc. The local trees.
   (2) *Summer's glory.*—Buttercup, daisy, grasses, rushes, rose, bee, wasp, butterfly, moth, ant, etc.
   (3) *The season of rest.*—Evergreens, hibernation, etc. Some of the nature lessons will be taken in connection with the gardening, for which there is a separate syllabus.

GARDENING.

1. *Soils.*—Heavy and light soils and their preparation for crops.
2. *Manures.*—Natural and artificial.
3. *Seeds.*—Preparation of seed bed and methods of sowing.
4. *Transplanting.*—When and how to transplant seedlings.
5. *How to prolong* the flowering stage of a plant.
6. *Fertilization* of flowers and setting of seed; culture of various fruits and vegetables.
7. *Garden operations.*—Watering, digging, double and bastard trenching; hoeing, its uses in clearing weeds and conserving water.
8. *An allotment.*—Its arrangement and care.
9. *In the choice* of plants care is taken to include those most useful in nature lessons.
10. *Exercises in profit and loss*, percentages, etc., based on garden produce. Digging and preparation of clay for pottery.
11. *Clay modeling.*

MUSIC.

Upper division—

1. Breathing exercises.
2. Voice training. Exercises to oo, ah, oh, ay, ee.
3. Ear-training. Simple phrases consisting of four notes, time and tune combined.
4. Sight reading—
   (a) Tonic sol-fa—time and tune combined.
   (b) Staff—easy passages in keys C, F, G in 2/4, 3/4, and 4/4.

5. The modulator—the first flat and sharp keys.
6. Songs—
   (*a*) "Who is Sylvia?"
   (*b*) "I know a Bank."
   (*c*) "Oh Mistress Mine."
   (*d*) "On Wings of Song."
   (*e*) "The Ash Grove."
   (*f*) "Spring Song."
   (*g*) "Ye Banks and Braes."

Lower Division—

1. Breathing exercises.
2. Voice training—voice exercises to oo, oh, ah, ay, ee.
3. Ear training. Simple phrases consisting of three notes.
4. Sight reading—
   (*a*) Tonic sol-fa time and tune combined.
   (*b*) Staff—easy passages in Key C in 2/4, 3/4, and 4/4.
5. Songs—
   (*a*) "Who is Sylvia?"
   (*b*) R. L. Stevenson's Songs for little children.
   (*c*) "Ye Banks and Braes."
   (*d*) "The Ash Grove."
   (*e*) "Spring Song."

HANDWORK.

Boys and Girls—

Modeling in plasticine.
Historical and geographical models.
Gardening, including clay modeling (see separate syllabus).
Simple repousse work in connection with light woodwork.
Weaving in cane, bast, or string (younger children).
Graduated exercises in paper, cardboard, and wood connected with stenciling, etc.

Girls only—

Needlework (see separate syllabus).
Knitting.

Boys only—

Simple exercises in fretwork and wood carving (class 3).
Ordinary woodwork, such as the making of easy models (younger boys) or wind screen, tool shed (elder boys).
Metal work (zinc, tin, brass).
Rustic woodwork (elder boys).

DRAWING.

1. Rough sketches to illustrate various lessons.
2. Water color, pencil, crayon, and chalk work, chiefly to illustrate the nature lessons.
3. Simple design (elder children).
4. Imagination drawing correlated with literature and history.

NEEDLEWORK.

Classes I and II—

1. Patching—calico, print, and flannel.
2. Darning—stocking web, socks, and dresses.
3. Stitches used in plain needlework.

4. Patterns of useful garments (blouses, dresses, underclothing, pinafores, overalls) taught by means of paper folding.
   Measuring material required and finding its cost.
5. Knitting—fancy stitches, skullcaps, etc.
6. Crocheting with cotton, wool, and macrame string.
7. Art needlework.

Classes III and IV—

1. Various stitches.
2. Making clothes for dolls; patterns for these garments to be taught by means of paper folding, and then cut out in material.

ORGANIZED GAMES.

Boys—

1. Singing games (younger boys).
2. Cricket, football, hockey, and rounders, according to the season of the year.

Girls—

1. Singing games.
2. Basket ball.
3. Skipping.

PHYSICAL EXERCISE.

1. Marching from Plum Lane School to the open-air school, and vice versa.
2. Breathing exercises (see separate syllabus).
3. Special exercises for cold weather.

Bermerside Open-Air School, Halifax, England.—The following program from the Bermerside Open-Air School, conducted by the city of Halifax for physically debilitated children, is typical of the arrangement of a day at the English schools:

TIME TABLE AND SYLLABUS.

8.00 to 9.00.	Breakfast.
9.00 to 9.20.	Prayers, hymn, Scripture lesson.
9.20 to 9.30.	Registration, personal inspection.
9.30 to 10.00.	Nature lesson.
10.00 to 10.30.	Play, lunch.
10.30 to 10.45.	Singing.
10.45 to 12.00.	Manual work.
12.00 to 12.30.	Preparation for dinner, washing, setting table.
12.30 to 1.30.	Dinner.
1.30 to 3.30.	Sleep.
3.30 to 4.00.	Play, setting tea table.
4.00 to 5.00.	Tea.
5.00 to 5.45.	Reading, telling stories.
5.45 to 6.15.	Games, impromptu plays, etc.
6.15 to 6.45.	Prayers, supper, home.

English programs show a later hour of dismissal than is customary in the American schools. Most English schools have, following the rest period in the afternoon, a short school session, then tea, and outdoor work or play until 5.30 or 6 o'clock. The longer summer

evenings and the ease of transportation make this possible where it would not be feasible in the United States.

Country Schools for City Children, England.—Several English cities have established what they call "country schools for city children," to which anemic and debilitated children are sent for summer vacations, lasting for a month or two, and where they receive a certain amount of instruction.

One of the most beautiful of these schools is the Bowring House Council School at Roby, near Liverpool. Here the curriculum is based entirely on nature study. The reading books used are appropriate to country life, and the poems studied relate to nature and its teachings. Stories are chosen with corresponding games and songs. The letters sent home weekly are descriptive of surroundings and new interest. One special feature of the school curriculum is the opportunity for self-expression, as shown in illustrated diaries and calendars which decorate the walls of the schoolroom, as well as drawings which result from the study of natural surroundings. This weekly diary, the mounted specimens, and the productions in clay and wood, are valuable results of enlightened observation during country rambles. A special feature is a course of lessons on the growth of trees, given weekly. Children learn to recognize the characteristics of various trees, by actual observation, and a friendly spirit of rivalry exists in the search for specimens of flora and fauna.

The boys learn to distinguish the birds by their various notes, and nests are found and carefully examined. Many opportunities thus arise for emphasizing the value of bird life. Butterflies, insects, frogs, and toads are studied. The children notice the blossoming of the shrubs and fruit trees, and the effect of a night's frost on those that are not sheltered. They make a note of the moon and its shape, night by night, for entry in their diary card.

The care of live stock, including chickens, ducks, goat, rabbits, dog, cat, canary, and two donkeys, proves a very popular occupation.

School gardens provide many of the vegetables used at the table. Visits are made to places of special interest in the neighborhood, as a quarry, brick works, a pottery plant, an old church, and a near-by farm.

The necessary household duties occupy the first part of the morning, each child having a special task to perform. Some are bed makers, others dust the rooms or peel potatoes, while some are engaged in washing up, and others in boot cleaning. All the little ones are kept very busy with the cleaning of spoons and the like. The girls also are taught to darn the stockings and mend the clothes and make the working aprons. The boys take part in the household work and darning, but practical woodwork interests them more.

Under direction they have made the houses and runs for the live stock.

Thrift is encouraged by banking the children's money on arrival, and by receiving frequent deposits. "Shopping days" are allowed twice a week, when money can be obtained from the bank, but careful account has to be kept of the expenditures.

In these and many other ways the community life of the school is related to the studies which are pursued.

An English roof school.—That the possibility of introducing novel ideas and methods into the curriculum does not depend wholly upon a country location for the school is shown by the following account of a school on an English roof.

The school equipment consists of a block of blank paper, pencil, water colors or pastel material for handwork, and the usual school textbooks. The teachers in charge keep diaries which list short lessons providing as much individual work as possible to the children, and in which are entered the amount of work done, and any other points worthy of notice.

First of all, in the morning the children walk about the roof, which commands an expanse of 40 miles from east to west. Such a wide prospect has a stimulating effect on children used to the restricted view of London streets. Facing the sunny hills to the east, they sing an opening hymn. Then, grouped in the sunshine, some count the railings, others tell how many more are on one side than on the other, and they check each other's results. They find out by actual measurements how many feet run are in the fence, how much iron in the bars, how much to paint so many feet, how many bricks in the chimney stacks, how long is the playground, how high, how many square feet are under cover, how much concrete to cover the floor, and so on. The older pupils find the cubical contents of pipes, the capacity of cisterns, the adequacy of gutters, and the calculation of height by the length of shadows. All are kept busy, with a foreman in charge of each group of six.

For the geography lesson they trace out the direction of the great roads with their borrowed telescopes, follow the river, get the position of the rising ground, and with their hands full of plasticine make a model of the landscape as they see it. From these models they make real maps, and so learn the relation of the map to the landscape. Older children may draw the prominent features of the prospect on one side of a glass slip and transfer this to paper, carefully naming all the outstanding features of the landscape, whether they be hilltop, factory shaft, or the distant wood.

The children learn about the clouds as they discover them in the sky, and draw them with pale washes of color or murky sepia. The kite that they have just flown over the railings, and the toy windmills that they have each made, tell them of the winds, the shifting

direction as the kite travels round, and the force as their tiny mills whirr in a flutter. They learn about light and shadow, keep a weather chart, and, most interesting of all, by noting and marking the moving shadows of stationary uprights they discover something of a world that is turning and moving.

For drawing, they go to large rough drawing boards, hung on the railings by rope loops, well papered to give a smooth surface. In the classroom it is hard to do any but tiny drawings, but out here they make life-size copies. The younger children love to draw on the playground floor, and they are allowed to do this with colored chalks. By the end of the open-air period the playground is a perfect mosaic of sketches.

History and English can always be acted, and the freedom of the open-air classes gives chances for working out little plays by the children.

American open-air school curricula.—Persons who have visited open-air schools both abroad and in this country feel that in many instances American teachers are simply doing indoor work out of doors, without much effort at new methods or means of expression as far as the teaching is concerned. However, more careful study of the work reveals in almost every instance a conscious groping for the same kind of freedom of curriculum which characterizes open-air schools in more favorable localities.

School gardens.—The educational value of the school garden has not been overlooked, even in schools where access to the soil is difficult, and, everywhere that the site has permitted, the garden has been made a special feature of the school. In Rochester a large space has been set aside for gardening. Aside from the preliminary preparation of the ground, all the work is done by the children under the direction of a woman gardener. The school is in session throughout the year. In the summer of 1914 they raised vegetables enough, with the exception of potatoes, to supply the table through the summer and fall. Tomatoes, turnips, carrots, peas, chard, string beans, and sweet corn flourished.

In South Manchester, Conn., where the school is in session during 10 months only, the children were encouraged to come on certain days during the summer for the garden lesson. A minister living near the school volunteered his services as instructor, and hired help to divide the land into plats, each 8 by 10 feet, and to apply the fertilizer. Each child was allowed one of these plats for his own ground, and what he raised he carried home. The same seeds were planted by all the children—radishes, lettuce, beets, onions, butter beans, and sweet corn. There were three community plats where the produce was raised for the use of the school. As a result of this work many of the children planted gardens at home.

The location of the Elizabeth McCormick Open-Air Schools, 1 and 2, on adjoining roofs of the Hull House in Chicago seemed to prohibit any work with gardens, but a near-by roof was found somewhat sheltered on three sides from prevailing winds, on which for the last three summers a very successful flower and vegetable garden has been maintained. Large boxes were carried to the roof and filled with soil. The vegetables were started under cold frames late in April and early in May. By June there were abundant flowers, and during the summer a small crop of vegetables was produced. Perhaps the achievement which gave the children the greatest pride was a harvest of 150 ears of sweet corn.

School journeys.—The school journey, as practiced in France, Switzerland, and other countries, is described elsewhere in this bulletin.[1] English work was started in 1896 by the Bellenden Road School, Peckham. The plan was to take some 30 or 50 boys by train to a convenient and inexpensive hotel, and use that as a center for daily expeditions. The idea spread slowly, but the board of education now recognizes for purposes of the attendance grant, "time occupied by visits during the school hours to places of educational value or interest, or by field work, or by rambles." (Code, art. 44B.) The London County Council allows teachers and classes to use its tramways at reduced rates, and where they can not be used the council pays part of the traveling expenses. A handbook on educational visits has been issued which lists places of interest, hours when they are open, subjects of educational interest, and special facilities. School journeys may last for a week or longer. The council makes a grant of not more than $30 a week, or $60 for a longer period, to pay for supplies, teacher, provide equipment, and defray the traveling expenses of the teacher.

The teachers interested in such expeditions have formed a School Journey Association, which publishes the School Journey Record. From the Torriano Avenue Guide, the following aims and objects are quoted:

(1) To bring teachers and scholars into closer touch with one another.
(2) To foster habits of good-fellowship, self-reliance, and unselfishness.
(3) To study nature on a larger scale than is possible in the classroom.
(4) To investigate the causes which produce scenery.
(5) To secure rock, plant, and animal specimens near London.
(6) To acquire the habit of learning from the world at large, as well as from books.
(7) To extend our knowledge of mankind, past and present.
(8) To make a special study of a port (Harwich).
(9) To observe various forms of labor, "especially the naval," and so obtain a better idea as to what we are fitted for.
(10) To gain health and vigor from a week's life at the seashore.
(11) To learn how to spend a holiday intelligently and happily.

[1] See p. 155.

With the development of the work, a large number of hotels, farms, cottages, and country camps have been listed which can be used as centers for expeditions. The cost of the journeys varies considerably. Some schools keep the pro rata cost down to $1.50 a week. The expeditions are planned for normally well children, but there is no reason why they could not be undertaken in moderation for the physically debilitated.

In Italy, where inclement weather does not so often need to be considered, whole classes may be seen carrying light-weight portable desks and knapsacks, and journeying from place to place under the guidance of an experienced teacher. Wherever the locality invites them, they can unstrap their desks, chairs, and conduct an informal recitation.

Very little work of this sort has been done as yet in the United States, but there is no reason why it should not be more widely undertaken.

Playground classes.—Another form of open-air education increasingly in use in England is the so-called playground class. This simply means that certain classes go to the playground for recitation. Detroit, Mich., where most of the schools have large, shady yards, removed from the business streets, tried a similar plan several years ago with considerable success. It is only practicable where the yard is attractive and removed from noise and dust. Contrary to the expectation of the teacher, wherever such classes have been conducted it has been found that the attention of the children has been excellent, and that discipline has caused no difficulty.

Physical exercises.—The place of physical culture in the curriculum of an open-air school has been much discussed. Some physicians have gone so far as to forbid any form of violent exercise for the children in an open-air school class. Most, however, have recognized the value of properly supervised exercise adapted to the need of the individual child. The Swedish remedial exercises are frequently used and highly recommended by teachers in the foreign schools. Breathing exercises are sometimes given with the children stripped to the waist, so that the instructor can observe the chest formation and the action of the lungs.

The teachers at the Ethical Culture School in New York City believe that play constitutes "perhaps the largest single factor in the development of the open-air school children." Only once a day, in this school, does one lesson follow another without the intervention of recess or lunch and rest period, and then there is a 5-minutes' intermission devoted to vigorous play. If a child has become nervous or confused in one lesson, he has time to regain his poise and start afresh in the following period. Besides, intellectual food, just as

physical food, needs time for digestion, and during this time stuffing is harmful.

Education means growth.—If the function of all well-directed education is to foster growth, there can be no question that the open-air school affords that opportunity in large measure. Most children who apply for admission at American open-air schools come with previous school records of poor attendance, low-grade scholarship, and depleted energy. The transformation which takes place in their attitude toward school and toward life is universally recognized. To free a child from such handicaps before they have seriously affected his career is the inspiring task set before the teacher of the open-air school. Toward its accomplishment every facility of educational organization and curriculum should be directed.

Chapter XIII.

RESULTS OF OPEN-AIR SCHOOLS.

In the United States it is an accepted theory that every child should have at least that amount of formal education which is measured by the completion of the work of the grammar school. In recent years attention and interest have centered increasingly on the more than 50 per cent of all the children who do not achieve this minimum standard. Our attention would have been called to this subject earlier if these pupils had accumulated in the schools. Children leave school both because they succeed and because they fail, and the public has accommodatingly absorbed the failures as well as the successes.

Health inspection of school children and the general advance in social work have been factors largely responsible for the new attitude on this subject. The public now wants to know to what degree adverse physical, economic, and environmental conditions are responsible for the failure of children to get at least through the grammar school. On page 161 of his book on Medical Inspection of Schools Dr. Ayres gives a table which is perhaps one of the most definite statements, though by no means final, yet made as to the effect of physical handicaps on school progress. The table, based on a study of 3,304 children, in 1908, gives the years required by defective and nondefective children to complete the eight grades of the public schools of New York City.

Years required to complete eight grades.

Children with—	Years.
No defects	8.0
Defective vision	8.0
Defective teeth	8.5
Defective breathing	8.6
Hypertrophied tonsils	8.7
Adenoids	9.1
Enlarged glands	9.2

Dr. Ayres further says:

If these figures are substantially significant for all New York City school children, their educational and economic import is great. According to the data, the child with seriously defective teeth requires half a year more than a

nondefective child to complete the eight grades. About one-half of the children have seriously defective teeth. The handicap imposed by defective breathing means six-tenths of a year. About one child in seven has defective breathing. The child with hypertrophied tonsils takes about seven-tenths of a year more than he should. About one child in every four has hypertrophied tonsils. The extra time required by the child with adenoids is about one and one-tenth years. About one child in eight has adenoids. The pupil with enlarged glands requires one and two-tenths years extra. Nearly half of the children have enlarged glands.

Dr. Ayres points out that these figures are confined to one city and to a comparatively small group of children, and warns against any large generalization. However, the figures are significant as an indication. Health inspection in public schools has everywhere shown that a large percentage of school children have physical defects of one kind or another.

The open-air school has definitely undertaken to deal with school children from the health side; consequently, in reports of nearly all the open-air schools where results are given they are largely in terms of physical improvement. On the other hand, the usual public-school records are mainly concerned with intellectual attainments and school attendance.

There is widespread interest in the results of open-air school work. Perhaps the questions most frequently asked are about the effect of open-air schools on the grade standing of the children. This is especially true of teachers and school authorities. Long emphasis on the importance of passing examinations and making grades, and the fact that the teachers themselves are ranked according to their success in getting children through the course in a given time, account for the interest on this point.

The child needs both health and education. It profits him little to achieve the school work if he loses his health. The problem is to use the eight years which are required by the compulsory-education law from each child in such a way that it will give him the maximum of both physical fitness and training for service.

In the preparation of this bulletin an effort was made to secure as accurate data as possible on both physical and intellectual results in open-air school work. The questionnaire sent out by the United States Bureau of Education[1] did not cover the matter of school standing, but it did call for points concerning the physical, social, and economic conditions of children. The school standing and progress of the children in Chicago open-air schools were studied independently, however, and the findings will be made a part of this chapter.

In order that the reader may have some of the points on the social and economic conditions of the children directly before his

[1] See Chap. III.

mind while considering results, a slight repetition may be warranted. The questionnaire was answered for 598 open-air school children in Chicago and for 620 children in open-air schools from other cities. The average number of members in the families of all the open-air children in the study was 6.15, and the average number of rooms to the family 4 plus. The income in more than 85 per cent of the families was about one-half the amount set in the standards established by different authorities mentioned in the chapter on social and economic conditions.

The children of the open-air schools for practically all of the cities for which returns were made are selected on the basis of physical needs. In the following table the symptoms which are largely determinative in the selection of children are grouped under the general head of "Principal diagnostic findings," and cover tuberculosis, anemia, malnutrition, chronic heart troubles, and bronchitis. Other defects, such as diseased tonsils, adenoids, and decayed teeth, are given in another division, together with data on defects corrected. Each general division is indicated by heavy lines. The table gives typical conditions and results. It does not, in most cases, include all the open-air school children of the city reporting.

Physical condition of 1,218 children on admission to open-air schools, and certain results obtained in one year's work in such schools.

	Boston.	Chicago.	Cincinnati.	Cleveland.	Louisville.	Minneapolis.	Montclair.	Newark.	New York.	Oakland.	Pittsburgh.	Providence.	Rochester.	St. Louis.	Schenectady.	Springfield.
Number of pupils studied	46	598	50	123	15	54	14	45	80	24	18	25	26	45	30	25
PRINCIPAL DIAGNOSTIC FINDINGS.																
Tuberculosis	22	450	1	62	5	49	4	18	7	11	8	12	6	38	1	15
Anemia and malnutrition	21	136	47	56	8	2	10	24	73	10	8	10	13	6	28	6
Chronic heart disease, bronchitis, etc		12	1		2	3		1		1		3				1
Unrecorded	3		1	5	0	0	0	2	0	2	2	0	7	1	1	3
MINOR DEFECTS, AND RESULTS OF CARE.																
Children having diseased tonsils	10	188	18	17	11	17	7	17	26	16	6	6	8	7	9	
Tonsil defects corrected	5	81	6	7	6	7	7	13	0	7	6	4	0	2	3	
Children having adenoids	8	165	6	11	9	20	7	20	4	13	9	6	4	6	8	
Children having adenoids removed	5	65	3	7	6	7	7	13	0	7	8	4	0	4	3	
Children having defective teeth	28	466	36	41	5	40	14	43	38	19	16	23		18	26	
Children having teeth defects corrected	17	347	34	1	2	14	4	42	3	19	12	21		14	7	
Children having defective eyes	8	152	5	11	3	20	5	12	1	10	5	7	4	6	7	3
Children having eye defects improved or corrected	5	94	2	8	2	7	1	9	0	10	2	4	0	2	6	0
Children having ear defects	2	36	1			3		1		3				1		
Children having ear defects improved or corrected	2	14	0			0		1		1				1		
Children having nose defects		81		1							1			1		
Children having nose defects improved or corrected		26		0							0			1		
MINOR UNCLASSIFIED AILMENTS.																
On admission	31		3	27	5	39	22	12	44	12	11	5	19	27	15	8
Number of such defects improved on discharge	27		2	25	4	39	21	5	44	12	7	4	16	27	13	8
WEIGHT.																
Children who gained in weight	45	546	49	96	15	46	13	29	79	19	18	22	20		22	130.75
Children who lost in weight	1	24		14		6	1						6		6	21
Children whose weight remained the same		10	1	11		1		1	1			3			2	
Total gain in weight, pounds	248.29	2,870.75	297.27	362.00	93.75	163.88	93.57	167.25	362.00	184.50	131.25	88.00	110.75		52.00	
Average gain in weight, pounds	5.40	4.95	5.94	3.00	6.25	3.09	6.68	5.57	4.52	9.71	7.28	3.52	4.26		1.73	6.23

Physical condition of 1,218 children on admission to open-air schools, and certain results obtained in one year's work in such schools—Continued.

	Boston.	Chicago.	Cincinnati.	Cleveland.	Louisville.	Minneapolis.	Montclair.	Newark.	New York.	Oakland.	Pittsburgh.	Providence.	Rochester.	St. Louis.	Schenectady.	Springfield.
HEIGHT.																
Average gain in height.....inches.	2.00	1.5	1.6	.....	.....	1.2	.....	1.2	1.5	2.76	.....	1.5	1.0	.....	.....	.....
HEMOGLOBIN TEST.																
Children who gained	.....	295	20	.....	8	.....	.....	37	68	.....	14	18	15	1	.....	.....
Children who lost	.....	15	.....	.....	2	.....	.....	3	.....	.....	.....	.....	2	.....	.....	.....
Children who remained the same	.....	124	5	.....	2	.....	.....	5	12	.....	.....	4	9	1	.....	.....
Total gain[1]	.....	2,455	215	.....	75	.....	.....	430	780	.....	135	194	160	10	.....	.....
Average gain[1]	.....	8.3	8.6	.....	6.3	.....	.....	9.5	9.7	.....	9.6	8.8	6.2	5.0	.....	.....

[1] In ratio of red corpuscles to white, 100 is taken as a standard.

The material in the above table gives some indication of the health activities carried on in open-air schools. A summary is given below:

CONDITION ON ADMISSION.	CONDITION ON DISCHARGE.
Of 598 Chicago open-air school children—	
188 had diseased tonsils	81 children, i. e., 43 per cent, had tonsils removed.
165 had adenoids	65 children, i. e., 40 per cent, had adenoids removed.
466 had decayed teeth	347 children, i. e., 74 per cent, had teeth corrected.
152 had defective eyes	94 children, i. e., 62 per cent, had improved.
36 had defective ears	14 children, i. e., 38 per cent, had improved.
89 had defective nose	26 children, i. e., 29 per cent, had improved.

CONDITION ON ADMISSION.	CONDITION ON DISCHARGE.
Of 620 open-air school children from different cities—	
175 had diseased tonsils	73 children, i. e., 48 per cent, had tonsils removed.
131 had adenoids	73 children, i. e., 56 per cent, had adenoids removed.
347 had decayed teeth	190 children, i. e., 54 per cent, had teeth corrected.
97 had defective eyes	58 children, i. e., 60 per cent, had improved.
11 had defective ears	5 children, i. e., 45 per cent, had improved.
3 had defective nose	1 child, i. e., 33 per cent, had improved.

In addition to the above there were 308 other minor defects, of which 255 were improved on discharge.

The following table shows the results of hæmoglobin tests applied to children in open-air schools at the beginning and end of school year 1913–14. The Tallquist test was used:

Of 434 Chicago open-air school children—
- 295, or 68 per cent, gained an average of 8 to 9 points.
- 15, or 3 per cent, lost.
- 124, or 29 per cent, remained the same.

Of 227 open-air school children from different cities—
- 181, or 79 per cent, gained an average of 7 to 8 points.
- 8, or 4 per cent, lost.
- 38, or 17 per cent, remained the same.

Answers to the questionnaire on the points covering cleanliness, ventilation, regularity of meals, hours of retiring, etc., were incomplete and unsatisfactory. However, they were fairly well covered in the case of 154 families representing 210 children in four of the Chicago open-air schools. In these schools the nurses gave special attention to cooperation with the home, and the results show that there is a fruitful field for effort in this line. It should be understood, however, that the same results were often secured in other open-air schools, because everywhere there is more or less direct effort on the part of teachers, physicians, nurses, and others connected with the school to secure the hearty cooperation of the home.

When the children entered, 118, or 76.6 per cent, of the 154 families represented kept their homes passably clean. On discharge this number had arisen to 148 families, or to 96 per cent. Similarly, 96 families, or 62.3 per cent of the total, had, when the children were admitted, satisfactory provisions for ventilation, but at the close of the year this number had been increased to 152 families, or all but 2.

Only 94 of the 210 children were supplied in the beginning with regular meals at home. At the close this number had been increased to 186. Again, when the children first entered, only 85 of them went to bed before 9 o'clock in the evening, but at the close of the year's work this number had been increased to 174. On admission 160 of the children, all tubercular, were compelled to share their beds with others. On discharge this number had been reduced to 118.

The home conditions of open-air school children have been more fully dealt with in the chapter on social and economic conditions.

Inadequate income, overcrowding, and lack of conveniences are definite and serious handicaps. However, it is possible in most of these homes to make certain improvements, and even the most discouraged families have responded to resourceful efforts of nurses, teachers, and others to improve conditions. Some of the families have been moved to better quarters, back porches have been made into sleeping rooms, tents put up in back yards, cots purchased to give the child a bed to himself, diets secured, instruction given on the preparation of food, hours of retiring, and regularity of meals, and many other definite services of this kind have been rendered. Few people habitually do the best they can, and when an interested and enlightened person enters such homes and makes the welfare of the little child the point of interest and contact, and when real help, not merely good natured but impractical advice, is offered, a great change may take place.

GAINS IN WEIGHT.

Gain in weight is perhaps the best single index of a child's physical progress and condition. In discussing this phase of the subject it is desirable to have an established norm.

For the sake of comparison two tables have been used: First, that published by Dr. L. Emmett Holt in The Diseases of Infancy and Childhood, 1912 (p. 20). This table is based on a study by Dr. Bowditch of 4,327 boys and 3,681 girls in the Boston public schools. These were normal average children of American parentage. The children were weighed with their clothing on. Most of the children in open-air schools are weighed stripped. The second table was compiled by the Board of Education of Chicago and was the result of a study of 2,788 Chicago schoolboys and 3,471 Chicago schoolgirls. This study was published in Child Study Report No. 2 (pp. 12 ff.), 1900. These children were also weighed with their clothing on. The investigation covered all the children in certain schools, and therefore included many anemic and undernourished children. No racial distinction was made. This is one explanation for the differences between the two tables.

In order to arrive at the net weight of children, the Chicago Board of Education made careful computations as to the weight of clothing by age and sex. It found that the average weight for boys' clothing was 5.8 per cent of the gross weight; that of the girls' 5.2 per cent of the gross weight.

The following tables give Holt's standard and the Chicago Board of Education standard of weights by age and sex. The columns headed "Gross weight" are, respectively, Holt's standard and the board of education standard. The figures in the net-weight columns are obtained by deducting 5.8 per cent of the gross weight of the boys and 5.2 per cent of the girls. The net yearly gain is obtained by comparing the net weights on admission and on discharge.

A table gives the weight of clothing by age and sex and is obtained by applying the Chicago Board of Education standard of 5.8 per cent and 5.2 per cent, respectively, for boys and girls to the gross weights given by Holt and the Chicago Board of Education.

Normal weight, in pounds, for boys.

Ages.	Holt's standard.			Chicago Board of Education standard.		
	Gross weight (clothing included).	Net weight (5.8 per cent gross weight deducted).	Net yearly gain (same percentage deducted).	Gross weight (clothing included).	Net weight (5.8 per cent gross weight deducted).	Net yearly gain (same percentage deducted).
5	41.2	38.8				
6	45.1	42.5	3.7	43.52	41.00	
7	49.5	46.6	4.1	47.66	44.90	3.90
8	54.5	51.3	4.7	52.52	49.47	4.57
9	60.0	56.5	5.2	58.07	54.70	5.23
10	66.6	62.7	6.2	63.30	59.63	4.93
11	72.4	68.2	5.5	68.85	64.86	5.23
12	79.8	75.2	7.0	75.30	71.93	7.07
13	88.3	83.2	8.0	83.98	79.11	7.18
14	99.3	93.5	10.3	94.14	88.68	9.75
15	110.8	104.4	10.9	105.82	99.68	11.00
16	123.7	116.5	12.1	117.39	110.58	10.90

Normal weight, in pounds, for girls.

Ages.	Holt's standard.			Chicago Board of Education standard.		
	Gross weight (clothing included).	Net weight (5.2 per cent gross weight deducted).	Net yearly gain (same percentage deducted).	Gross weight (clothing included).	Net weight (5.2 per cent gross weight deducted).	Net yearly gain (same percentage deducted).
5	39.8	37.7				
6	43.8	41.5	3.8	41.61	39.45	
7	48.0	45.5	4.0	46.25	43.85	4.40
8	52.9	50.1	4.6	50.74	48.10	4.25
9	57.5	54.5	4.4	55.69	52.79	4.69
10	64.1	60.3	6.3	61.29	58.10	5.31
11	70.3	66.8	6.0	67.61	64.00	5.99
12	81.4	77.2	10.4	75.79	71.86	7.77
13	91.2	86.5	9.3	85.94	81.57	9.71
14	100.3	95.1	8.6	97.50	92.43	10.86
15	108.4	102.9	7.8	106.19	100.69	8.26
16	113.0	107.1	4.2	111.69	105.88	5.19

Weight, in pounds, of clothing.

Ages.	Boys.		Girls.	
	Holt.	Board of Education.	Holt.	Board of Education.
5			2.1	
6	2.6	2.52	2.3	2.18
7	2.9	2.76	2.5	2.40
8	3.2	3.05	2.8	2.64
9	3.5	3.37	3.0	2.90
10	3.9	3.67	3.3	3.19
11	4.2	3.99	3.7	3.52
12	4.6	4.37	4.2	3.93
13	5.1	4.87	4.7	4.47
14	5.8	5.46	5.2	5.07
15	6.4	6.14	5.5	5.51
16	7.2	6.81	5.9	5.81

As noted elsewhere, the average gain in weight for all of the Chicago open-air school children was 4.95 pounds, and the average gain for the children in open-air schools in other cities, 4.73 pounds. In order to know whether gains in weight are significant, they should be studied by age and sex and should be compared with established norms for children of the same age and sex. Gains in weight stated as isolated facts may mislead the person who deals with the figures. They often sound large, when perhaps they are below what the child should have gained in a given period. Rapid gains in weight in the early weeks or months in an open-air school are likely to be obtained, especially where meals are served as a part of the plan of the school.

Studies of gains in weight in Chicago open air and open-window schools are indicated in the tables following. They give the weight on admission, the year's gain, and the percentage of gain of 169 girls and 165 boys, who were in Chicago open-air and open-window schools the entire school year 1913–14, together with corresponding figures for pupils of the same age, according to the Chicago Board of Education standard and that of Holt.

Percentage of gain in weight made by 169 girls and 165 boys in Chicago open-air schools the full school year 1913–14, compared with the percentage of gain in weight of children of the same age, as established in the standards by Holt and the Chicago Board of Education.

GIRLS.

Ages.	Number of pupils.	Actual average weight at beginning of school year.	Actual average gain during school year 1913–14.	Per cent of gain.	Holt's standard.			Board of Education.		
					Normal weight.	Normal gain.	Per cent of gain.	Normal weight.	Normal gain.	Per cent of gain.
		Pounds.	*Pounds.*	*Per cent.*	*Pounds.*	*Pounds.*	*Per cent.*	*Pounds.*	*Pounds.*	*Per cent.*
7	4	43.9	2.4	5.5	41.5	4.0	9.6	39.5	4.4	11.1
8	10	47.1	4.5	9.5	45.5	4.6	10.1	43.8	4.3	9.8
9	27	50.7	4.4	8.7	50.1	4.4	8.8	48.1	4.7	9.8
10	20	52.3	4.4	8.4	54.5	6.3	11.6	52.8	5.3	10.0
11	28	55.8	5.5	9.9	60.8	6.0	9.9	58.1	6.0	10.3
12	33	62.7	6.5	10.4	66.8	10.4	15.6	64.1	7.8	12.2
13	21	72.0	10.2	14.2	77.2	9.3	12.0	71.9	9.7	13.5
14	22	76.4	8.5	11.1	86.5	8.6	9.9	81.5	10.9	13.4
15	4	77.5	5.2	6.7	96.1	7.8	8.2	91.8	8.9	9.7

Percentage of gain in weight made by 169 girls and 165 boys in Chicago open-air schools the full school year 1913–14, compared with the percentage of gain in weight of children of the same age, as established in the standards by Holt and the Chicago Board of Education—Continued.

BOYS.

Ages.	Number of pupils.	Actual average weight at beginning of school year.	Actual average gain during school year 1913–14.	Per cent of gain.	Holt's standard.			Board of Education.		
					Normal weight.	Normal gain.	Per cent of gain.	Normal weight.	Normal gain.	Per cent of gain.
		Pounds.	*Pounds.*	*Per cent.*	*Pounds.*	*Pounds.*	*Per cent.*	*Pounds.*	*Pounds.*	*Per cent.*
7	6	41.1	3.7	9.0	42.5	4.1	9.6	41.0	3.9	9.5
8	21	46.9	2.9	6.2	46.6	4.7	10.1	44.9	4.6	10.2
9	21	49.9	3.7	7.4	51.3	5.2	10.1	49.5	5.2	10.5
10	24	58.3	4.1	7.0	56.5	6.2	11.0	54.7	4.9	8.9
11	28	59.7	5.0	8.4	62.7	5.5	8.8	55.7	4.8	8.7
12	18	63.4	6.1	9.6	68.2	7.0	10.3	64.8	7.1	10.9
13	29	69.4	7.0	10.1	75.2	8.0	10.6	71.9	7.2	10.0
14	14	72.1	9.1	11.2	83.2	13.3	12.4	79.0	9.7	12.3
15	9	79.9	10.8	13.5	93.5	10.9	11.6	88.7	11.0	12.4
16	3	67.6	5.2	7.7	101.4	12.1	11.6	99.7	10.9	10.9

Perhaps the only comment to be made here is that the large gains in weight made during adolescent growth occur a year or more later with the open-air school children than with those indicated in the other standards.

Weight of same girls and boys at the close of the school year 1913–14 compared with the standard set by Holt and the Chicago Board of Education for pupils of the same age.

GIRLS.

Ages.	Number of pupils.	Actual average weight.	Normal weights according to—	
			Holt.	Chicago Board of Education.
		Pounds.	*Pounds.*	*Pounds.*
7	4	46.3	45.5	43.9
8	10	51.6	50.1	48.1
9	27	55.1	54.5	52.8
10	26	56.7	60.8	58.1
11	28	61.3	66.8	64.1
12	33	69.2	77.2	71.9
13	21	82.2	86.5	81.6
14	22	84.9	95.1	92.4
15	4	82.7	102.9	100.7

BOYS.

7	6	44.8	46.6	44.9
8	13	49.9	51.3	49.5
9	21	53.6	56.5	54.7
10	24	62.4	62.7	59.6
11	28	64.7	68.2	64.9
12	18	69.5	75.2	71.9
13	29	76.4	83.2	79.1
14	14	81.2	93.5	88.7
15	9	90.7	104.4	99.7
16	3	72.8	116.5	110.6

It will be recalled that the average gain for the Chicago children was a little larger than the average for the combined number of children reported from other cities. In considering these tables the physical condition of these children should constantly be borne in mind. The figures for the Chicago children, as well as the children from other cities, covered only the 10 months' school year. The figures given by Holt and the Chicago Board of Education are for a full year. In the case of 60 Chicago children who were in the open-air schools two full school years, there was a slight increase in weight during the summer months. Of the 60 children, 30 gained, 27 lost, and 3 remained the same. It resulted in an average increase of twenty-two one-hundredths of a pound for the whole group. With one exception the schools studied were in session only five days a week, and most of them only the usual school hours. In most instances there were two meals a day at the school. In the Chicago schools the food values average 1,100 calories per pupil per day. It is the experience in the Chicago open-air schools that children lose in weight Saturdays and Sundays and on holiday vacations.

In this connection there are presented herewith certain data on the increase in weight of children in open-air schools in England, which are taken from the report of the school medical officer on open-air schools to the education committee of the London County Council, March, 1913. The tables give results obtained with 93 children who were in the Birley House open-air school in the school year 1911–12. These children were admitted to the school by the examining medical officer on account of the following conditions:

Malnutrition and general poor physique	30
Family history of or signs suggesting phthisis	22
Phthisis	19
Anemia	9
Chest conditions (nontubercular)	4
Enlargement of glands	5
Other conditions	4

The following table shows the average weight (expressed in kilograms) of these children, by ages, on admission to the Birley House school, compared with the corresponding averages of all London elementary school children. (A kilogram equals a little more than 2.2 pounds.)

Birley House school children compared with all London elementary school children as to average weight.

Boys.				Girls.			
Age last birthday.	Birley House children.	Average weight on admission.	Average weight of all L. C. C. school boys.	Age last birthday.	Number of children.	Average weight on admission.	Average of all L. C. C. school boys.
		Kilograms.	*Kilograms.*			*Kilograms.*	*Kilograms.*
7	4	22.57	(1)	7	1	20.70	.....
8	4	22.32	23.47	8	4	19.10	22.92
9	7	23.78	25.48	9	9	23.10	25.00
10	7	26.77	27.59	10	7	26.35	27.16
11	11	28.62	29.25	11	7	27.80	29.87
12	11	34.16	32.46	12	8	28.81	33.32
13	3	33.13	36.40	13	2	35.30	37.71

(1) Not recorded.

It will be noted that in every instance the open-air school children on admission were below the average weights of "all London County Council school children."

The next table shows the average gain in weight in kilograms in each age group during the 40 weeks covered by the study, compared with the corresponding averages of all London elementary school children.

Birley House school children compared with all London elementary school children as to average gain in weight.

Boys.				Girls.			
Age last birthday.	Birley House children.	Average gain in 40 weeks.	Average gain in standard boys.	Age last birthday.	Number of children.	Average gain in 40 weeks.	Average gain in standard girls.
		Kilograms.	*Kilograms.*			*Kilograms.*	*Kilograms.*
7	4	2.7	(1)	7	1	1.5	(1)
8	4	1.7	1.56	8	4	3.0	1.67
9	7	2.2	1.78	9	9	2.9	1.89
10	7	2.7	1.78	10	7	3.4	2.42
11	11	2.7	2.33	11	7	3.5	2.89
12	11	3.8	2.89	12	8	4.2	3.33
13	3	4.3	2.67	13	2	4.0	3.67

(1) Not recorded.

The same report gives another table which shows the average weekly gain in weight in kilograms at various ages compared with the corresponding average weekly gain of all London elementary school children.

Birley House children compared with all London elementary school children, as to average weekly gain in weight.

Boys.				Girls.			
Age last birthday.	Birley House children.	Average weekly gain.	Average weekly gain in standard boys.	Age last birthday.	Birley House children.	Average weekly gain.	Average weekly gain in standard girls.
		Kilograms.	*Kilograms.*			*Kilograms.*	*Kilograms.*
7	4	0.07	.....	7	1	0.04	.....
8	4	.01	0.04	8	4	.10	0.04
9	7	.05	.01	9	9	.07	.05
10	7	.07	.04	10	7	.08	.06
11	11	.07	.05	11	7	.09	.07
12	11	.10	.07	12	8	.10	.08
13	13	.11	.07	13	2	.13	.09

The Birley House school was in session six days a week, from 9 o'clock in the morning until 6 in the afternoon. The children were given three meals a day at this school.

A hæmoglobin test was also made of these children. Quoting again from the report of the medical officer of the London County Council:

> Some measure of improved conditions of bodily health is afforded by the estimations of the hæmoglobin content of the blood; the summary of these (made with Tallquist's scale) is set out in the table below, 100 being taken as normal.

Hæmoglobin averages at Birley House, 1912.

Occasions.	Boys.	Girls.
At opening of school	86.6	85.3
At end of 24 weeks	89.1	88.7
At end of 44 weeks	91.8	90.7

It may be of interest to compare the gains in weight of the Birley House open-air school with those of Chicago open-air school children. The following table gives such a comparison by age and sex between 85 Birley House school children and 334 Chicago open-air school children:

Comparison of gains in weight between Chicago open-air school children and children of the Birley House open-air school, London, England.

Boys.			Average gain in 40 weeks.		Girls.			Average gain in 40 weeks.	
Ages.	Chicago.	Birley House.	Chicago.	Birley House.	Ages.	Chicago.	Birley House.	Chicago.	Birley House.
7	6	4	3.7	5.94	7	4	1	2.4	3.30
8	13	4	2.9	3.74	8	10	4	4.5	8.58
9	21	7	3.7	4.84	9	27	9	4.4	6.38
10	24	7	4.1	5.94	10	20	7	4.4	7.48
11	28	11	5.0	5.94	11	28	7	5.5	7.70
12	18	11	6.1	8.36	12	33	8	6.5	9.24
13	29	3	7.0	9.46	13	21	2	10.2	10.78

The above tables show that in every instance the gains of children in the Birley House school, England, were greater than those of the Chicago children. The discrepancy in numbers should be borne in mind—334 Chicago children compared with 85 in the Birley House school.

Again, the Birley House school was in session six days a week and from about 8.30 in the morning until 6 o'clock in the evening. Three meals a day were served in the Birley House school and two in the Chicago schools. The one day extra a week gave the Birley House school children 40 extra days.

As has been stated, it is the experience in the Chicago schools that children lose in weight over week ends and on holidays. A perusal of records in general seems to indicate the desirability of a six-days school week for open-air school children. In some of the foreign schools the children are in the school seven days a week.

In the report of the school medical officer of Bradford, England, for the year 1912 (p. 45) is another interesting table showing the average gain in weight, height, hæmoglobin, chest measurement, and average duration of attendance at Bradford (England) open-air school.[1]

Showing the average gain in weight, height, hæmoglobin, chest measurement, and the average duration of attendance of children at the open-air school.

Diseases.	Children.	Weight (kilograms).	Height (centimeters).	Hæmoglobin.	Chest measurement (in inches).	Average stay (in months).
Phthisis:						
Boys	35	2.93	4.23	23.63	1.14	6.56
Girls	36	2.44	3.01	21.76	1.22	7.00
Other tubercular diseases:						
Boys	17	1.94	3.16	19.20	1.50	4.99
Girls	16	2.29	4.15	24.78	1.30	7.13
Anæmia:						
Boys	46	1.63	2.04	22.44	.80	3.92
Girls	86	2.31	2.88	23.48	1.20	5.01
Bronchitis and other chest diseases:						
Boys	20	1.92	2.14	22.00	.90	4.17
Girls	19	1.77	3.03	24.75	.82	5.48
Heart disease:						
Boys	4	2.32	3.37	26.50	1.80	[2]6.25
Girls	10	2.51	3.06	19.40	.81	4.67
Chorea:						
Boys	4	1.72	22.00	20.75	.75	4.37
Girls	10	2.50	2.81	21.80	1.10	4.06
Rickets:						
Boys	5	1.83	1.70	28.00	1.33	6.15
Girls	2	3.35	4.30	29.50	.75	6.12
Other diseases:						
Boys	16	1.47	2.36	20.00	1.22	2.38
Girls	12	1.80	2.75	27.16	1.33	3.86
Average	[1]338	[2]2.15	2.93	21.57	1.12	5.43

[1] Total. [2] Equals 4½ pounds.

A feature worthy of special comment in this table is the column giving the average length of stay for the different children. There

[1] Bradford, England, Education committee. Report of school medical officer, 1912, p. 45.

is a widespread interest in the result of open-air school work, and these tables are given as examples where records have been kept. They emphasize features which should be kept in mind by those conducting open-air schools. Average gains are, in themselves, interesting, but to be valuable as guides they should be studied with reference to age and sex and compared with carefully established norms.

SCHOLARSHIP.

No effort was made to gather data with regard to general educational results. In the city of Chicago, however, the Elizabeth McCormick Memorial Fund has made a study of the grade progress of 522 children who were in the Chicago open-air and open-window schools during the entire school year 1913–14. The grade of each pupil was recorded on admission to these schools in September, 1913. The following table is based on the grade marks given to the same children by the teachers at the close of school in June, 1914:

Grade progress of 522 children in Chicago open-air and open-window schools, school year 1913–14.

Number of children.	Grades made in school year 1913–14.
1	3
12	2
9	1½
387	1
113	0

The progress of these same children prior to their attendance in the open-air school is shown in the next table. Nine of these children entered the school during school year 1913–14 and were eliminated from the following study. Of the 522 children 25 had not completed a grade at the end of the school year 1912–13 and were not included. The table, therefore, concerns 488 of the 522 children.

The results shown in the table were arrived at as follows: The age of all the pupils was taken at the beginning of the school year 1913, as was also the number of grades completed by each child up to that date. These were known quantities. Second, the table assumes that, according to the usual standards, each child entered school in his seventh year; that he continued in school regularly, and that he should have made one grade each year. A table based on the above facts and assumptions follows:

Average length of time required per grade for 488 children previous to attendance in open-air schools.

Number of children.	Total number of years in school.	Number of grades completed.	Average number of years to make grade.
7	7	14	0.50
4	8	12	.67
1	5	7	.71
4	15	20	.75
4	16	20	.80
1	5	6	.83
107	337	337	1.00
7	56	49	1.14
5	35	30	1.16
30	180	150	1.20
27	135	108	1.25
2	18	14	1.28
36	156	117	1.33
13	91	65	1.40
1	10	7	1.42
51	204	136	1.50
1	8	5	1.60
28	140	84	1.67
19	133	76	1.75
1	9	5	1.80
70	304	152	2.00
6	42	18	2.33
12	66	24	2.50
2	16	6	2.67
20	78	26	3.00
2	14	4	3.50
9	36	9	4.00
5	25	5	5.00
1	6	1	6.00
2	14	2	7.00
488			

This table shows that previous to entering the open-air school 129 children made a grade in a year or less; that 339 averaged more than one year to a grade. In the open-air school 409 made a grade in a year or less and 113 failed to make a grade in their year in the open-air school. We call attention again to the assumptions on which the table is based, also to the fact that there were 522 children in the first table and 488 in the second. We realize that it is too much to assume that previous to the admission to the open-air school all the children went regularly. The study is offered more as a suggestion and to stimulate interest and further study than as presenting anything final on the subject. It raises the interesting question also as to how many years a child should spend in a grade without attracting attention and receiving such care as he needs.

Another study was made by the Elizabeth McCormick Memorial Fund of the children in the open-air schools in the school year 1911–12. The school progress of 151 children in the open-air schools in Chicago in that year was compared with the scholarship of the same children in the regular schools for the school year 1910–11. These figures were taken from the grade marks as given by the

teachers. The marks for the 151 children were averaged and were as follows:

Average scholarship of 151 children in open-window rooms, school year 1911–12	84.54
Average scholarship of same 151 children in regular schools, school year 1910–11	74.43
Average gain in scholarship in open-window rooms	10.17

One hundred and four of the 151 children improved in scholarship.
Thirteen of the 151 children lost.
Thirty-four of the 151 children remained the same.

In the report of the Rochester (N. Y.) Public Health Association for 1911–13, page 257, the results of scholarship in the Rochester open-air schools are given as follows: Of 149 children in attendance, 111 made usual grade progress; 14 made more rapid progress, and 12 less rapid progress than is customary in the regular school. The Ethical Culture School of New York City, in its prospectus of 1914, states that the majority of children have accomplished as much work in the promotion subjects as those in corresponding grades indoors. The South Manchester (Conn.) open-air school for 1913 reports that 3 children have done almost two years' work in one, 12 have completed 1 year's work in one year, and 3 are not doing much of anything, being extremely nervous; 4 have just entered. The educational club of South Manchester, Conn., in its report for 1913–14, reports that the children in their open-air school range from 6 to 15 years, and in grades from one to eight. Of 22 children in school at that time, 11 completed a year's work in a year's time. Of this number 3 were called "slow" and had repeated one or more grades previous to entering the open-air school. Four pupils did a year's work in 30 weeks; 3 of these were repeaters from the year before. Of the remaining 7 all were in poor physical condition. Three failed to make a grade in a year, 1 was withdrawn, and the other 2 are not recorded. These are fair samples of the comments and records of open-air schools.

ATTENDANCE.

In the matter of attendance a number of studies have been made comparing attendance in open-air schools with that of closed-window rooms in the same city and for children of as near the same physical, social, and economic conditions as could be chosen. The open-window rooms usually show a better percentage of attendance. In the report of the health officer of the District of Columbia, for 1911, page 22, is this statement: "The number of days lost from illness in outdoor schools since the first examination is 60, while the indoor school was 161, average loss per pupil in outdoor school 2.40 days, for the indoor 4.79." The annual report for 1911–12, of the Civic

Club of Allegheny County, Pittsburgh, Pa., page 27, showed a record of absences for a 20-day period in March, 1912, in a roof school and in a primary room in one of the nearest public schools. Attendance in the open-air school was almost 2 per cent higher than that in the closed schoolroom. While something like 14 of the closed-room pupils were absent because of sick headaches, indigestion, sore throats, etc., not one of the children was out of the open-air school for such a cause.

The attendance record of 127 children in the Chicago open-air and open-window schools for the year 1911–12 was studied. Some of the records were incomplete and in such cases the children were not included in the study. Complete records were secured for 92 children. The comparison was made with the attendance of the same children in the regular schools for a corresponding period, both as to duration and time of year, next preceding their admission to the open-air schools. Of the 92 children, 61, or 66.3 per cent, showed a better record of attendance; 10, or 10.8 per cent, remained the same; 21, or 22.8 per cent, lost in percentage of attendance.

Contagious and infectious diseases are often important factors in school attendance. The absence of such diseases in open-air schools is a matter of frequent comment in open-air school reports. In Philadelphia the Christian Street open-air school reported that during the first 10 months of open-air school work no case of contagious diseases occurred among the children. Only two were absent on account of illness. Mrs. Ellenore Comstock Robertson's private open-air school, Syracuse, N. Y., in the report of December, 1913, says: "Since opening October 1, 1912, we have had no spread of contagious disease, although we have had among our pupils two cases of chicken pox, one of mumps, and one of whooping cough caught from brothers and sisters at home. Although our children have had colds, they do not seem to spread from one to another." The Ethical Culture School of New York, in its prospectus of 1914, says: "The health of most of the children has improved in rather a marked degree. Several children, who previous to entering had shown a tendency to take cold very easily, have overcome this weakness in a way which has delighted their parents. Even more remarkable has been the complete disappearance in a number of cases of nervous habits observable in every ordinary classroom, choreic symptoms, tendency to stutter when excited, etc." The open-air school at Springfield, Mass., reports an attendance record for the school year 1912–13 of 98.2 per cent. The principal says: "We have some children who are just beginning to know what it is to be regular in school attendance." E. L. Garling, superintendent of Maitland Sanitarium, Peppard Common, Oxon, England, says in report of February, 1914: "Our record of school attendance is very good, as

we have been remarkably free from minor ailments and casualties. The open-air life seems to promote a regular level of healthfulness which renders even so-called invalid children more capable of regular school attendance than normal children."

EXPERIENCE OF TEACHERS.

The reaction of open-air school work upon the teachers is interesting. The smaller number of children gives a greater opportunity for individual work and for a more intimate acquaintance with the child himself. This fact alone has great significance. The mass dealing with children may prevent really knowing the individual child at all. The more original and less formal methods possible in an open-air school, on account of small numbers, also are an aid to the teacher. She meets the child at more points of contact and more nearly on the child's own terms. The teacher has these and other advantages in addition to that of fresh air, which is as necessary to working efficiency as steam is to an engine. A teacher in Montclair, N. J., stated that she would agree to teach the children the same amount in the open air in one-third the time that would be required in a closed, heated room.

In London, England, in the Botanical Gardens open-air school, one teacher is quoted in The Child, of March, 1914, page 443, as saying that she had fewer headaches in the open-air schools. Another that she had been in better health in the open-air school than ever before. Both said they had not felt the cold at all. One said, "I would never teach in a closed room if I could help it; there is less nerve strain out of doors, both for the teachers and children; the fidgetiness and inattention which often arise from a badly ventilated room do not occur." In the annual report of the board of education, Grand Rapids, Mich., 1912, page 21, is a quotation from the principal of the open-air school:

> To see children change in a few weeks from listless, drowsy, slow, gaping, lazy, shuffling children, whose special rôle is a habit of failure, into children with an air of superiority and confidence, and whose new rôle is a habit of success, has startled some of us into thinking. * * * The law requires pupils to attend schools where the amount of oxygen is decreased, and also where the air is stagnant, overheated, too dry, impregnated with bad odors, and often laden with dust and bacteria. They are expected to do brain work, an essential condition of which is an adequate supply of oxygen. From the point of view of school hygiene, the question is raised why normal children should not be permitted the supply of oxygen that is an essential condition of the work required of them as well as children who are ill.

The following comments are from open-air school teachers in the cities indicated:

> *Providence, R. I.*—I would not care to return to the closed room. My pleasure in my work makes me wish that, for the sake of the teacher as well as the pupil, every schoolroom might be an open-air room.

Boston, Mass.—For a score or more years my experience as a teacher has been gained in the public schools of this country, in good old New England, California, and the Middle West. Our teachers to-day are victims of nervousness, irritability, and so-called overwork. Those who have tried the outdoor work have been capable of more prolonged labor with far less fatigue. This is my own testimony, and nearly all associate teachers who have given it a fair trial feel there is no school for them like the open-air school.

Chicago, Ill.—Fresh air has done wonders for me. I am strong and fat and have gained 10 pounds since last year in spite of seven weeks' work in the summer. My complexion has undergone a complete change. Instead of being a sallow, dead, dry-skinned person, my skin is fresh, full of life, and rosy.

Chicago, Ill.—I have never in my life been so free from backache and extreme fatigue as I have been since I took the open-air school. "How do you keep so fresh?" asked another teacher last night. "I am always nervously exhausted after a dark, rainy day like this." I told her truthfully that I had ceased to dread such days. Not even rain can dispel the sunshine in the open-air school.

EFFECTS ON INDIVIDUAL CHILDREN.

The effort has been in this chapter to give some indication of results obtained in open-air school work. It has been necessary to deal with the children in groups and by averages; however, the small army of debilitated children in the open-air schools and the vastly larger numbers of the same kind of children not yet properly cared for, like every other army, is resolvable into individual units. Somebody is especially interested in each child. It would be interesting to narrate the individual stories of these open-air school pupils, for every story would have its own special appeal. This is strikingly true when proper nurture and care are given to children who previously have not had opportunities and who have been prevented from making normal progress by reason of physical handicaps.

A teacher in the Buffalo open-air school reports a girl of 12, whose mother brought the child to the school quite in despair on account of her daughter's nervous condition. The child was thin, undernourished, and anemic. She was nervous, discouraged, and often cried without any apparent cause. She had defective eyes and ears, and poor teeth. She was suffering from adenoids and hypertrophied tonsils, and was a mouth breather. She was admitted to the open-air school and in the year following gained 20 pounds, the anemia and malnutrition disappeared, her eyes were treated and made to function properly, her hearing was corrected, the adenoids and tonsils were removed and she was able to breathe normally and properly. She became ambitious, happy, and capable in every way. Her attendance was practically perfect. The child's happiness was fully equaled by that of the mother, who had not believed such a transformation possible.

The superintendent of the open-air school at Grand Rapids reports the story of a little girl who was brought to his office by her mother;

who declared that the child had not been able to attend school for more than two weeks at a time for years. She requested that the child be placed in the open-air school. The superintendent responded to her request and says that in the past year the child did not miss a day and besides that made three grades in one year, and gained 25 pounds in weight.

In the same school was a boy who was unable to remain in the climate of Grand Rapids the previous year and spent the cold months in Texas. His parents were planning to send him to Texas again, but decided to try the fresh-air school. The superintendent reports that he attended school regularly all winter and made good progress in his studies.

The following story was told by one of the Chicago open-air school-boys in a little autobiography which he wrote for the Open-Air Smile, a monthly periodical which was started by the children of the Chicago open-air schools:

I was born in a little gray house in a little country town near the city of Kiev. When I was 2 years old my downfall began. First I fell sick and had the scarlet fever, and as soon as I was cured of that I caught diphtheria, and after I was cured of that I caught pneumonia. I stayed in bed for a year and I n[illegible] got out of bed for that long time. When I was 6 years old I came to America to the city of Chicago. Everybody had told us in Russia that gold was lying everywhere in the streets. I started to go to school at the Garfield School. Later, we moved to a different street, so I took a transfer to the Langland School, and later on we moved again, and then I came to the Goodrich School, which I attended a couple of years. When I was finally in the seventh grade I was sent out to Winfield tuberculosis camp. I stayed there six months, because I was charged with having tuberculosis. Those six months passed away so quickly that it seemed to me like six weeks. I think it was the happiest time of my life, staying out there. When I went home hardly anybody recognized me, because I was not the sick little fellow that I was when I went to Winfield, but a big, strong, and healthy boy with cheeks like roses. Later on I was put in the Foster open-air room, where I am now in the eighth grade.

The stories of practically all the children in open-air schools are of tragic interest. In the great majority of cases the improvement is marked, and the response by the pupil is most gratifying, not only to the teachers and to the parents, but the children themselves are conscious of the change.

The chief object of these schools has been to build up the health of children, in order that they may become more capable of assimilating and benefiting by the instructions given in the ordinary schools, and that they may thereby become better qualified for the duties of life.

The material in this chapter gives some indication of the results that have accrued directly to the children and to the teachers. There has been an indirect effect upon the community itself and upon the

general school problem, for the open-air school, in addition to its direct ministry to the children involved, has become an educational laboratory where more natural and less formal methods have been used and where experiments and systems have been tried which are directed to the needs of children. Wherever there is an open-air school will be found a group of people who are deeply interested in the school problem and who are determined that the public schools shall be as rich and fruitful as it is possible for the community to make them. They believe that it should be impossible for any pupil to sit through the seven or eight years required of every child, with his handicaps undiscovered and unrelieved and his school experience impaired or negatived by the presence of remediable defects. The immediate purpose of the open-air school will be realized only when all debilitated children now in the regular schools have a chance for fresh air, sufficient food, and a general hygienic life. The ultimate purpose is to keep the children from getting sick and anemic by emphasizing the rights of all to a sanitary and wholesome life.

FIG. 104.—"The open-air smile."

APPENDIXES.

APPENDIX A.

Social, economic, and hygienic conditions of 886 families of 1,062 open-air school pupils in 15 American cities.

Cities.	Families studied.				Tuberculous families.				Income.					Housing.		
	Number of families reported.	Members in families (including pupils) studied.	Number of open-air pupils in families.	Average number of persons in families.	Tuberculous persons (including pupils) in families.	Number of pupils who were tuberculous.	Average number of tuberculous persons to each family.	Percentage of tuberculous members.	Number of families reported.	Total number of members in families.	Number of pupils in families.	Total monthly income of families.	Average monthly income per family.	Average income per person per month.	Number of families reported.	Number living in tenements.	Number living in detached houses.
Chicago	280	2,342	488	8.16	683	389	1.79	29.1	285	1,784	371	$12,530.20	$43.96	$7.02	375	274	101
Cincinnati	48	248	50	5.20	7	1	.15	2.8	35	194	36	1,389.00	36.83	7.16	43	34	9
Cleveland	87	587	123	6.70	75	61	.90	12.7	53	353	68	1,868.50	35.26	5.29	84	57	27
Louisville	14	98	15	7.00	8	5	.60	8.2							14	9	5
Minneapolis	46	277	54	6.00	74	51	1.60	26.7	41	247	48	1,740.40	42.45	7.04	45	14	31
Montclair	14	113	14	8.10	6	4	.40	5.3	9	65	9	289.[illegible]	32.17	4.45	13	6	7
Newark	45	283	45	5.70	22	18	.50	7.8	35	201	35	1,891.[illegible]	54.04	9.41	44	31	13
New York	76	491	80	6.50	14	7	.20	2.8	72	527	76	3,819.10	53.04	7.24	76	75	1
Oakland	20	101	24	5.10	12	11	.60	11.9	13	78	18	1,455.00	97.00	18.65	20	20	....
Pittsburgh	18	107	18	6.30	21	8	1.20	19.6	16	100	16	552.00	34.50	5.52	18	13	5
Providence	23	154	25	6.70	22	12	.90	14.0	21	142	23	723.00	34.45	5.09	23	18	5
Rochester	26	157	26	6.00	21	12	.80	13.4							26	8	18
St. Louis	39	191	45	5.30	70	38	1.90	36.6	25	135	30	1,181.65	47.27	8.75	36	32	4
Schenectady	25	163	30	6.50	1	1	.04	.6	20	127	23	1,714.50	85.73	13.50	25	13	12
Springfield	23	128	25	5.10	17	15	.70	13.3	16	84	15	746.00	49.73	8.88	25	19	6

Social, economic, and hygienic conditions of 886 families of 1,062 open-air school pupils in 15 American cities—Continued.

Cities.	Rooms.					Bedrooms.					Rent.			
	Number of families reported.	Total number of members in families.	Number of open-air pupils.	Total number of rooms.	Average number of persons per room.	Number of families reported.	Total number of members in families.	Number of open-air pupils.	Total number of rooms used as bedrooms.	Average number of persons per bedroom.	Percentage of rooms used as bedrooms.	Number of families reported.	Total number of rooms.	Total monthly rent of families studied.	Average monthly rent per family.	Average monthly rent per room.
Chicago	380	2,216	466	1,663	1.3	290	1,806	378	803	2.2	60.60	307	1,465	$3,587.00	$11.68	$2.46
Cincinnati	47	242	49	155	1.6	47	242	49	99	2.5	65.00	43	137	510.00	11.86	3.72
Cleveland	86	582	122	369	1.5	82	562	116	238	2.4	63.00	67	301	835.00	12.47	2.74
Louisville	14	98	15	45	2.2	13	91	14	24	3.8	57.00					
Minneapolis	46	277	54	245	1.1	45	274	53	124	2.2	51.25	39	207	525.60	13.46	2.54
Montclair	14	113	14	69	1.6	14	113	14	44	2.6	63.80	10	44	126.50	12.55	2.85
Newark	45	263	45	213	1.2	45	263	45	119	2.2	56.63	42	198	533.25	12.70	2.69
New York	76	491	80	280	1.8	6	40	6	15	2.7	79.30	68	252	1,044.00	15.36	4.14
Oakland	19	98	23	129	.8	17	88	21	59	1.5	52.00	5	28	75.00	15.00	2.68
Pittsburgh	17	107	17	48	2.2	17	107	17	38	2.9	75.00	17	48	204.00	12.00	4.25
Providence	23	154	25	120	1.3	23	154	25	69	2.2	57.50	21	114	217.00	10.30	1.90
Rochester	6	34	6	26	1.3	7	42	7	18	2.3	57.70					
St. Louis	34	182	40	113	1.7	27	132	31	53	2.5	63.00	23	71	226.85	9.86	3.20
Schenectady	25	163	30	162	1.0	25	163	30	73	2.2	44.85	12	70	194.50	16.21	2.78
Springfield	25	128	25	145	.9	25	128	25	82	1.6	56.60	19	103	279.00	14.68	2.71

APPENDIX B.

ESTIMATED EXPENSE OF EQUIPPING AND MAINTAINING AN OPEN-WINDOW ROOM WITH FULL REGIME OF MEDICAL AND NURSING SERVICE, FEEDING, AND REST.

(TWENTY-FIVE CHILDREN—SCHOOL YEAR 10 MONTHS.)

FIRST YEAR.		
25 coats, at $4.00	$100.00	
1 teacher's coat	10.00	
25 felt boots, at $1.35	33.75	
Boots for teacher	1.35	
25 cots, at $3	75.00	
25 sleeping blankets, at $3.85	96.25	
25 weighting aprons, at 25 cents	6.25	
25 cot covers, at 20 cents	5.00	
25 pairs wool gloves, at 50 cents	12.50	
Gloves for teacher	.50	
		$340.60
Scales and measuring rod	30.00	
China and silver	20.00	
Kitchenware	30.00	
Supplies	20.00	
		100.00
Thermometers and drugs	20.00	
Laundry	12.00	
Car fare	10.00	
Miscellaneous	10.00	
		52.00
8 window ventilators, at $3		24.00
Total equipment		516.60

FIRST YEAR—continued.		
Service:		
Physician, at $50 per mo	$500.00	
Matron, at $40 per mo	400.00	
		$900.00
Food:		
Milk (¾ qt., at 9 cents, per day per child)	337.50	
Bread	65.00	
Meat	70.00	
Groceries	115.00	
		587.50
Total expense		1,994.10
If the following equipment is not furnished by the board of education, the cost will be:		
Kitchen sink		15.00
Gas stove		25.00
2 cupboards		80.00
2 kitchen tables		5.00
2 dining-room tables		25.00
30 chairs, at $1		30.00
		180.00

(TWENTY-FIVE CHILDREN—SCHOOL YEAR 10 MONTHS)—Continued.

SECOND YEAR.

The suits should wear 3 to 4 years.		
The boots should wear 2 to 3 years.		
The gloves should wear 2 to 3 years.		
The cots should wear 5 years or more.		
Repairs on suits	$12.50	
Repairs on boots, resoling, at 60 cents	15.00	
Repairs on cots	10.00	
10 pairs gloves, at 50 cents	5.00	
		$42.50
Replenishing china and silver	10.00	
Replenishing kitchenware	10.00	
Supplies (towels, napkins, etc.)	20.00	
		40.00
Thermometers and drugs	20.00	
Laundry	12.00	
Car fare	10.00	
Miscellaneous	10.00	
		52.00
Service for 10 months		900.00
Food for 10 months		587.50
Total expense for second year		1,622.00

APPENDIX C.

RECIPES FOR OPEN-AIR SCHOOLS.

The following recipes for the preparation of foods especially adapted to the needs of the open-air school children of Chicago were worked out by the matrons, in cooperation with the physicians, nurses, dietitians, and teachers. They are here inserted for the guidance or help of those teachers who are working with children of a similar type and under somewhat comparable conditions. Each recipe is designed to serve 30 children.

SOUPS.

Tomato and Lentil Soup.

1½ lbs. lentils soaked over night.
4 oz. bacon.
4 oz. onions, fried in bacon drippings till nearly done.
1 stalk celery.
2 lbs. potatoes, cubed.
½ lb. carrots.

Boil lentils about 3 hours, add vegetables and cook until done through. Add one can tomatoes. Season with salt, pepper, and small amount of vinegar, to taste.

Navy Bean Soup.

2 lbs. navy beans.
Knuckle of veal.
2 small onions.
Celery.

Wash the beans and soak over night in cold water. In the morning put them on to boil, adding more water if necessary. Put in the knuckle of veal, a few stalks of celery, and 2 small onions. Cook slowly 3 hours, watching carefully, as it burns easily. Season to taste with salt, pepper, and paprika. Serve with slices of toast. Split pea soup may be made the same way.

Tomato Soup with Rice.

7 oz. rice.
2 cans tomatoes.
½ teaspoonful baking soda.
1 teaspoon butter.
1 tablespoon salt.
3 qts. boiling milk.

Stew and strain the tomatoes. Wash rice and put in double boiler with the boiling water and boil for half an hour, stirring with a fork. Add the strained tomatoes, baking soda and salt, pepper, butter, and hot milk. Cook all together for 20 minutes.

Split Pea Soup.

3 lbs. split peas.
6 oz. onions.
½ lb. salt pork or bacon.
1 teaspoon celery salt.
Pepper and salt.

Soak peas over night in cold water and one-third teaspoonful of baking soda. In the morning drain off water and add about 9 quarts of fresh, cold water. Boil slowly 3 or 4 hours, and put through colander. Fry salt pork with onions to a light brown. Add to peas, also seasoning. Serve with toasted squares.

Vegetable Soup.

2 lbs. beef.
1½ cent soup bone.
4 oz. barley.
1½ lbs. potatoes.
½ lb. cabbage.
½ lb. turnips.
½ lb. carrots.
4 oz. onions.
6 oz. celery.
1 lb. can tomatoes.
1 can corn.

Put soup bone and beef in 2 gals. of cold water. Let come to a boil slowly and skim. Boil 4 hours. Add salt to taste and barley. Chop together the potatoes, cabbage, turnips, carrots, onions, celery, tomatoes, corn, and add to the soup 2 hours before serving.

Cut all meat from the bone, run through chopper, and add to the soup.

MEATS.

Baked Beef Stew.

3½ lbs. beef.
1 lb. carrots.
½ lb. turnips.
2 oz. onions.
1 clove garlic.
4 lbs. potatoes.
Seasoning.

Put beef, carrots, and turnips through coarse meat chopper; put over fire in about 5 quarts of boiling water.

Simmer for about ½ hour; put in seasoning, onions, and garlic. Put in potatoes, bake in moderately hot oven for 1½ hours. One-half hour before serving add thickening. It makes about 6½ quarts in all.

Beef Loaf with Tomato Sauce.

3½ lbs. chopped beef.
½ lb. chopped pork.
1 egg.
1 lb. cracker crumbs or stale bread.

If bread is used, soak in cold water until tender; squeeze out water. Mix thoroughly with meat, seasoning well with salt and pepper. Make into loaf, not too thick, and bake about 1 to 1½ hours, basting often with drippings and hot water.

Put in saucepan 1 can tomatoes, 4 oz. onions, finely chopped, and 1 pt. boiling water, and season well with pepper and salt. Cook 30 minutes.

Remove loaf from baking pan, add 1 qt. boiling water and stir in tomatoes and onions. Thicken with 6 oz. flour and season well with salt and pepper or paprika.

Pour gravy over loaf and serve with mashed potatoes.

Corn-Beef Hash.

5 lbs. cooked corn beef.
7 lbs. potatoes.
1 onion.
2 teaspoonsful salt.
½ teaspoon pepper.
3 cups cream.

Corn beef should be put on in cold water and cooked very slowly for 3 hours the day before needed. Boil potatoes in their skins; peel, chop all together with a meat chopper; add salt, pepper, put in a baking dish and pour cream over top. Bake for ½ hour.

Creamed Salt Pork.

3½ lbs. lean salt pork.
1 qt. milk.

Roll sliced pork in flour and fry brown; put in stew kettle and continue to fry until all is done, then pour off some of the drippings and brown flour with what is left in pan. When flour is brown pour 1 qt. milk into pan gradually, stirring constantly, and let come to a boil; pour over pork and put back on fire to simmer for 1½ to 2 hours.

Tomato Sauce.

3 cans tomatoes.
2 tablespoons flour.
3 tablespoons butter.

Cook the tomatoes for 10 minutes; rub through a strainer. Beat in saucepan until smooth; add 2 tablespoons of flour and 3 tablespoons of butter. Salt and pepper and cook 10 minutes.

This may be served with macaroni, rice, etc., as well as with fish and meats. The flavor may be modified by addition of onions, spices, or herbs.

Brown Beef Gravy.

4 lbs. beef.
½ lb. salt pork.
6 oz. onions.
4 oz. flour.
1 can peas.
½ can tomatoes.

Grind beef, salt pork, and onions through food chopper. Season with salt, pepper, and bake until brown. Stir in 4 oz. flour, 1 qt. water, peas, and tomatoes.

Very good with baked or plain boiled potatoes.

FISH.

Salmon Loaf.

3 cans salmon.
3 eggs.
2 cups milk.
Cracker crumbs.

Drain liquor off the salmon. Mince salmon and mix with it the eggs, milk, and cracker crumbs enough to form into a loaf. Bake in a moderate oven until nice and brown.

Salmon and Rice.

16 oz. rice.
2 cans salmon.
1 qt. milk.
4 oz. butter.
6 oz. flour.

Wash well in running water 16 oz. of rice. Cover well with boiling water to which salt has been added, and cook until flaky and tender. Do not stir rice while cooking, turn fire low. When cooked remove from fire and drain in colander.

Remove skin and bone from salmon, put into baking dish, add rice, cover with 1 pt. milk and white sauce and season well with salt and pepper. Put in oven for few minutes until thoroughly heated and serve hot.

White Sauce.

Add to butter, slightly heated, the flour, beat until creamy; stir into 8 pts. boiling milk, stirring constantly, so as not to burn or lump, if double boiler is not used.

CHEESE.

Cottage Cheese.

4 qts. sour milk. Cream.

Warm and strain milk through cheesecloth; add just enough cream to blend, salt and pepper.

MISCELLANEOUS STEWS.

Kidney-Bean Stew.

2 lbs. beef.
3 lbs. dried kidney beans.
1 can tomatoes.
4 medium-sized onions.
3 lbs. potatoes.

Soak beans in cold water over night. In the morning drain off water and start to cook at 8 o'clock in enough cold water to cover well. Just as soon as beans get soft, add beef cut in squares, tomatoes, and onions. At 11 o'clock add potatoes diced, thicken with flour, add salt and pepper to taste.

Vegetable Stew on Toast.

2 lbs. Scotch dried peas.
1½ lbs. carrots.
1 lb. potatoes.
1 pt. milk.
1 tablespoon butter.

Soak peas in plenty of lukewarm water over night. In the morning drain off water and put on to boil in plenty of fresh water. Boil slowly 3 hours. An hour before serving add diced carrots and potatoes; pint of milk. Just before serving add butter, and season to taste. Serve on toasted bread. A good Friday dish.

Lentil Stew with Bacon Strips.

2 lbs. lentils.
2 lbs. potatoes.
1 lb. bacon or 1½ lbs. frankfurts.
4 oz. drippings.
2 oz. onions.
2 cloves garlic.
Salt and pepper.
6 oz. flour.

Soak lentils overnight, put on to boil in morning at 8 o'clock, covering well with water. Put bacon through coarse meat cutter, put in baking pan and fry to light brown. Pour off drippings, add to lentils, also onions and garlic. One hour before serving add potatoes cut into squares. Brown flour in drippings, put with lentils ½ hour before serving.

The garlic gives the stew the flavor of frankfurts, and the children like it just as well. If frankfurts are used instead of bacon, cut in small pieces.

Carrot Stew.

6 oz. onions.
3 lbs. carrots.
3 lbs. tomatoes.
8 oz. rice.
1 stalk celery.

Saute the onions in two tablespoons drippings. Put carrots through coarse knife of food chopper; add to the onions, then add boiling water enough to make sufficient amount of soup when carrots are done. Add rice and cook slowly till done, 1½ hours. Season with salt and pepper.

Baked Pork and Beans.

5 lbs. navy beans.
2 lbs. salt pork.
6 oz. molasses.
Salt.
Paprika.

Wash and soak beans overnight. Boil on slow fire 3 hours, keeping well covered with water. Slice salt pork, add molasses, salt, and paprika. Place in oven and bake 1½ hours.

Baked Macaroni and Spaghetti.

2½ lbs. macaroni or spaghetti.
¾ lb. salt pork.
1 onion.
½ teaspoon salt.
½ lb. cheese.
2 cans tomatoes.
½ teaspoon celery salt.
¼ teaspoon pepper.
¼ teaspoon paprika.
1 teaspoon sugar.

Boil macaroni or spaghetti in salted water about 45 minutes; rinse in cold water; add ground salt pork, cheese chipped fine. Boil tomatoes; add diced onion, salt, celery salt, pepper, paprika, and sugar; boil slowly about ½ hour. Place macaroni in baking dish, add salt pork, cheese, and tomatoes and bake about one hour.

Spaghetti with Tomato Sauce.

3 lbs. spaghetti.
2 cans tomatoes.
4 oz. onions.
2 cloves garlic.
½ lb. bacon strip or salt pork.
Paprika.

Boil spaghetti in plenty of boiling salted water for 20 minutes, rinse in cold water. Put in baking dish. Fry salt pork and onions, also garlic to a

light brown. Put tomatoes in stew pan. Boil until cooked through; strain and add salt pork, onions, and seasoning. Bake one hour in hot oven.

To make another dish, add ½ lb. of cheese to spaghetti.

For a Friday dish, omit bacon or salt pork; use ½ lb. butter instead.

VEGETABLES.

Scalloped Potatoes.

7 lbs. potatoes.
Onion.
Milk.

Boil potatoes with jackets on. Peel and slice in pudding dish. Cover potatoes with milk; add grated onion; season and bake in hot oven one hour.

A nice addition is ½ lb. grated cheese sprinkled over top about 15 minutes before taking out of oven.

Carrots and Peas.

10 oz. diced carrots.
2 cans peas.
1 qt. milk.
3 oz. flour.

Cook carrots ½ hour, add peas, milk, flour, and salt.

Cabbage Salad.

2½ to 3 lbs. cabbage.
1 egg.
1 spoon mustard.
½ cup salt.
1 tablespoon sugar.
1 tablespoon flour.
Butter size of egg.
½ cup vinegar.
½ cup water.

Mix mustard, salt, sugar, and flour together until free of lumps; add egg well beaten, vinegar, and water. Put in double boiler to thicken, stirring all the time, adding butter. When used, thin with cream. Put cabbage through grinder, mix with dressing, serve on plates with baked beans.

CAKES AND HOT BREADS.

Pumpkin Cakes.

½ cup butter.
1 cup sugar.
2 eggs.
1 cup molasses.
2 cups strained pumpkin.
1 cup sour milk.
1 teaspoon soda.
1 teaspoon cinnamon, cloves.
Ginger and lemon extract.
3 cups flour.

Beat well; bake in muffin tins in a slow oven about 45 minutes. Makes 30 cakes.

Ginger Bread.

½ cup butter or good drippings.
1 cup sugar.
1 cup molasses.
1 cup sour milk.
1 teaspoon soda.
2½ cups flour.

Bake in slow oven ½ hour.

Ginger Cake.

½ cup butter or half lard or drippings and half butter.
1 cup molasses.
1 cup sugar.
1 rounded spoon ginger.
1 rounded spoon cinnamon.
1 cup sour milk.
2 spoons baking soda, dissolved in 2 tablespoons warm water.
3 cups flour, well sifted.
2 eggs, well beaten.
Pinch of salt.

Have bake tins well greased and bake in slow oven for ½ hour. Always grease tins with lard, as grease with salt will make cake stick to tins.

Cornmeal Gems.

2 cups cornmeal.
2 cups flour.
2 cups sour milk.
½ teaspoon baking soda.
2 eggs.

Bake in a moderate oven 25 minutes.

Oatmeal Cookies.

5 cups rolled oats.
2 cups sour milk.
Soak overnight and add—
1 cup molasses.
1 teaspoon soda.
1 teaspoon salt.
5 eggs.
1½ cups flour.
Bake in moderate oven.

Bran Muffins.

2 cups bran.
1 cup white flour.
1 cup sour milk.
½ teaspoon baking soda.
1 egg.
1 small cup molasses.
Teaspoon salt.
Bake 45 minutes.

DESSERTS.

Baked Rice.

½ lb. rice.
8 oz. sugar.
½ teaspoon cinnamon.
½ teaspoon salt.
2½ qts. milk.

Wash rice well in several waters, put in pudding dish, add sugar, salt, and cinnamon, then milk, *cold*. Bake in moderate oven 2 hours.

The addition of 2 eggs well beaten and 6 oz. of raisins will make a richer pudding.

Farina.

7 oz. farina.
8 oz. sugar.
2 eggs.
2 spoonfuls vanilla.

Put milk in double boiler to heat. When hot pour in farina, stirring so it will not lump. Let cook 15 to 20 minutes. Beat up eggs and add to farina. Take from stove, add sugar and vanilla, stirring well.

Tapioca Pudding.

2 qts. milk.
6 oz. minute tapioca.
3 eggs.
8 oz. sugar.
1 teaspoon vanilla.

Put the milk in double boiler until it comes to the scalding point; stir in the tapioca, stirring well for 10 minutes; beat together the eggs, sugar, vanilla, and a litle nutmeg; beat into tapioca until light. This will serve 30 people.

Dried Fruits.

2 lbs. dried fruit.
12 oz. sugar.

Wash the fruit and soak in cold water 24 hours. Drain thoroughly, cover with boiling water, and simmer until fruit is tender. Add sugar a few minutes before done. Peaches, prunes, apricots, apples, loganberries, or raisins may be cooked this way. Apples combine well with any of the above fruits except loganberries.

Cocoa Pudding.

3 qts. milk.
3 oz. cocoa.
5 oz. cornstarch.
Sugar.

Three qts. of milk in double boiler, add sugar to taste; dissolve three oz. of cocoa in enough boiling water to make it smooth. Add this to the boiling milk. Thicken with 5 oz. cornstarch made smooth with milk. Cook 30 minutes. Flavor with vanilla. Serve cold with cream and sugar.

APPENDIX D.

LIST OF CHICAGO MENUS, MATERIALS USED, AND THEIR COST.

Morning lunch—Cocoa, bread, jelly.

Noon dinner—Browned beef stew, boiled potatoes, mashed turnips, bread and milk, farina pudding.

Material used:

- 2 large loaves rye bread.
- 3 loaves whole wheat bread.
- 8 oz. butter.
- 3 oz. cocoa.
- 5 oz. farina.
- 5 oz. flour.
- 8 oz. jelly.
- 5 lbs. beef.
- 22 qts. milk.
- 12 oz. onions.
- 11½ lbs. potatoes.
- 18 oz. sugar.
- 5 lbs. turnips.

Number served:

30 children.

2 attendants.

Per capita caloric value, 1,002.

Per capita estimated cost, 10½ cents.

Morning lunch—Cocoa, raisin bread.

Noon dinner—Baked lima beans, cabbage salad, apple sauce, bread and milk.

Material used:

- 4½ lbs. lima beans.
- 2 large loaves rye bread.
- 2 large loaves raisin bread.
- 8 oz. butter.
- 3 oz. cocoa.
- 5 lbs. fresh apples.
- 22 qts. milk.
- 18 oz. sugar.
- 1 can tomatoes.
- 4½ lbs. cabbage.

Number served:

30 children.

2 attendants.

Per capita caloric value, 1,031.

Per capita estimated cost, 9 cents.

Morning lunch—Milk, bread, jelly.
Noon dinner—Browned beef and gravy, baked potatoes, bread, milk, tapioca pudding.

Material used:

- 4 large loaves white bread.
- 2 eggs.
- 8 oz. flour.
- 1 lb. jelly.
- 4½ lbs. chopped beef.
- 23 qts. milk.
- 4 oz. onions.
- 9 lbs. potatoes.
- 8 oz. sugar.
- 5 oz. tapioca.

Number served:
30 children.
2 attendants.
Per capita caloric value, 1,233.
Per capita estimated cost, 11½ cents.

Morning lunch—Milk, bread, jelly.
Noon dinner—Milk, bread, kidney bean stew, cabbage salad, apricot sauce.

Material used:

- 2 lbs. kidney beans.
- 8½ small loaves white bread.
- 2 oz. cornstarch.
- 1 lb. apricots.
- 3 oz. flour.
- 6 oz. jelly.
- 3 lbs. beef.
- 20 qts. milk.
- 8 oz. onions.
- 4½ lbs. potatoes.
- 8 oz. sugar.
- 1 can tomatoes.
- 4½ oz. cabbage.

Number served:
25 children.
2 attendants.
Per capita caloric value, 1,097.
Per capita estimated cost, 9⅜ cents.

Morning lunch—Milk, bread, apple butter.
Noon dinner—Milk, bread, spaghetti with tomatoes, apricots.

Material used:

- 6 large loaves white bread.
- 1 lb. apricots.
- 1 lb. apple butter.
- 6 oz. bacon.
- 22 qts. milk.
- 3 oz. onions.
- 2½ lbs. spaghetti.
- 12 oz. sugar.
- 2 cans tomatoes.

Number served:
30 children.
2 attendants.
Per capita caloric value, 1,014.
Per capita estimated cost, 9½ cents.

Morning lunch—Cocoa, raisin bread.
Noon dinner—Milk, bread, vegetable soup with macaroni, baked rice.

Material used:
- 4 small loaves raisin bread.
- 3 large loaves white bread.
- 1 lb. carrots.
- 5 oz. cocoa.
- 8 oz. macaroni.
- 2 lbs. beef.
- 4 oz. onions.
- 8 oz. rice.
- 14 oz. sugar.
- 1 can corn.
- 1 lb. celery.
- 12 oz. cabbage.
- 20 qts. milk.

Number served:
25 children.
2 attendants.
Per capita caloric value, 1,070.
Per capita estimated cost, 9¾ cents.

Morning lunch—Cocoa, bread, sirup.
Noon dinner—Pea and barley soup, bread, butter, milk, stewed peaches.

Material used:
- 1 lb. barley.
- 3 large loaves rye bread.
- 3 small loaves whole wheat.
- 8 oz. butter.
- 4 oz. cocoa.
- 24 oz. peaches.
- 4 lbs. soup bone.
- 20 qts. milk.
- 8 oz. onions.
- 1 lb. dried peas.
- 20 oz. potatoes.
- 4 oz. rice.
- 22 oz. sugar.
- 8 oz. sirup.
- 1 can tomatoes.

Number served:
30 children.
2 attendants.
Per capita caloric value, 993.
Per capita estimated cost, 9 cents.

Morning lunch—Cocoa, bread, jelly.
Noon dinner—Browned beef stew, noodles, bread, butterine, milk, prunes.

Material used:
- 2 large loaves rye bread.
- 2 small loaves whole wheat.
- 8 oz. butter.
- 4 oz. cocoa.
- 24 oz. prunes.
- 4 oz. flour.
- 8 oz. jelly.
- 5 lbs. beef.
- 20 qts. milk.
- 20 oz. sugar.
- 2½ lbs. noodles.

Number served:
30 children.
2 attendants.
Per capita caloric value, 1,048.
Per capita estimated cost, 10 cents.

Morning lunch—Cocoa, raisin bread.
Noon dinner—Boiled eggs, mashed potatoes, bread, milk, baked rice pudding.

Material used:
- 2 large loaves rye bread.
- 2 large loaves raisin bread.
- 4 oz. cocoa.
- 3 oz. raisins.
- 28 eggs.
- 18 qts. milk.
- 10½ pounds potatoes.
- 20 oz. rice.
- 26 oz. sugar.

Number served:
- 25 children.
- 2 attendants.

Per capita caloric value, 1,016.
Per capita estimated cost, 10 cents.

Morning lunch—Corn-meal mush, cocoa, bread, jelly.
Noon dinner—Beef loaf and gravy, mashed potatoes, bread and milk, sliced bananas.

Material used:
- 3 large loaves rye bread.
- 3 small loaves whole wheat.
- 8 oz. butter.
- 3 oz. cocoa.
- 14 oz. corn meal.
- 3 oz. flour.
- 7 oz. jelly.
- 3½ lbs. beef.
- 20 qts. milk.
- 5 oz. onions.
- 10½ lbs. potatoes.
- 1 lb. sugar.
- 2½ lbs. bananas.
- 1 can tomatoes.

Number served:
- 25 children.
- 2 attendants.

Per capita caloric value, 1,020.
Per capita estimated cost, 11 cents.

Morning lunch—Milk, bread, jelly oat meal.
Noon dinner—Milk, bread, beef balls, spaghetti, cottage cheese, chocolate pudding.

Material used:
- 4 small loaves white bread.
- 4 large loaves graham bread.
- 2 oz. cocoa.
- 16 oz. oat meal.
- 2 oz. cornstarch.
- 8 oz. jelly.
- 3 lbs. beef.
- 29 qts. milk.
- 2 cans tomatoes.
- 4 lbs. cottage cheese.

Number served:
- 30 children.
- 2 attendants

Per capita caloric value, 1,000.
Per capita estimated cost, 9 cents.

Morning lunch—Milk, bread, jelly.
Noon dinner—Milk, bread, browned beef, peas, boiled potatoes, baked apples.

Material used:
- 8 small loaves white bread.
- 5 lbs. fresh apples.
- 8 oz. jelly.
- 4½ lbs. beef.
- 20 qts. milk.
- 4 oz. onions.
- 2 cans peas.
- 10 lbs. potatoes.
- 8 oz. sugar.

Number served:
- 25 children.
- 2 attendants.
- 1 physician.

Per capita caloric value, 1,132.
Per capita estimated cost, 11½ cents.

Morning lunch—Milk, bread, jelly.
Noon dinner—Milk, bread, creamed salmon, boiled potatoes, cottage cheese, ginger bread, peaches.

Material used:
- 8 small loaves white bread.
- 2 oz. butter.
- 1½ lbs. peaches.
- 2 eggs.
- 8 oz. flour.
- 10 oz. jelly.
- 2 cans salmon.
- 24 qts. milk.
- 8 lbs. potatoes.
- 20 oz. sugar.
- 3 oz. molasses.
- 3½ lbs. cottage cheese.

Number served:
- 30 children.
- 2 attendants.

Per capita caloric value, 1,000.
Per capita estimated cost, 9 cents.

Morning lunch—Cocoa, bread, sirup.
Noon dinner—Lamb stew and peas, boiled potatoes, bread and milk, farina pudding.

Material used:
- 2 large loaves rye bread.
- 3 small loaves whole wheat.
- 8 oz. butter.
- 4 oz. cocoa.
- 5 oz. farina.
- 4 oz. flour.
- 6 lbs. lamb.
- 20 qts. milk.
- 5 oz. onions.
- 3 cans peas.
- 11 lbs. potatoes.
- 20 oz. sugar.
- 8 oz. sirup.

Number served:
- 30 children.
- 2 attendants.

Per capita caloric value, 1,045.
Per capita estimated cost, 12 cents.

Morning lunch—Cocoa, bread and jam.
Noon dinner—Creamed codfish, boiled potatoes, bread and milk, dates.

Material used:
2 large loaves rye bread.
3 small loaves whole wheat.
8 oz. butter.
4 oz. cocoa.
3 lbs. dates.
5 oz. flour.
4 lbs. codfish.
20 qts. milk.
11 lbs. potatoes.
10 oz. sugar.
8 oz. jam.

Number served:
30 children.
2 attendants.
Per capita caloric value, 1,002.
Per capita estimated cost, 10 cents.

Morning lunch—Cocoa, bread.
Noon dinner—Milk, bread, split-pea soup, loganberries.

Material used:
5 large loaves white bread.
5 oz. cocoa.
8 oz. loganberries.
8 oz. salt pork.
4 oz. onions.
3 lbs. split peas.
18 oz. sugar.
18 qts. milk.

Number served:
25 children.
2 attendants.
Per capita caloric value, 1,045.
Per capita estimated cost, 9 cents.

Morning lunch—Milk, bread.
Noon dinner—Milk, bread, beef loaf with tomatoes, mashed potatoes, corn.

Material used:
5 large loaves white bread.
3 cans corn.
2 eggs.
6 oz. flour.
4 lbs. beef.
18 qts. milk.
2 oz. onions.
7 lbs. potatoes.
1 can tomatoes.

Number served:
25 children.
2 attendants.
Per capita caloric value, 1,105.
Per capita estimated cost, 11½ cents.

Morning lunch—Milk, bread, syrup.
Noon dinner—Creamed salmon, lyonnaise potatoes, bread, milk, stewed prunes.

Material used:
- 5 large loaves white bread.
- 4 oz. butter.
- 1½ lbs. prunes.
- 8 oz. flour.
- 24 qts. milk.
- 4 oz. onions.
- 9 lbs. potatoes.
- 8 oz. sugar.
- 1 lb. sirup.
- 2 cans salmon.

Number served:
- 30 children.
- 2 attendants.

Per capita caloric value, 1,008.
Per capita estimated cost, 10 cents.

Morning lunch—Cocoa, raisin bread.
Noon dinner—Cream of tomato soup, bread and milk, cocoa pudding.

Material used:
- 5 small loaves rye bread.
- 2 loaves raisin bread.
- 8 oz. butter.
- 6 oz. cocoa.
- 12 oz. cornstarch.
- 24 qts. milk.
- 20 oz. sugar.
- 3 cans tomatoes.

Number served:
- 30 children.
- 2 attendants.

Per capita caloric value, 1,146.
Per capita estimated cost, 9½ cents.

Morning lunch—Cocoa, bread, jelly.
Noon dinner—Baked beans, beet salad, bread and milk, apple sauce.

Material used:
- 4½ lbs. navy beans.
- 2 large loaves rye bread.
- 3 small loaves whole wheat bread.
- 8 oz. butter.
- 3 oz. cocoa.
- 5 lbs. fresh apples.
- 8 oz. jelly.
- 20 qts. milk.
- 22 oz. sugar.
- 1 can tomatoes.
- 6 lbs. beets.

Number served:
- 30 children.
- 2 attendants.

Per capita caloric value, 1,063.
Per capita estimated cost, 9½ cents.

APPENDIX E.

SUGGESTIONS FOR OPEN-AIR CLASSES.

Boston Public Schools, Superintendent's Office, November 5, 1913.

Object.—The primary object of open-air classes is to better the health of the pupils. This should not be interpreted to mean, however, that mental work, school discipline, or school programs, planned for the average normal child, should be set aside completely; neither is such a course necessary.

Type of child.—The physically debilitated child, for whom the open-air class is created, is capable of much mental work if the mental work is judiciously adjusted with the decreased or impaired physical asset of the child. This is not always possible in the regular-grade classroom, even when the conditions of fresh air, sunshine, and curriculum approximate those advocated for open-air classes. Hence the need of special classes for the debilitated children who are not ill to a degree sufficient to make hospital or home treatment necessary, but who are, nevertheless, in such a lowered physical state that the routine classroom program is unprofitable both mentally and physically.

Not for tuberculous children.—These pupils are not tuberculous, and every effort should be made to have the parents and teachers understand that open-air classes are not for tuberculous children. Tuberculous children are best cared for in special hospital schools.

Admission to classes.—Pupils shall be regularly admitted to open-air classes by the principal of the school, subject to the approval of the director of school hygiene (section 391).

Principals of schools in districts where open-air classes are authorized, or principals of schools where, in the opinion of the school physician, such classes should be established, should submit to the director of school hygiene a list of pupils for assignment to open-air classes.

Organization of classes.—The number of pupils to assign to each open-air class is 36.

Classes may be organized with one grade of pupils or with two or three grades of pupils.

No pupil shall be assigned to an open-air class without consultation with the parent or guardian.

FRESH-AIR ROOMS.

In school buildings having rooms constructed for open-air classes, but in which there is not a sufficient number of debilitated children for the formation of such classes, said rooms shall be utilized as fresh-air rooms (Order of School Committee, May 5, 1913).

These fresh-air rooms might be used advantageously by special classes (mentally defectives).

CLASSROOM TEMPERATURE.

The regulations of the school committee provide that no room temperature shall exceed 67 degrees.

The regulations further provide that the windows on one side of each classroom shall be kept *open all the time;* also that at regular periods complete flushing of each classroom and corridor with fresh air, by means of open windows, shall be carried out in each session.

DAILY PROGRAM.

Work and rest.—The underlying principle in the daily school program for debilitated children is to alternate the periods of work and periods of rest. This method gives to both the mental and physical development every possible growth. When kept within physiological limits, a good brain means a good physical state, and conversely, a good physical condition means a healthy brain. This balance is more easily upset the nearer one gets to the minimum of reserve power of either system. The great problem, therefore, for a teacher to solve is that of each child's physical and mental capacity. This is essentially an individual problem; it is not dependent solely upon chronological age, nor sex, nor grade, nor upon social condition and environment; neither is it based upon any supposed factors of heredity.

Attention and concentration.—There is, perhaps, no better index of mental overwork than that furnished by lack of attention and failure of concentration. A teacher who is able to perceive the presence of either of these factors is possessed of the key to both successful teaching and the maintenance of healthful child development.

Signs of fatigue.—The chief signs of fatigue are excitability, irritability, slow sense of perception, inattention, restlessness, shifting of position and posture, repeated failure on familiar problems.

METHODS OF TEACHING.

Arithmetic.—This subject has a great mental strain content and should be taught at periods following rest. The best period for this subject, in the daily program, seems to be between 9 and 10 o'clock a. m. The fatigue strain is increased greatly by combining written arithmetic with oral.

In open-air classes every advantage should be taken of teaching arithmetic by means of measurements, i. e., large measurements in lower grades (1, 2, and 3) more minute measurements in higher grades. This work should be done, as far as practicable, by means of games and plays, competition, i. e., scoring, measuring between points out of doors, etc.

The mental strain of arithmetic can be reduced greatly by using muscular sense rather than visual sense, especially in written arithmetic, e. g., blackboard work and exercises in counting, addition, subtraction, multiplication, division, incidental to exercise, games, and plays.

Mental arithmetic should not follow a lesson in history, writing, drawing, or sewing.

Writing and drawing.—These subjects should be taught, in the earlier grades, by means of large muscular movements rather than through the sense of sight. This should be done by large shoulder movements in forearm work on blackboard. The progression in drawing and in writing should be from the oblique straight lines to the ellipses, to the circles, and then to the vertical or horizontal strokes from which elements, squares, rectangles, and curves can be

developed. Blackboard and sand trays offer the best means of teaching these subjects in the first two grades. Later, covered electric wires of short lengths can be used. This material can be bent easily into figures and letter shapes.

No pencils, paper, pens, ink, or needles should be used in the kindergarten or first three grades.

Writing and drawing are less fatiguing when done in a standing position (blackboard) than when attempted in a sitting position with the use of paper or copy books.

Ruled paper, especially dotted lines, should not be used in the three lower grades, either for spacing the letters or for teaching proper alinement. In the higher grades thick black lines or blue lines may be used. Continuance of writing lessons is tiresome and fatiguing. Short lessons, illustrating a lesson then going on, may often be used to great advantage.

Physical exercises.—The possibility of fatigue in these exercises, especially if formal drill is followed, should not be overlooked. For pupils in the open air a short run (avoiding breath holding), stretching exercises, breathing exercises, are all that are necessary. These exercises may be worked into games and plays provided competition does not drive the children into a state of overexcitability or overexertion.

DAILY PROGRAM.

The subjects and exercises required for the grades corresponding to the grade or grades comprising the open-air classes should be followed.

The time allowance for each subject or exercise, however (see p. 6, School Doc. No. 8), should be so varied by the teacher in charge that the pupils may have the advantage of frequent periods of rest and relaxation. This can be done by combining the subjects and exercises in such a way that the educational value is increased rather than diminished by such curtailment of time.

Typical daily program.—The following daily program combines the requirements of the school committee with the special requirements suggested above for open-air classes:

Typical daily program.

Time.	Subject.	Grades.
9.00 to 9.10	Opening exercise	All.
9.10 to 9.20	Personal hygiene	Do.
	Medical inspection	Do.
	Hygiene and physiology teaching	Do.
9.20 to 10.00	Arithmetic (as outlined above)	Do.
10.00 to 10.10	Music	Do.
10.10 to 10.30	Luncheon	Do.
10.30 to 10.50	Recess	Do.
10.50 to 11.15	Elementary science, manual training, or household science	Do.
11.15 to 11.30	Spoken English, reading, and literature	Do.
11.30 to 11.40	Physical training	Do.
11.40 to 12.00	Written English	Do.
12.00 to 1.30	Home	Do.
1.30 to 1.40	Rest; relaxation; story telling	I-II.
1.40 to 1.50	Sight arithmetic	IV-V.
1.50 to 2.00	Physical training	All.
2.00 to 2.20	Drawing	Do.
2.20 to 2.30	Free play; recess	I-II-III.
2.30 to 3.00	Geography	IV, etc.
3.00 to 3.10	Physical training[1]	Do.
3.10 to 3.30	Oral arithmetic[1]	Do.

[1] Alternate days with manual training.

School nurses.—The school nurse will be found invaluable in creating an interest among parents concerning the carrying out of open-air class instruction. The nurse should visit the home of each child selected for open-air instruction

to acquaint the parent or guardian with the aims and purposes of the class and to give the necessary instruction relative to the home care of the child, especially on questions of proper food, hours of sleep, fresh air in the home, etc.

Luncheons.—Much debility is created among children in the lower grades on account of the radical transformation in their mode of life—home life to school life. So far as possible, children in the lower grades, whether or not in the open-air classes, should be encouraged to bring from home a suitable luncheon. The school nurses have been instructed as to the best articles of food to recommend to the parents for these luncheons.

In the open-air classes opportunity should be afforded for each child to purchase, at a cost not exceeding 2 cents daily, a glass of milk, a hot drink—cocoa, chocolate, broth, or chowder. This is to be in addition to the luncheon brought from home.

Extra clothing.—The school committee furnishes blankets for each child assigned to the open-air classes; these blankets are so made that they may be adjusted to children of different sizes. The blankets are thoroughly fumigated by the board of health at the end of each school term. Each blanket should be marked with the name of the child, and all interchanging of blankets, without fumigation, should be guarded against.

Furniture.—Movable furniture, of the seat and desk combination, offers many advantages over furniture attached to the floor. In open-air classes in school buildings this furniture can be removed from the center of the room, and space for rest, as well as for games and plays, can be created.

APPENDIX F.

LEGISLATION AND COMMITTEE RECOMMENDATIONS.

Chapter 575 of the Acts of the Legislature of Massachusetts, Session 1913.

An Act to Authorize Cities and Towns to Provide Free Meals for School Children:

Be it enacted, etc., as follows:

SECTION 1. The city council of a city and the selectmen of a town may provide meals or lunches free or at such price, not exceeding the cost, as they may fix, for children attending its public schools, and cities and towns may appropriate money for this purpose.

SEC. 2. This act shall be submitted to the voters of any city or town at the municipal election in any year if a petition to that effect, signed by not less than five per cent of the voters, is filed with the city clerk or town clerk, as the case may be, not less than one month before said election; and if accepted by a majority of the voters thereon it shall take effect in such city or town. Otherwise this act shall not take effect. (Approved May 2, 1913.)

Section 1509 of the School Code of Pennsylvania:

Persons having tuberculosis.—No person having tuberculosis of the lungs shall be a pupil, teacher, janitor, or other employee in any public school, unless it be a special school carried on under the regulations made for such schools by the commissioner of health.

Section 1609. Physiology and hygiene. Effect of alcoholic drinks, etc.:

Physiology and hygiene, which shall in each division of the subject so pursued include special reference to the effect of alcoholic drinks, stimulants, and narcotics upon the human system, and which shall also include special reference to tuberculosis and its prevention, shall be introduced and studied as a regular branch by all pupils in all departments of the public schools of this Commonwealth and in all educational institutions supported wholly or in part by money from this Commonwealth.

Legislation, Elmira, N. Y.:

6. The medical inspector shall at the beginning of each school year examine all teachers and janitors of the public schools of the city of Elmira and report the results of such examinations to the board of education.

No person having tuberculosis of the lungs shall be a pupil, teacher, janitor, or other employee in any of the public schools of the city of Elmira, unless it be a special school carried on under the regulations made for such schools by the board of education. (Am. Sch. Bd. Journal, Oct., 1914.)

Recommendation Made to Massachusetts Senate and House of Representatives by a Commission Appointed by the Massachusetts General Assembly in 1912:

The board believes that the question of tuberculosis in children is one of primary importance. This fact has been recognized already by the trustees of hospitals for consumptives through the adoption of the policy of caring for

consumptive children at one institution, the Westfield State Sanatorium, where 60 such children are receiving not only sanatorium treatment but also proper schooling. The board believes such outdoor schooling and treatment for that large class of children who are anemic, under weight, and otherwise predisposed to tuberculosis to be a most important factor in any scheme of prevention. The board, therefore, recommends the further establishment throughout the State of fresh-air rooms and open-air schools for children. Such a plan would, of necessity, require a much more adequate and rigid system of medical school inspection than now exists.

HENRY P. WALCOTT, M. D.,
CLEMENT F. COOGAN,
JOSEPH A. PLOUFF,
JULIAN A. MEAD, M. D.,
HIRAM F. MILLS, C. E.,
ROBERT W. LOVETT, M. D.,
C. E. MCGILLICUDDY,
State Board of Health.

DANIEL S. PRENDERGAST,
SYLVIA B. KNOWLTON,
ALBERT C. GETCHELL, M. D.,
ARTHUR DRINKWATER,
GEORGE A. DUNN,
Trustees of Hospitals for Consumptives.

JOHN B. HAWES, 2d, M. D.,
Secretary of Joint Board.

APPENDIX G.

LISTS OF OPEN-AIR SCHOOLS.

CITIES HAVING PUBLIC OPEN-AIR SCHOOLS FOR PHYSICALLY SUBNORMAL CHILDREN—SUPERINTENDENTS.

California: San Francisco	Superintendent of schools.
Colorado:	
Boulder	Do.
Denver	Dr. W. H. Smiley, superintendent of schools.
Connecticut:	
Hartford	Thomas S. Weaver, superintendent of schools.
New Britain	S. H. Holmes, superintendent of schools.
New Haven	F. H. Beede, superintendent of schools.
South Manchester	F. A. Verplanck, superintendent of schools.
Waterbury	M. Louise Seymour, Nottingham Terrace.
District of Columbia: Washington	S. E. Kramer, assistant superintendent of schools.
Georgia: Atlanta	L. M. Landrum, superintendent of schools.
Illinois:	
Chicago	Elizabeth McCormick Memorial Fund, 315 Plymouth Court.
Jacksonville	H. A. Perrin, superintendent of schools.
Maywood	Superintendent of schools.
Peoria	Do.
Rockford	Do.
Indiana:	
Fort Wayne	Do.
Indianapolis	Do.
Gary	Dr. O. B. Nesbitt, school physician.
Anderson	Superintendent of schools.
Iowa:	
Des Moines	Do.
Dubuque	Do.
Kentucky:	
Lexington	Do.
Louisville	Miss Carleen E. Proehl, principal of open-air school.
Maryland: Baltimore	Francis A. Soper, superintendent of schools.
Massachusetts:	
Boston	Dr. Thomas F. Harrington, director school hygiene.
Cambridge	Frank E. Parlin, superintendent of schools.
Canton	John C. Davis, superintendent of schools.
Chelsea	Frank E. Parlin, superintendent of schools.
Holyoke	Francis McSheny, superintendent of schools.
New Bedford	Allen P. Keith, superintendent of schools.
Springfield	James H. Van Sickle, superintendent of schools.
Winchester	Schuyler F. Herron, superintendent of schools.
Worcester	H. P. Lewis, superintendent of schools.
Lynn	Superintendent of schools.

Michigan:	
Battle Creek	W. G. Coburn, superintendent of schools.
Detroit	Frank Cody, superintendent of schools.
Flint	Superintendent of schools.
Grand Rapids	W. A. Greeson, superintendent of schools.
Iron Mountain	L. A. Butler, superintendent of schools.
Jackson	Superintendent of schools.
Kalamazoo	Do.
Lansing	J. W. Sexton, superintendent of schools.
Manistee	Superintendent of schools.
Menominee	John S. Silvernale, superintendent of schools.
Minnesota:	
Duluth	Dr. John H. Andres, medical inspector.
Eveleth	B. O. Greening, superintendent of schools.
Minneapolis	Dr. C. H. Keene, director of hygiene.
St. Paul	Dr. E. A. Meyerding, director of hygiene.
Missouri:	
Kansas City	I. I. Cammack, superintendent of schools.
St. Louis	Superintendent of schools.
Nebraska: Lincoln	Do.
New Jersey:	
East Orange	Do.
Hackensack	Do.
Montclair	Don C. Bliss, superintendent of schools.
Newark	Dr. George E. Holmes, medical inspector.
Orange	Superintendent of schools.
Plainfield	Henry M. Maxson, superintendent of schools.
Trenton	Ebenezer Mackey, superintendent of schools.
New York:	
Albany	Dr. Clinton P. McCord, health director.
Brooklyn	James Jenkins, jr., 69 Schermerhorn Street.
Buffalo	Superintendent of schools.
Fulton	J. R. Fairgrieve, superintendent of schools.
Hornell	Superintendent of schools.
Buffalo	Do.
New York City	Do.
Rochester	Do.
Saranac Lake	H. V. Littell, superintendent of schools.
Schenectady	A. R. Brubacker, superintendent of schools.
Syracuse	P. M. Hughes, superintendent of schools.
Utica	W. B. Sprague, superintendent of schools.
Yonkers	Superintendent of schools.
Ohio:	
Cincinnati	Dr. William H. Peters, chief medical inspector.
Cleveland	Dr. E. A. Peterson, medical inspector.
Columbus	Superintendent of schools.
Toledo	Dr. Porter B. Brockway, medical inspector.
Oregon: Portland	Superintendent of schools.
Pennsylvania:	
Allentown	F. D. Raub, superintendent of schools.
Bethlehem	William G. Cleaver, superintendent of schools.
Erie	I. B. Bush, superintendent of schools.
Hazelton	David A. Harmon, superintendent of schools.
Philadelphia	Dr. Walter S. Cornell, medical director.

Pennsylvania—Continued.	
Pittsburgh	Dr. Thomas W. Grayson, 1102 Westinghouse Building.
Williamsport	F. W. Robins, superintendent of schools.
Harrisburg	Dr. F. E. Downs, superintendent of schools.
Rhode Island:	
Pawtucket	Frank O. Draper, superintendent of schools.
Providence	Randall J. Condon, superintendent of schools.
Hoxsie	Superintendent of schools.
Virginia: Richmond	Dr. N. Y. Ennett, medical director of schools.
Wisconsin:	
Green Bay	Superintendent of schools.
Kenosha	Mrs. Mary D. Bradford, superintendent of schools.
Milwaukee	Dr. George P. Barth, director of hygiene.
Oshkosh	Superintendent of schools.
Racine	Do.

OPEN-AIR SCHOOLS OR CLASSES FOR NORMAL CHILDREN—SUPERINTENDENTS.

California:	
Almeda	Superintendent of schools.
Alhambra	Do.
Bakersfield	Do.
Chico	Do.
Chula Vista	Do.
Coronado	Do.
Dehesa	Do.
El Cajon	Do.
Fresno	C. C. Starr, superintendent of schools.
Glendale	Superintendent of schools.
La Jolla	Do.
Lodi	Do.
Long Beach	Do.
Los Angeles	M. C. Bettinger, superintendent of schools.
Modesto	Superintendent of schools.
Monrovia	Do.
Normal Heights	Do.
Oakland	Dr. N. K. Foster, medical director of schools.
Ocean Park	Superintendent of schools.
Pariler	Do.
Pasadena	Do.
Redlands	Do.
Riverside	Do.
Sacramento	Do.
San Bernardino	Do.
San Diego	Duncan MacKinnon, superintendent of schools.
San Francisco	Superintendent of schools.
San Jose	D. T. Bateman, superintendent of schools.
Santa Barbara	Superintendent of schools.
Tulare	Do.
Vallejo	Do.
West San Pasquale Dist.	Do.

Connecticut:	
Hartford	Superintendent of Schools.
New Haven	F. H. Beede, superintendent of schools.
Florida: Jacksonville	Superintendent of schools.
Illinois: Evanston	Do.
Louisiana:	
New Orleans	Do.
Shreveport	Do.
Maine: Bangor	Do.
Massachusetts:	
Boston	Do.
Canton	John C. Davis, superintendent of schools.
New Jersey:	
Camden	Superintendent of schools.
Montclair	D. C. Bliss, superintendent of schools.
New York:	
Alfaben	Superintendent of schools.
Brooklyn	Do.
New York City	Do.
Rochester	Do.
Schenectady	A. R. Brubacker, superintendent of schools.
North Carolina: Asheville	Superintendent of schools.
Ohio:	
Columbus	Do.
Dayton	Do.
Pennsylvania: Bethlehem	William G. Cleaver, superintendent of schools.
Rhode Island:	
Pawtucket	Frank O. Draper, superintendent of schools.
Providence	Dr. Ellen A. Stone, superintendent of child hygiene.
South Carolina: Columbia	Superintendent of schools.
Virginia: Williamsburg	Do.
Washington:	
Everett	Do.
Seattle	Do.

PRIVATE OPEN-AIR SCHOOLS—SUPERINTENDENTS.

California:	
Alameda—The Glen Taylor School	Mrs. Esther Taylor, principal.
Ben Lomond—Sun Haven	Miss Juliane Wolters, principal.
Berkeley—The Claremont Heights Out-of-Door School.	Miss Elizabeth Place, principal.
San Diego—Francis W. Parker School	Principal of school.
Connecticut:	
Hartford—Miss Wheeler's School	Miss Mary Pomeroy Wheeler, principal.
New Haven——The Misses Lums' Open-Air School.	Principal of school.
District of Columbia: Washington—Oak Crest Open-Air School, 4606 Thirteenth Street.	Margaret Raymond Paine, principal.
Florida: Jacksonville—The Florida Open-Air School.	Mrs. Langdon Caskin, director.
Georgia: Atlanta—Washington Seminary, Peachtree Street.	Principal of schools.

Illinois:	
Chicago—The Jewish Training School	Joseph L. Bache, superintendent.
Chicago—The Loring School, Kindergarten.	Mrs. Stella Loring, principal.
Chicago—The Orthogenic School, 620 South Hermitage Avenue.	Principal of school.
Maine: Casco—The McAuliffe Outdoor School for Boys.	F. J. McAuliffe, principal of school.
Maryland:	
Baltimore—The Calvert School (for boys)	Principal of school.
Baltimore—3104 Wulbrook Avenue	Mrs. A. K. Bond.
Roland Park—Roland Park Country School.	Principal of school.
Massachusetts: Boston—Miss Elizabeth J. Woodward's School.	Do.
New Jersey: Summit—Open-Air Kindergarten, affiliated with Kent Place School.	Miss Maud Mueller, principal.
New York:	
Albany—St. Agnes' school	Principal of school.
Allaben, Ulster County—The Mountain School for Boys.	Do.
Brooklyn—Friends' School	Do.
Brooklyn—Brooklyn Heights Seminary, 18 Pierrepont Street.	Do.
Buffalo—The Park School, Jewett Place corner Main.	Mary Hammett Lewis, principal.
New York—Ethical Culture School, Central Park West and Sixty-third Street.	Principal of school.
New York City—Horace Mann School, One hundred and twentieth Street and Broadway.	Do.
New Rochelle—Mrs. Ada C. Beckwith's Out-of-Door Kindergarten, 85 Sickles Avenue.	Do.
Rochester—St. Nicholas Outdoor School	Do.
Syracuse—Mrs. Elizabeth Comstock Robertson's Open-Air Kindergarten, 320 Farmer Street.	Do.
Syracuse—Mrs. Rice's Open-Air School	Do.
Pennsylvania:	
Bryn Mawr—The Phoebe Anna Thorne Open-Air Model School.	Prof. Mathilde Castro, director.
Merion—The Merion Country Day School.	Gertrude Hartman, principal.
Lansdowne—Open-Air Kindergarten	Principal of school.
Mount Airy—Miss Hill's School, 302 Green Avenue.	Do.
Sharon Hill—Rose Outdoor School	George K. Goodwin, principal.
Wayne—Mrs. Hunter's School	Principal of school.
Wilkes-Barre—Wilkes-Barre Institute	Do.
Rhode Island: Providence—Open-Air School, 405 Angel Street.	Dr. Helen Cooke, principal.
South Carolina; Columbia—Bon Air School	Principal of school.

PREVENTORIUMS—SUPERINTENDENTS.

Illinois: Lake Forest—Ridge Farm Preventorium.	Mrs. Frances R. Dickinson, 1518 Astor Street, Chicago.
New Jersey: Farmingdale—Tuberculosis Preventorium for Children.	J. Palmer Quinby, superintendent.
New York: Albany—Preventorium	Superintendent.
Rhode Island: Hoxsie—Lakeside Preventorium.	League for the Suppression of Tuberculosis, 55 Eddy Street, Providence.
Ohio: Cleveland—Buckeye Road Fresh-Air Camp.	

SANATORIUMS AND HOSPITALS.

Connecticut: Wallingford—Gaylord Farm Sanatorium Open-Air School.	Superintendent.
Delaware: Marshalltown—Hope Farm Sanatorium Open-Air School.	Do.
Georgia: Atlanta—Battle Hill Sanatorium Open-Air School	Do.
Illinois:	
Chicago—Municipal Tuberculosis Sanitarium Open-Air School.	Do.
Oak Forest—Cook County Tuberculosis Hospital Open-School.	Do.
Iowa: Oakdale—Oakdale Sanatorium Open-Air School	Do.
Kentucky: Louisville—Waverly Hill Sanatorium Open-Air School.	Do.
Maryland:	
Baltimore—James L. Kernan Hospital and School for Crippled Children.	Do.
Savillusville—Maryland State Sanatorium Open-Air School.	Do.
Massachusetts:	
Boston—Mattapan Consumptives' Hospital Open-Air School.	Do.
Canton—Massachusetts Hospital Open-Air School	Do.
New Bedford—Sassaquin Sanatorium	Do.
Michigan:	
Detroit—Herman Kiefer Sanatorium School	Do.
Grand Rapids—Municipal Sanatorium Open-Air School	Do.
Minnesota: Nopeming—Nopeming Sanatorium Open-Air School.	Do.
Missouri: Mount Vernon—State Sanatorium Open-Air School	Do.
New Jersey: Glen Gardner—New Jersey State Sanatorium Open-Air School.	Do.
New York:	
Brooklyn—Long Island College Hospital Open-Air School	Do.
Glen Aberdeen—State Tuberculosis Sanatorium Open-Air School.	Do.
Lake Kushaqua—Stony Wold Sanatorium Open-Air School	Do.
New York City—Medford Sanatorium Open-Air School	Do.
New York City—Home Hospital, New York Association for Improving Condition of the Poor, 105 East Twenty-second Street.	Do.

New York—Continued.	
New York City—Sea Breeze Hospital for Children with Tuberculosis of the Bone, New York Association for Improving Condition of the Poor, 105 East Twenty-second Street.	Superintendent.
Otisville—New York City Municipal Sanatorium Open-Air School.	Do.
Perrysburg—J. N. Adams Memorial Hospital Open-Air School.	Do.
Rochester—Iola Sanatorium Open-Air School	Do.
Ohio: Cincinnati—Municipal Tuberculosis Hospital	Do.
Pennsylvania: Pittsburgh — Tuberculosis Hospital Open-Air School.	Do.
Wisconsin: Wales—State Tuberculosis Sanatorium Open-Air School.	Do.

SELECTED BIBLIOGRAPHY.

I. BOOKS.

Ayres, Leonard P. Laggards in our schools. New York, Survey associates, inc., 1913. 236 p. charts. (Russell Sage foundation.)
A study of retardation and elimination in public-school systems.

——— Open-air schools. New York, Doubleday, Page & company, 1910. 171 p. illus.
Bibliography.

Baldwin, Bird Thomas. Physical growth and school progress; a study in experimental education. Washington, Government printing office, 1914. 215 p. charts. (U. S. Bureau of education. Bulletin, 1914, no. 10.)
Tables on weight and height of school children. Bibliography of 336 titles.

Bryant, Louise Stevens. School feeding, its history and practice at home and abroad. Philadelphia, J. B. Lippincott & co., 1913. 345 p. illus.
Bibliography.

Burks, Frances Williston, *and* Burks, Jesse D. Health and the school. New York, D. Appleton & co., 1913. 393 p. illus.
Bibliography.

Carrington, Thomas Spees. Fresh air and how to use it. *In* National association for the study and prevention of tuberculosis. New York, 1914. 250 p. illus.

Crowley, Ralph H. The open-air recovery school. *In his* Hygiene of school life. London, Methuen & co., 1910. p. 230–254.

Dresslar, Fletcher B. School hygiene. New York, Macmillan co., 1913. xi, 369 p. illus., plates. (Brief course series in education, ed. by P. Monroe.)
Contains a chapter on open-air schools and discussion on heating and ventilation of schoolrooms and general problems of school hygiene.

Gorst, *Sir* John E. The forest school at Charlottenburg. *In his* Children of the nation. 2d ed. London, Methuen & co., 1907. p. 153–171.

Gulick, Luther Halsey, *and* Ayres, Leonard P. Medical inspection of schools. New York, Survey associates, inc., 1913. 224 p. illus.

Hogarth, A. H. Medical inspection of schools. London, Oxford university press, 1909. 300 p.
A history of medical inspection and discussion of general principles and methods used in England. Bibliography.

Kandel, I. L. Elementary education in England. Washington, Government printing office, 1914. 161 p. illus. (U. S. Bureau of education. Bulletin, 1913, no. 57.)
Contains a good chapter on open-air schools, also section on school journeys.

Kelynack, T. N., *ed.* Yearbook of open-air schools and children's sanitaria. London, John Bale, sons & Danielson, ltd., 1915. 444 p. illus.

Kingsley, Sherman C. Open-air crusaders. Chicago, Elizabeth McCormick memorial fund, 1913. 128 p. illus.
Bibliography.

Kirchner, M. Die Tuberkulose und die Schule. Berlin, Schoetz.

Lietz, H. Gedanken und Bilder aus Deutschen Landerziehungsheimen. Leipzig, R. Voigtlaenders, 1910.

Neufert, H., *and* Bendix, B. Die Charlottenburger Waldschule im ersten Jahr ihres Besteheus. Berlin, Wein, Urban und Schwartzenberg, 1906.

Sandt, H. Waldschulen. *In* Schulhygienisches Taschenbuch. Hamburg, 1907. p. 260–266.

Terman, Lewis M. The hygiene of the school child. New York, Houghton Mifflin co., 1914. 417 p. illus.
References.

Watt, William Edward. Open air; a statement of what is being done and what should be done to secure right air in houses, schools, offices, etc. Chicago, Little Chronicle co., 1910. 282 p. illus.
Gives some account of the Graham school, Chicago.

II. PAMPHLETS.

Ayres, Leonard P. Open-air schools. New York, Russell Sage foundation, 1914. 15 p.

Bierbaum *and* Doereukamp. Die Waldschule. [Muenchen-Gladbach, Heinrich Lapp, 1910.]

Carrington, Thomas S. Directions for living and sleeping in the open air. *In* National association for the study and prevention of tuberculosis. New York, 1913.

De Montmorency, J. E. G. School excursions and vacation schools. London, Wyman & sons, ltd., 1907. 89 p. (Great Britain. Board of education. Special reports on educational subjects, v. 21.)
Gives acounts of several open-air schools in England and Germany.

Gray, Ernest. Open-air schools. North of England educational conference, 1900.

Kentucky. Board of tuberculosis commissioners. Fresh air and the schools. Frankfort, State journal co., n. d. 15 p. illus.
Outlines methods of open-air school administration.

Kingsley, Sherman C. Open-air school houses. Chicago, Elizabeth McCormick memorial fund, 1912. 31 p.
Illustrated.

Knopf, A. Adolphus. Tuberculosis and other diseases in schools and colleges. New York, 1913. 12 p. illus.
Reprinted from the New York medical journal, Jan, 25, 1913.
A good discussion of open-air schools and open-air instruction, with list of breathing exercises to be taken as preventive measures.

Koenig, Karl. Die Waldschule in Muelhausen. Strassburger Druckerei und Verlagsanstalt.

Kraft, A. Waldschulen. Zurich, Verlag Art. Institut Orell Fuessli, 1908. 28 p.

Public education association, New York. Shall the schools serve luncheons? New York, 1913. 7 p. (Bulletin no. 9.)

Rose, Frederick. Brief account of the nature and scope of open-air schools and details and estimate of the model. London, Penny & Hill, printers. (London couhty council. Pamphlet.)

——— Open-air schools. London, Royal sanitary institute.

Van Pelt, John V. Open-air schools and their relation to pulmonary tuberculosis. Reprinted from the Interstate medical journal, vol. 21, no. 4, 1914. 24 p.

Walton, *Miss* Carol F. Bulletin of the Michigan association for the prevention and relief of tuberculosis. Open-air school number, April, 1913.

Wanger, B. Die Waldschule in Muelhausen i. Elsass, 1907.

Warren, B. S. Open-air schools for the prevention and cure of tuberculosis among children. Washington, Government printing office, 1912. 20 p. illus. (U. S. Public health service. Bulletin no. 58.)

Charts, tables, and description of the St. Louis, Mo., open-air school, with brief discussion of the work in other cities.

III. ARTICLES.

Ayres, Leonard P. Open-air schools. New York, 1910. 13 p.

Reprint from the proceedings of the Albany (1910) meeting of the Committee on the prevention of tuberculosis of the New York state charities aid association.

Baginsky, Adolf. Ueber Waldschulen und Walderholungstätten. *In* Zeitschrift für pädagogische Psychologie, Pathologie, und Hygiene, 1906. Bd. 8, p. 161–177.

Bendix, B. Ueber die Charlottenburger Waldschule. Deutsche Vierteljahrsschrift für oeffentliche Gesundheitspflege. (Leipzig, B. G. Tuebner.) 39: 305–322. September, 1906.

Proceedings of the Seventh annual meeting of the Deutscher Verein für Schulgesundheitspflege.

Bienstock, *Dr.* Die Waldschule in Muelhausen. Strassburger Medizinische Zeitung, Heft 1, 1907; Zeitschrift für Schulgesundheitspflege, 20: 219–235. Leopold Voss, Hamburg.

Byles, A. Holden. The open-air school. World's work (London), 13: 197–208, January, 1909. illus.

Schools in England, and Charlottenburg, Germany.

Bjorkman, Edwin. The outdoor school. Van Norden, December, 1909.

Bryce, P. H. Open-air schools and preventoria. Medical review of reviews, 15: 550–558. August 25, 1909.

Carrington, Thomas S. How to build and equip an open-air school. Survey, 24: 144–151, April 23, 1910.

Cheney, Charles Henry. Oakland school building inquiry. American school board journal, 46: 9–11. April, 1913.

Gives plan for open-air schoolrooms. Illustrated.

Clark, Ida Hood. Management and curriculum of open-air schools. *In* National education association. Proceedings and addresses, 1909. p. 894–901.

Crowley, Ralph H. The open-air school movement. British journal of tuberculosis, 3: 188–190. July, 1909.

Curtis, Elnora W. Outdoor schools. Pedagogical seminary, 16: 189–194, June, 1909.

Bibliography.

—— Outdoor schools. American city, 1: 115–118. November, 1909 *and* 2: 33–37. January, 1910.

Illustrated.

Floyd, Cleayland. Care of phthisis in children through the outdoor school. American journal of public hygiene, 19, n. s., 5: 745–753, November, 1909.

Foerste, August F. Open-air schools, Ohio state board of health. Monthly bulletin, 2:42–65, March, 1912.

——— History of open-air schools in Germany, England, and America to date.

Fraser, Mark S. Pulmonary tuberculosis in school children. *In* Seventh annual report on the medical inspection of school children in Dunfermline (Scotland), 1912–13. p. 80–106. (Carnegie Dunfermline trust.)

Godfrey, Betty. An inexpensive outdoor school (Hartford, Conn.). Good housekeeping, 50:670, May, 1910.

Grau, H. Ergebnisse und Bedeutung der Waldschule. Centralblatt für allgemeine Gesundheitspflege, 1906. 25. Jahrgang, Heft 11–12, p. 373–480.

H., A. La ligue pour l'éducation en plein air. L'hygiene à et par l'école, December, 1913. p. 135–137.

Description of organization.

Hartt, Mary Brunson. A school on a roof. Boston transcript, May 11, 1910.

Franklin park school.

Henderson, Charles Hanford. Outdoor schools. World's work, 17:11095–8, January, 1909.

Effort to adapt teaching to the real conditions of modern life.

Huetzer, *Dr.* Walderholungstaetten und Waldschule. Centralblatt fuer allgemeine Gesundheitspflege, 1906. 25. Jahrgang, Heft 1–2, p. 72–77.

Hyatt, Edward. California schoolhouse for $500. Sacramento, State printing office, n. d. 9 p. illus.

Hyams, Isable F., *and* Minot, James. Boston's outdoor school. Reprinted from the journal of outdoor life, July, 1909, in "Outdoor schools," published by the Boston association for the relief and control of tuberculosis, 1909. p. 11–19, illus.

Jacob, —. Tuberkulose und schule. *In* IX internationalen Tuberkulose Konfenerz. Bruessel, 1910.

Kauffman, Eunice H. School in the forest. Outlook, 90:793–795, December 5, 1908.

Keyes, Harold Brown. Effect of indoor and outdoor school life on the mental condition of children. *In* Fourth international congress on school hygiene, Buffalo, 1913. Transactions, vol. 2, p. 125–134. illus.

Kingsley, Sherman C. Tuberculous children on a city roof. Survey, 23:863–866, March 5, 1910.

An account of the school carried on by the United charities of Chicago. Illustrated.

Kirchner, M. Tuberkulose und Schule. Zeitschrift für Schulgesundheitspflege, Beiheft, 1912.

Kruesi, Walter E. School of outdoor life, Roxbury, Mass. Charities and the commons, 21:447–449, December 19, 1908.

Parker Hill School.

——— ——— Playground no. 23:5–6, February, 1909.

Illustrated.

Lange, W. Die Waldschule. Paed. Warte, Jahrgang 15, Heft 20, p. 1096–1107.

——— Die Charlottenburger Waldschule, Neue Bahnen, Bd. 18, No. 2.

Lennhoff, Rudolph. Walderholungstaetten und Gesundheime. Deutsche Vierteljahrsschrift für öffentliche Gesundheitspflege, 39:71–107, 1906.

Moll-Weiss, Augusta. Les écoles de plein air. L'enfant, p. 549–554, December, 1908.

Morin, Jeanne. An open-air school in France. Wide world, 24:198–201, December, 1909.

Illustrated.

McMichael, O. W. Four months in the open air; a study of sixty children. 1911. 8 p.
Reprinted from the transactions of the seventh annual meeting of the National association for the study and prevention of tuberculosis, 1911. Report on children in the Franklin school open-window rooms.

Neufert, H. Waldschulen. *In* Verhandlungen der *VII* Jahresversammlung des Deutschen Vereins für Schulgesundheitspflege. Published as a supplements, etc. "Gesunde Jugend." 1906.

Nietner, *Dr.* Der Stand der Tuberkulosebekaempfung im Fruejahr 1909. Geschaefsbericht des Deutschen Zentralkomitees zur Bekaempfung der Tuberkulose. Berlin. 1909.

Nuth, Margaret E. Open-air education for well-to-do children. Child (London), 4: 438–444. March, 1914.
An account of the open-air school held in the Botanical Gardens, Regent's Park, London. Illustrated.

Pannwits, *Dr.* Gesichtspunkte bei der Anlage und dem Betrieb von Kindersanatorien. *In* Verhandlungen der *VII* Internationalen Tuberkulose Konferenz in Stockholm 8–10–Juli–1909.
Freiluftschulen Hohenlychen.

Quesada, Luis Miot. Porvenio de la escuela al cure libre. *In* Fourth international congress on school hygiene. Transactions, vol. 2, 1913, p. 144–154.

Roach, Walter W. Open-window classrooms for normal, healthy children. School progress, 1913, p. 445–477.

——— Revitalizing devitalized children—an open-window experiment. American journal of public health, vol. 3, no. 2. (Reprinted, 13 p.)

——— Vitalizing school children—an open-window experiment in Philadelphia. *In* Fourth international congress on school hygiene. Transactions, vol. 2, 1913, p. 135–143.
Illustrated.

Rose, Frederick. Open-air schools. Progress, 3: 87–98, April, 1908.
Illustrated.

——— The national importance of outdoor schools. British journal of tuberculosis, 3: 181–187. July, 1909.
Bibliography.

Schaefer, *Dr.* Zur Eröffnung der Waldschule der stadt M. Gladbach. Centralblatt für allgemeine Gesundheitspflege, 1906. 25. Jahrgang. Heft 7, p. 311–315. Bonn, Martin Hager.

Schoen, Henri. Les nouvelles écoles sous bois. L'éducation, p. 389–420. September, 1909.
Description of open-air schools in Germany, England, and Switzerland. Illustrated.

Schwarz, Karl W. Waldschulen. Die Gesundheitswarte der Schule, 3. Jahrgang. August, 1905, p. 200–202.

Slocum, Maude M. America's fresh-air school in Providence. Good health, 43: 383–385, July, 1908.
Illustrated.

Spencer, *Mrs.* Anna Garlin. Open-air schools. *In* Sixth international congress of tuberculosis. Transactions, 1908, vol. 2, p. 612–618.

Stoll, Henry F. The Hartford preventorium; an outdoor school for delicate children. Journal of outdoor life, vol. 7, March, 1910.

Talbot, Winthrop T. The physical basis of attention. *In* National education association, Proceedings and addresses, 1908, p. 932–936.

Thiel, Peter J. Die Waldschule in der freien Natur, eine pädagogische Notwendigkeit und Möglichkeit. *In* Internationaler Kongres für Schulhygiene, Nuernberg, April, 1904. Bd. 2, p. 346–352.

Todd, John B. Ventilation. Fallacies, facts; experiments, experience. Syracuse, A. R. Elliott publishing co., 1914. 13 p.
Reprinted from the New York medical journal, April 18, 1914. Bibliography.

——— The new method of determining the dust in air and in fresh-air schoolrooms. Syracuse, A. R. Elliott publishing co., 1914. 11 p.
Reprinted from the New York medical journal, February 28, 1914.

Upton, Siegried Maia Hansen. Open-air schools. Teachers' college record (Teachers college, Columbia university), 15:139–205, May, 1914.
Includes a brief history of movement, description of organization, and methods of teaching, results, with tests for determining the efficiency of methods in open-air schools; bibliography.

Vieten-Hagen-Boell. Ueber die Bekaempfung der Tuberkulose im Kindesalter. Zeitschrift für aerztliche Fortbildung, 1909, no. 9.

Watt, William E. Fresh air for average children. Survey, 21:806–809, March 5, 1910.
Illustrated. An account of the fresh-air room experiment in the Graham School, Chicago.

Williams, R. P. Honolulu's open-air school. Paradise of the Pacific (Honolulu), 27:12–13, May, 1914.
Illustrated.

——— Kauai open-air schoolroom. Photograph of a typical schoolroom in Kauai. Hawaii educational review, 1:1, November, 1913.

——— Sheffield open-air recovery school. School hygiene, 1:136–143, March, 1910.

——— Sheffield open-air school. British journal of tuberculosis, 4:101–106, April, 1910.
Illustrated.

III. REPORTS.

AUSTRALIA.

Victoria. Minister of public instruction. Education report (together with appendices) for the year 1911–12. Victoria, 1913.

CANADA.

Hamilton health association. Annual reports, 6–8. Hamilton, Ontario. 1911–1912, 1913.
Children's preventoria at the Mountain sanatorium. Illustrated.

Montreal. Royal Edward institute for the study, prevention, and cure of tuberculosis. Fourth annual report. Montreal, 1913.
Description of open-air school at Royal Edward institute. Illustrated.

Struthers, W. E. Medical inspection of schools in Toronto. Public health journal (Canadian), 5:67, February, 1914.
Written by Chief medical inspector. Illustrated.

DENMARK.

Børnehjaelpsdagens Friluftskoloni. Beretning, 1912. 7 p. illus.
Report on the fresh-air colony for weak children, organized by the children's aid day.

ENGLAND.

Barnsley.

Sadler, F. J. Report on Queen's Road open-air school, session 1912–13. Barnsley. Education office. 1913. 12 p. Tables.
Report of the school medical officer.

Bradford.

Crowley, Ralph H. Report on the Thackley open-air school by the medical superintendent. Bradford. Education committee. 1908.

Williams, Lewis. Reports on the Thackley open-air school. *In* Reports of the school medical officer for the years 1911 to date. Bradford. Education committee, 1912 to date. Tables.

Birmingham.

Auden, George A. Open-air school and its place in educational organization. Public health (London), 25: 249–259. April, 1912.

——— Report on the Uffculme open-air school. *In his* Annual report of the school medical officer. 1912. p. 29–41.
Issued by the Birmingham education committee.

Bristol.

Bristol. School medical officer. Report on the Bristol open-air school. *In his* Sixth annual report. 1913. p. 58–63.
Issued by the Bristol education committee. 1914.

Darlington.

Darlington. Education committee. Report on the open-air school. *In their* Fourth report, August 1, 1908, to July 31, 1910. p. 15–16.

Mostyn, S. G. Reports on the open-air school. *In his* Annual reports of the school medical officer, 1911, p. 20–21; 1912, p. 65–66.

Wood, F. T. H. Report on open-air school. *In his* Third report of the school medical officer. 1910. p. 27–32.

Eastcote (near Pinner).

St. Vincent's cripples' home. Reports and accounts for the years 1911–12 and 1912–13.
Illustrated.

Halifax.

Halifax. Education committee. Report on Bermerside open-air school, 1908, 1909.
Illustrated.

——— School medical officer. Reports on Bermerside open-air school. *In his* Annual reports, 1912, p. 6–17; 1913, p. 14–19.

London.

Great Britain. Board of education. Open-air education. *In the* Annual report of the chief medical officer, 1912. p. 256–270. London. Eyre and Spottiswoode, ltd. 1913.
Illustrated.
A particularly valuable discussion, with illustrations, of the principles and development of open-air education in England, including a chapter on tuberculosis among school children.

London county council. Education committee. Open-air schools, 1908. Report of the education committee of the council submitting a joint report of the education officer and the medical officer (education) on the open-air schools held at Birley House, Dulwich; Montpelier House, Upper Holloway; and Shrewsbury House, Woolwich, between the 10th of June and 31st of October, 1908. London, P. S. King & son, 1909. 20 p.

——— ——— Report on vacation schools and organized vacation play. London, P. S. King & son, 1912.

——— ——— Reports by the school medical officer on open-air schools, 1912, 1913. London, P. S. King & son, 1912, 1913.

Paddington and Kensington dispensary for the prevention of consumption. Fourth annual report, 1912. illus.

St. Marylebone dispensary for the prevention of consumption. Report on the working of the open-air school in Regent's Park. *In its* Second annual report, 1912, p. 56–65. illus.

Alexandra hospital for children with hip disease. Forty-sixth annual report, 1912.

Manchester.

Manchester. Education committee. Manchester country school and care of consumptive children. *In their* Ninth annual report, 1910–11. p. 158–171, 199.

Oxon (near Reading).

Maitland sanatorium. Reports for the years 1912, 1914. illus.
Description of Kindercot, the children's department of the sanatorium.

Sheffield.

Williams, Ralph P. Report on the open-air recovery school at Whiteley Wood. *In his* Fifth annual report of the chief medical officer, 1912. p. 38–42.
Issued by the Sheffield education committee.

——— Reports of the school medical officer on the open-air recovery school at Whiteley Wood, 1909, 1910, 1911.
Issued by the Sheffield education committee.

ITALY.

Granziani, Alberto. Lascuola all' aperto. Rome, Editrice nazionale, 1912. 53 p.
Issued by the Instituto nazionale per l' incremento della educazione fisica in Italia.
Reprint of an address before the fourth International congress of physical education.

Florence.

Dotti, G. A Relazione sulla scuola all' aperto del comune di Firenze. Firenze, Luigi Niccolai, 1913. 8 p.
Issued by Societa Florentina Umberto I contro la tuberculosi.
Brief report of the open-air school, 1912–13.

Padua.

Associazione Padovana contro la tubercolosi. Album of views. Padua, 1910.
Contains several pictures of open-air schools.

Neri, Giovanni. Lavigilanza igienica sulle scuole comunati elementari di Padova durante gli anni 1904–1909. Padua, Societa cooperativa tipografica, 1912. 18 p.

Randi, Alessandro. La lotta contro la tubercolosi nel comune di Padova. Reprint of an address given before the second National antituberculosis conference, Florence, 1909. Florence, Salvadore Landi, 1910. 8 p.

Report of the Antituberculosis association of Padua, including a brief report on open-air schools.

——— Recreatori e Scuole a' aperto per i fanciulli deboli. Padua, R. Stab. P. Prosperini, 1908. 7 p.

Discussion of playgrounds and open-air schools for sickly children.
Reprint of an address before the sixth Italian congress of pediatrics, Padua, 1907.

SCOTLAND.

Edinburgh.

Edinburgh. School board. Report on special school for delicate children at Humble. *In their* Annual report for session, 1911–12. p. 43–44.

——— Report on special schools. *In* Report by medical officer for session, 1911–12. p. 16, 19, 20.

Glasgow.

Glasgow. School board. Report on Biggart memorial home at Prestwick. *In their* Annual report, session 1911–12. p. 21.

——— Report on open-air residential school, Prestwick. *In their* Third annual report on medical inspection of children, 1911–12. p. 11–12.

Perthshire.

Perth. School medical officer. Reports on open-air schools. *In his* Second and third annual reports on the medical inspection of school children, 1911–12, p. 45, 46; 1912–13, p. 57.

Issued by the committee for the county of Perth on secondary education.

SWEDEN.

Stockholm.

Stockholm. City council. Reprints from proceedings, including a plan for establishing a forest school for sick children, submitted by Dr. Sundell, Stockholm, 1907, 1914.

Reports on the proposition by various municipal departments of the municipality and by a commission appointed to investigate the matter; and the decision of the council.

UNITED STATES.

Illinois.

Chicago. Board of education. Department of child study and pedagogic investigation. Child-study reports, nos. 2, 3, 1899–1900, 1900–01.

No. 2 is a reprint from the forty-sixth annual report of the Board of education of Chicago, 1899–1900.

Wing, Frank E. Report of Chicago's first outdoor school and its results. Chicago, The Chicago tuberculosis institute, 1909. 14 p. illus.

Massachusetts.

Massachusetts. State board of health and board of trustees of hospitals for consumptives. Recommendation for the establishment of open-air schools. Boston, Wright and Potter printing co., 1913. p. 12. (House, no. 1950.)

Boston.

Association for the relief and control of tuberculosis. Annual reports. 1908 to date.

Gives running story of development of open-air school work in Boston.

Michigan.

Grand Rapids. Board of health. Survey of five years' work at tuberculosis sanatorium. Grand Rapids, 1912. 26 p. illus.

New York.

Charity organization society of the city of New York. Preventing tuberculosis in New York City. Ninth report of the Committee on the prevention of tuberculosis, covering the years 1911, 1912, and 1913. New York, Charity organization society of New York, 1914. 70 p. illus.

Charts and photographs illustrating the work of the committee in establishing and conducting fresh-air classes in the New York City schools.

New York association for improving the condition of the poor. Home hospital experiment. Report for 1912–13. 75 p. illus. (Publication no. 78.)

——— Poverty and tuberculosis; two years of the home hospital experiment. Report for 1912–14. 112 p. illus. (Publication no. 84.)

New York City. Department of education. Reports on open-air classes. *In the* Annual reports of the city superintendent of schools on defective children, 1910–11 to date.

Pennsylvania.

School lunch committee of the home and school league. Annual reports, 1911 to 1913.

Valuable charts and statistical data on the work of the School lunch committee in the Philadelphia schools.

WALES.

Welsh national memorial association (King Edward VII). Second annual report on the prevention and abolition of tuberculosis, 1913–14. Cardiff, Memorial offices, 1914. 18 p. illus.

Cardiff.

Walford, Edward. Report on tubercular children. *In his* Annual report of the school medical officer, 1912, p. 23–25.

Issued by the Cardiff education committee.

Carnarvon.

Carnarvonshire county council. Report on Brynaerau open-air school. *In* Summary of annual report of the school medical officers, 1912, p. 21. illus.

Issued by the Carnarvonshire county council education committee, 1913.

INDEX.