

Nurses' papers on tuberculosis : read before the Nurses' Study Circle of the Dispensary Department, Chicago Municipal Tuberculosis Sanitarium.

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Publication/Creation

Chicago : Municipal Tuberculosis Sanitarium, 1914.

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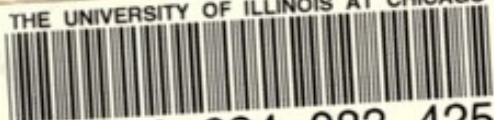


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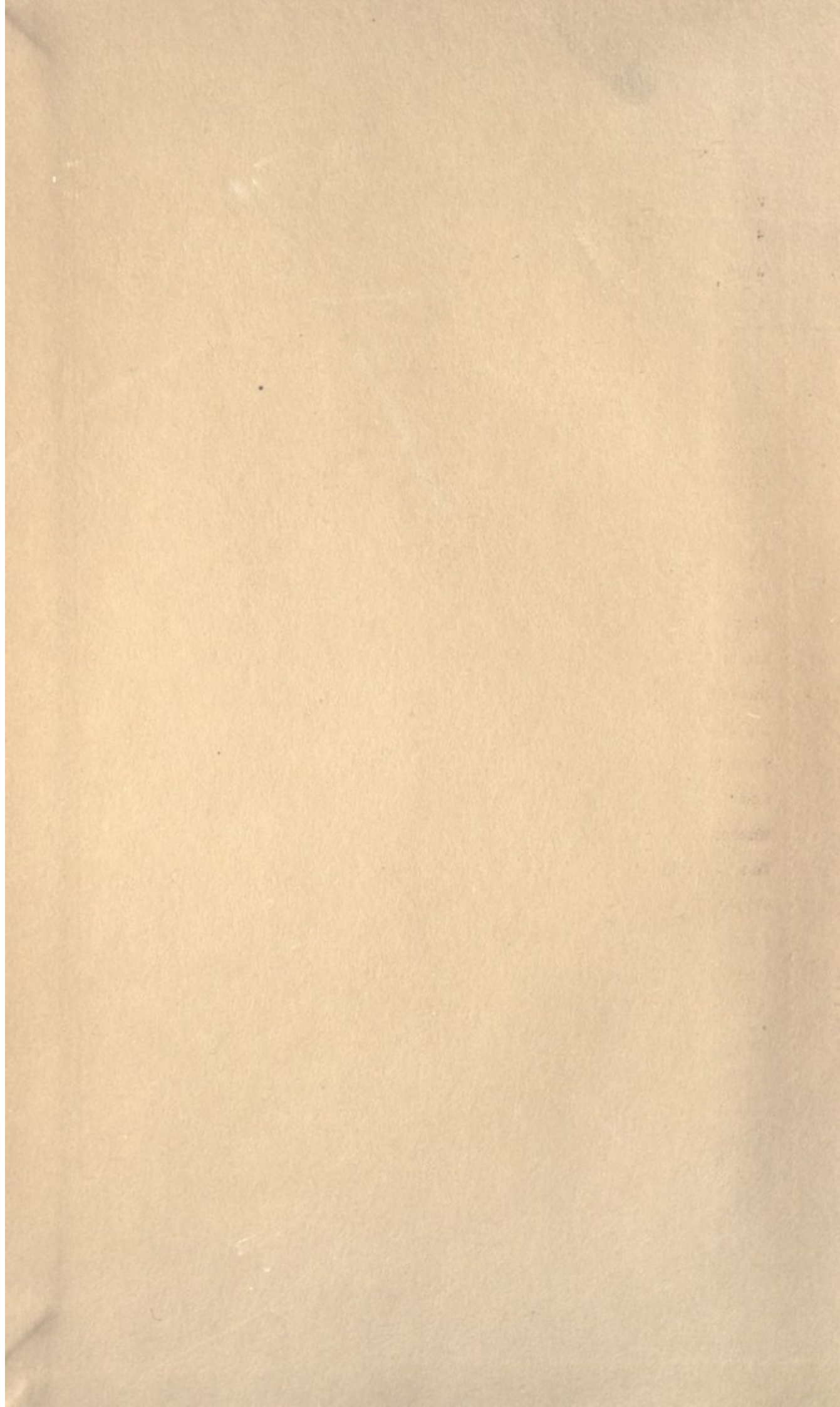
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Dispensary Department

Bulletin No. 1

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NURSES' PAPERS

— ON —

TUBERCULOSIS

PUBLISHED BY THE
CITY OF CHICAGO
MUNICIPAL TUBERCULOSIS SANITARIUM,
SEPTEMBER 1914

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CITY OF CHICAGO

MUNICIPAL TUBERCULOSIS SANITARIUM

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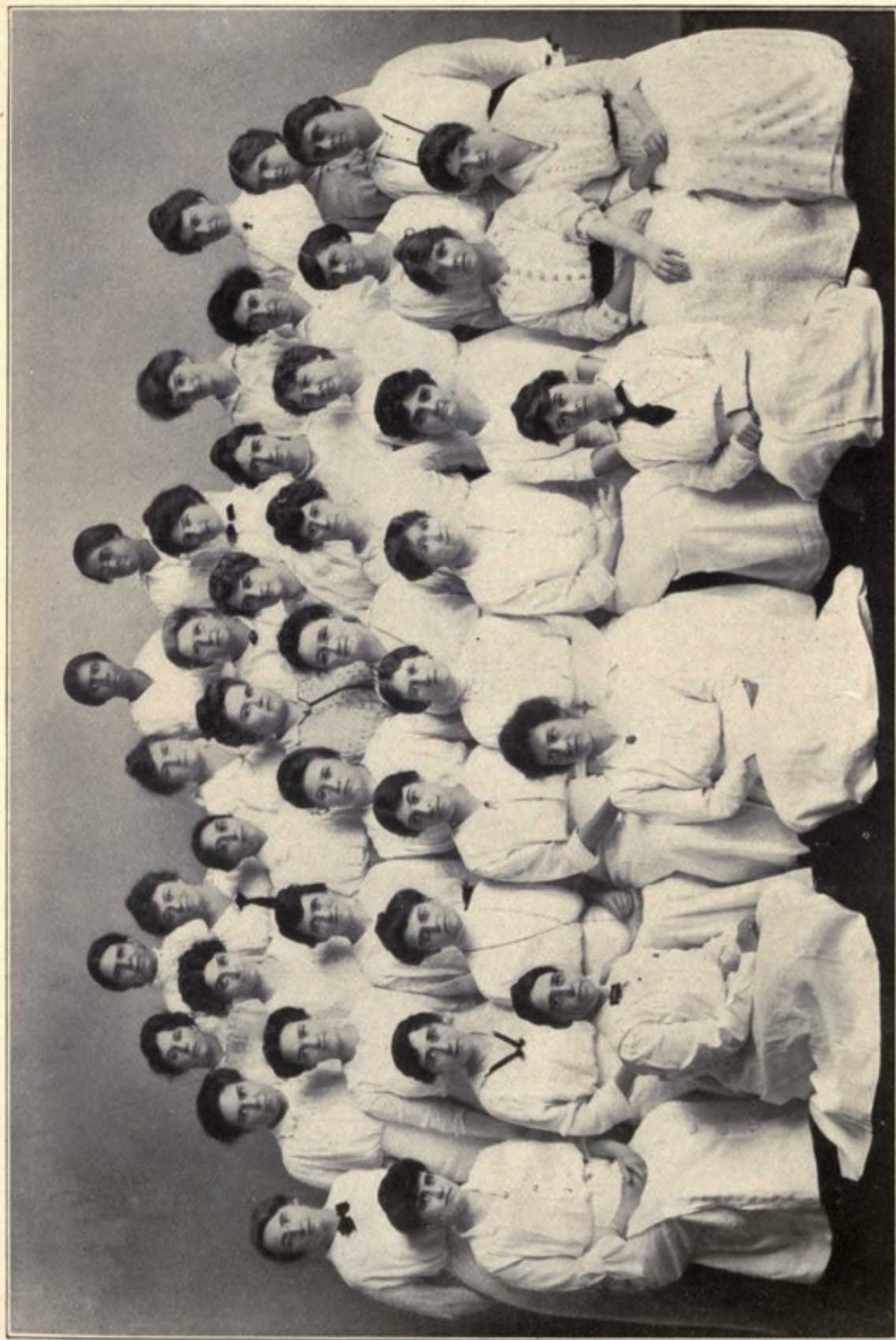
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NURSES' PAPERS

— ON —

TUBERCULOSIS

READ BEFORE THE

NURSES' STUDY CIRCLE

OF THE

DISPENSARY DEPARTMENT

CHICAGO MUNICIPAL TUBERCULOSIS SANITARIUM

—

PUBLISHED BY THE

CITY OF CHICAGO

MUNICIPAL TUBERCULOSIS SANITARIUM

105 WEST MONROE STREET

SEPTEMBER 1914

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NURSES' TUBERCULOSIS STUDY CIRCLE

It is well known that the gathering of facts and study of literature essential to the preparation of a paper on a certain subject is a very productive method of acquiring information. If the paper is to be presented to your own group of co-workers, and the subject covered by it represents an important phase of their work, or an analysis of some of its underlying principles, then there is a further incentive to do your best, as well as an opportunity for a general discussion which acts as a sieve for the elimination of false ideas and gradual formulation of true conceptions.

Lectures on various phases of the work being done by a particular group of people are very important. Papers by the workers themselves are, however, greatest incentives to study and self-advancement.

With this view in mind, I suggested the organization of a Tuberculosis Study Circle by the Dispensary Nurses of the Municipal Tuberculosis Sanitarium. The nurses chosen to present papers on particular phases of tuberculosis are given access to the library of the General Office of the Sanitarium; they are also given the assistance of the General Office in procuring all the necessary information through correspondence with various organizations and institutions in Chicago and other cities.

As the program stands at present, the Nurses' Study Circle meets twice a month. At one of these meetings a lecture on some important phase of tuberculosis is given by an outside speaker, and at the next meeting a paper is read by one of the nurses. At all of these meetings the presentation of the subject is followed by general discussion. The program since January, 1914, was as follows:

January 9th, 1914—"Historical Notes on Tuberculosis," by Miss Rosalind Mackay, Head Nurse, Stock Yards Dispensary of the Municipal Tuberculosis Sanitarium.

January 23rd, 1914—"Channels of Infection and the Pathology of Tuberculosis," by Professor Ludwig Hektoen of the University of Chicago.

February 13th, 1914—"Visiting Tuberculosis Nursing in Various Cities of the United States," by Miss Anna M. Drake, Head Nurse, Polyclinic Dispensary of the Municipal Tuberculosis Sanitarium.

March 13th, 1914—"Provisions for Outdoor Sleeping," by Miss May MacConachie, Head Nurse, St. Elizabeth Dispensary of the Municipal Tuberculosis Sanitarium.

March 27th, 1914—"What Should Constitute a Sufficient and Well Balanced Diet for Tuberculous People," by Mrs. Alice P. Norton, Dietitian of Cook County Institutions.

April 10th, 1914—"Some Points in the Nursing Care of the Advanced Consumptive," by Miss Elsa Lund, Head Nurse of the Iroquois Memorial Dispensary of the Municipal Tuberculosis Sanitarium.

May 15th, 1914—"Open Air Schools in This Country and Abroad," by Miss Frances M. Heinrich, Head Nurse of the Post-Graduate Dispensary of the Municipal Tuberculosis Sanitarium.

May 29th, 1914—"Efficient Disinfection of Premises After Tuberculosis," by Professor P. G. Heinemann, Department of Bacteriology, University of Chicago.

The organization of the Tuberculosis Study Circle among the nurses of the Dispensary Department of the Municipal Tuberculosis Sanitarium, calling forth the best efforts of the nurses in getting information on various phases of tuberculosis for presentation to their co-workers in an interesting manner has, no doubt, stimulated the progress of our entire nursing force. The first five papers presented by the nurses are given in this series. The pamphlet is published with the idea of attracting the attention of other organizations to this method of stimulating more intensive study among their nurses.

THEODORE B. SACHS, M. D., President

Chicago Municipal Tuberculosis Sanitarium.

HISTORICAL NOTES ON TUBERCULOSIS

By ROSALIND MACKAY, R. N.

Head Nurse, Stock Yards Dispensary of the Chicago Municipal Tuberculosis Sanitarium.

So far as our information goes, pulmonary tuberculosis has always existed. It is, as Professor Hirsch remarks, "A disease of all times, all countries, and all races. No climate, no latitude, no occupation, forms a safeguard against the onset of tuberculosis, however such conditions may mitigate its ravages or retard its progress. Consumption dogs the steps of man wherever he may be found, and claims its victims among every age, class and race."

Hippocrates, the most celebrated physician of antiquity (460-377 B. C.), and the true father of scientific medicine, gives a description of pulmonary tuberculosis, ascribing it to a suppuration of the lungs, which may arise in various ways, and declares it a disease most difficult to treat, proving fatal to the greatest number.

Isocrates, also a Greek physician and contemporary of Hippocrates, was the first to write of tuberculosis as a disease transmissible through contagion.

Aretaeus Cappadox (50 A. D.) describes tuberculosis as a special pathological process. His clinical picture is considered one of the best in literature.

Galen (131-201 A. D.) did not get much beyond Hippocrates in the study of tuberculosis, but was very specific in his recommendation of a milk diet and dry climate. He held it dangerous to pass an entire day in the company of a tuberculous patient.

During the next fifteen centuries, a period known as the Dark Ages and characterized by most intense intellectual stagnation, little was added to the knowledge of pulmonary tuberculosis. In the seventeenth century Franciscus Sylvius brought out the relationship between phthisis and nodules in the lymphatic glands. This was the first step toward accurate knowledge of the pathology of tuberculosis.

Richard Morton, an English physician, wrote, in 1689, of the wide prevalence of pulmonary tuberculosis, and recognized the two types of fever: the acute inflammatory at the beginning, and the

hectic at the end. He also recognized the contagious nature of the disease and recommended fresh air treatment. He believed the disease curable in the early stages, but warned us of its liability to recur. Morton taught that the tubercle was the pathological evidence of the disease.

In 1690, Leeuwenhoek, a Dutch lens maker, started the making of short range glasses which resulted later in the modern microscope, making possible the establishment of the germ theory of disease, including the establishment of that theory for tuberculosis.

Starck, whose observations and writings were published in 1785 (fifteen years after his death), gave a more accurate description of tubercles than had ever been given before, and showed how cavities were formed from them.

Leopold Auenbrugger introduced into medicine the method of recognizing diseases of the chest by percussion, tapping directly upon the chest with the tips of his fingers. The results of his investigations were published in a pamphlet in 1761. This new practice was ignored at first, but after the work of Auenbrugger was translated he attained a European reputation and a revolution in the knowledge of diseases of the chest followed.

Boyle recognized in miliary tubercle, as it was afterwards called by him, the anatomical basis of tuberculosis as a general disease, and, in 1810, published the results of one of the most complete researches in pathology. He described the stages in the development of the disease, using miliary tubercle as its starting point. He opposed the theory that inflammation caused tuberculosis and declared hemorrhage a result and not a cause of consumption.

Laennec discovered one of the most important, perhaps, of all methods of medical diagnosis—that of auscultation. By means of the stethoscope, which he invented in 1819, he recognized the physical signs and made the first careful study of the healing of tuberculosis; he gave also one of the best accounts of the sputum of the consumptive. He believed that every manifestation of the disease in man or animals was due to one and the same cause.

Up to this time the views which were held concerning the infectious nature of tuberculosis were not based upon direct experiment, but in 1843 Klenke produced artificial tuberculosis by inoculation. He injected tuberculous matter into the jugular vein of a rabbit, and six months later found tuberculosis of the liver and lungs. He did not continue, however, his researches; so they were soon forgotten.

To Villemin, a French physician, belongs the immortal fame of being the first to show the essential distinction in tuberculosis

between the virus causing the disease and the lesion produced by it. By inoculating animals, he demonstrated that tuberculosis is a specific disease caused by a specific agent. His paper presented in 1865 before the Academy of Medicine in France contained a detailed account of his experimental investigations. This was a most remarkable contribution to scientific medicine.

It remained for Robert Koch in 1882, after years of painstaking investigation, to announce to the world the discovery of a definite bacillus as the causative agent in all forms of tuberculous lesions. Koch isolated, cultivated outside the body, described and differentiated the infective organism of tuberculosis and proved that it could continue to produce the same lesions indefinitely. He showed the presence of the bacilli in all known tuberculous lesions and in tuberculous expectoration, and demonstrated the virulence in sputum which had been dried for eight weeks.

Following directly upon the knowledge of the cause of tuberculosis came the recognition of its curability, and the proper means of its prevention. Although good food and fresh air have always been considered of importance in the treatment of the disease, it was not until the middle of the nineteenth century that anything like systematic treatment was undertaken.

Dr. George Bodington of Sutton, Coldfield, England, wrote an essay in 1840 advocating fresh air treatment. He denounced the common hospital in large towns as a most unfit place for consumptive patients, and established a home for their care, but met with so much opposition that it was soon closed.

In 1856, Hermann Brehmer wrote a thesis on the subject which has been the foundation of our modern treatment. He opened a small sanatorium in 1864. Five years later he established the sanatorium at Goerbersdorf, in Silesia, which eventually became the largest in the world. He advocated life in the open air, abundant dietary and constant medical supervision. He believed that the heart of the large majority of consumptives is small and undeveloped, and that this predisposes them to the disease. In accordance with this theory he put a great deal of emphasis on exercise in the treatment of his patients. He built walks of various grades on the grounds of his sanatorium and installed a system of walking exercise. Patients began with the lowest grade, gradually accustoming themselves to ascend to the highest. Brehmer was himself a consumptive, and was cured by the method he so firmly believed in.

Dr. Dettweiler, who opened the second sanatorium in Germany, at Falkenstein, near Frankfort, was also a consumptive, having de-

veloped tuberculosis during the arduous campaign in the Franco-Prussian War in 1871. He entered the Goerbersdorf Sanatorium as a patient, becoming later an assistant of Brehmer. Dr. Dettweiler laid great emphasis upon rest in treatment.

In 1888, Dr. Otto Walther opened his famous sanatorium at Nordrach in the Black Forest, in Germany.

The first sanatorium for the care of the consumptive in the United States was opened at Saranac Lake by Dr. Edward L. Trudeau in 1884. He was the pioneer of the sanatorium treatment in this country, and an example of what a man, although tuberculous himself, can do for his fellow men. In 1874, a seemingly helpless invalid, he made his home in the Adirondack Mountains. A little more than twenty-five years ago he became the founder of a village now crowded with tuberculous patients. The Saranac Lake institution, which began with one small cottage, has since developed into the best known sanatorium in this country.

In 1891, Dr. Herman Biggs posted the first anti-spitting ordinance in the street railway cars of New York.

Dr. Lawrence Flick brought about the formation of the first anti-tuberculosis society in 1892, and in 1894 the City of New York adopted a law to enforce notification and registration.

Dr. Philip of Edinburgh was the first to systematically and completely organize the anti-tuberculosis campaign. In 1887 he inaugurated that new institution, the anti-tuberculosis dispensary, which has since rendered such inestimable service. The fundamental principle of the Edinburgh system is that the disease should be sought out in its haunts.

The first dispensary in the United States was opened in New York in 1904, modeled after the Edinburgh system. About the same time came the Open Air Schools—Charlottenburg establishing one in 1904 and Providence, R. I., following in 1908. The first Day Camp in the United States was opened in 1905 in Boston. New Jersey established the first Preventorium for Children at Farmingdale in 1909. All this naturally led to better provision for advanced cases; sanatoria for hopeful cases at small cost; factory inspection; and, in some countries, industrial colonies for arrested cases.

The tuberculosis patient of today presents a hopefulness previously undreamt of. The outlook is brighter with promise than ever before, and we have every reason to look forward to a steady reduction in the mortality rate from this dread disease; but the extinction of tuberculosis will be achieved only when the social and economic problems have been solved.

VISITING TUBERCULOSIS NURSING IN VARIOUS CITIES OF THE UNITED STATES

By ANNA M. DRAKE, R. N.

Head Nurse, Policlinic Dispensary of the Municipal Tuberculosis Sanitarium.

BALTIMORE

In 1903, the first visiting tuberculosis nurse was assigned in Baltimore to follow up patients of the Johns Hopkins Hospital Out-patient Department. Her duties were varied as are the duties of the present day tuberculosis nurse. She was to instruct patients in the use of sunlight and fresh air and was allowed to furnish them with special diet in the shape of milk and eggs. She investigated home conditions and helped improve sleeping quarters. She placed patients in sanatoria, or brought them back to the dispensary for treatment. She gave bedside care to advanced cases, if she could not get them into hospitals, and applied to relief organizations for help in solving the problems of the family. From time to time other nurses of the Baltimore Visiting Nurse Association were assigned to the work, other dispensaries and agencies began referring cases to be followed up, and the work grew to such proportions as to be almost unmanageable for a private organization.

In 1910, the Tuberculosis Division of the Baltimore Health Department was organized. It began its activities with a corps of fifteen nurses and a visiting list of 1,617 patients turned over to it by the Baltimore Visiting Nurse Association. The object of the Tuberculosis Division was to bring under the supervision of the Health Department all persons in the city suffering with pulmonary tuberculosis. Ambulatory cases were to be given advice and instruction; advanced cases, bedside care, if needed, or hospital care, if available. At present, it is upon the advanced cases, as well as those who are in contact with them, that the nurses of the Tuberculosis Division concentrate their efforts. The Staff at present consists of a Superintendent and sixteen Field Nurses. The city is

divided into sixteen districts, a nurse being assigned to each district. Each nurse is responsible for the care of all cases of tuberculosis in her district.

In 1912, the Tuberculosis Division opened two municipal tuberculosis dispensaries. These dispensaries receive patients on alternate days from 3 to 5 p. m., nurses in districts nearest the dispensaries alternating for clinic duty. Other dispensaries are the Phipps Tuberculosis Dispensary at Johns Hopkins Hospital, and the University of Maryland Hospital Tuberculosis Dispensary.

The problems which chiefly concern the Tuberculosis Division in its efforts to control the spread of tuberculosis in Baltimore are the failure of physicians to report cases to the Department of Health until the patient is in a dying condition, and the inadequate provision for hospital care of advanced cases. These conditions are particularly marked in the case of colored patients, who are found going in and out of homes, restaurants, and laundries, as cooks, waitresses and servants of various kinds, as long as they are able to drag themselves about.

The nurses of the Tuberculosis Division are graduate nurses and are registered. They are paid \$75 a month, with car fare and telephone expenses, and are allowed two weeks' vacation with pay. They are not required to take a Civil Service examination, but are carefully selected with a view to obtaining women of a high grade of efficiency. They wear uniforms of blue denim with simple hats and coats, but not of uniform design. Each nurse wears under the lapel of her coat a badge reading "Nurse—Baltimore Health Department," which she uses on occasions. The nurses report to the Superintendent each morning at 8:30 to hand in reports of the previous day's work, to stock their bags, and to receive new work for the day. At noon each nurse reports at her branch office, of which there are seven, each situated on border lines of adjoining districts. An hour is spent at the branch office for lunch and rest, for receiving telephone calls and for restocking the bags for afternoon rounds. The nurse leaves her district at four o'clock to attend to about an hour's clerical work, which is usually done at home.

The average number of patients per nurse is 212, about four per cent of whom are bed cases. These bed patients are visited two or three times a week, while ambulatory cases are visited on an average of twice a month. During the year 1912 the sixteen nurses made 72,058 visits for instruction and nursing care.

NEW YORK

The oldest tuberculosis clinic in New York City is connected with the New York Nose, Throat and Lung Hospital; it was es-

established in 1894. In 1895, the Presbyterian Hospital established a special tuberculosis clinic. In 1902, the Vanderbilt Clinic organized a special class for the treatment of tuberculosis. In 1903, Gouverneur and Bellevue Hospitals and, in 1904, Harlem Hospital added Tuberculosis Clinics. These were followed during the next few years by the establishment of many others. In 1906, when the Tuberculosis Relief Committee of the New York Charity Organization Society began its work among the tuberculous poor of the city, it met at every turn instances of overlapping and duplication in the work done by the various clinics. This lack of co-operation, with the resulting difficulties encountered by the Committee in its endeavor to efficiently administer its special tuberculosis fund, demonstrated the advisability of forming an organization having as its object the co-ordination of the work of the various tuberculosis clinics. In 1908, nine of these clinics and several allied philanthropic agencies were organized into the Association of Tuberculosis Clinics. Today there are 29 clinics, 14 philanthropic institutions and organizations, five departments of municipal and state government, six tuberculosis institutions, and numerous other institutions and organizations having special interest in tuberculosis work. Of the 29 clinics, eleven are under the supervision of the Department of Health, three are connected with city hospitals, and the remainder are operated by private institutions. This voluntary association of private and municipal dispensaries, sharing equal responsibilities and acknowledging equal obligations, is a striking feature of tuberculosis work in New York and presents a unique example of co-operation.

The task of standardizing the clinics was a difficult one. One clinic had ten rooms with every convenience. Another had one room and no conveniences. Some clinics made no provision for sputum beyond a cuspidor; others provided gauze or paper napkins when patients entered the room. Two clinics provided no drinking water; two had a metal water cooler in the waiting room; one provided sanitary drinking cups; and another had two enamel drinking cups chained to the wall. Some clinics had sanitary fountains; in others the nurse kept a glass on hand for the patients. Neither was there any uniformity in matters of dress. Nurses and doctors at some clinics wore ordinary street clothes. At other clinics, gowns or aprons, with or without sleeves, were worn. Three clinics occupied separate buildings of their own. Four clinics provided separate waiting-rooms for tuberculous patients. At one dispensary the tuberculous patients had the use of the general waiting room, there being no other clinics held at that time; other clinics made no dis-

tion, tuberculous patients using the general waiting room in company with patients attending other clinics. After studying the conditions existing in the various clinics, it was decided that to belong to the association each clinic must subscribe to and comply with the following regulations:

- a. Tuberculous patients must be segregated in a separate class.
- b. Home supervision of all cases by a graduate nurse especially assigned for this purpose must be maintained.
- c. Each dispensary must serve a certain district, and all cases living outside of this district must be transferred to the clinic serving the district within which they live.

Early in the history of the Association objection was made to this last rule by teachers of medicine, who held that it tended to deprive them of teaching material; but they soon fell in line with the other dispensaries when they saw the advantage it afforded them of improving their methods without loss of teaching material, and the further opportunity of securing home supervision.

From time to time it has been necessary for the Association to adopt certain methods of procedure in the administration of the various clinics. The general policy of the Association is as follows:

- (1) Each clinic should arrange for a physician to visit and treat in their homes patients who are too ill to attend clinic, for whom hospital care cannot be provided.
- (2) Special children's clinics should be established wherever the size of the clinic warrants it.
- (3) Sputum of every patient should be examined once a month; patients should be re-examined once a month, and the results entered on the records.
- (4) The physician should use the nurse's report of home conditions as a basis for advising patients.
- (5) Patients refusing to attend the proper dispensary shall be dismissed as delinquent and reported to the Health Department.
- (6) All supervising nurses should be affiliated with some local relief organization in order to better organize the relief work of the clinic.
- (7) The home of every patient should be visited at least once a month.
- (8) The classification of the National Association for the Study and Prevention of Tuberculosis should be followed for recording stages of disease and condition on discharge.

- (9) A uniform system of record keeping should be used by nurses in order to facilitate the compiling of monthly reports.
- (10) The staff of physicians should be sufficient to allow at least fifteen minutes for the examination of every new case, and at least six minutes for every old case.
- (11) There should be at least one nurse for every 100 patients on the clinic register.
- (12) Sputum cups, or a proper substitute, should be furnished to patients to take home.
- (13) Paper or gauze handkerchiefs should be given to each patient on entrance to the clinic.
- (14) No cuspidors should be used.
- (15) Sanitary fountains or sanitary drinking cups should be provided.
- (16) Gowns with sleeves should be worn by physicians. Nurses should wear gowns with sleeves or washable uniforms while on duty in the dispensary.

That the Association found it necessary to make so many recommendations for the administration of the various clinics is evidence of the diverse systems, and in some instances, the entire lack of system, in vogue in some dispensaries. The salary of nurses in privately operated tuberculosis dispensaries averages about \$75 per month; no standard uniform is in use.

The first tuberculosis visiting nurse of the New York Department of Health was appointed March 1st, 1903. By January, 1910, the staff had grown to 158, the Health Department becoming practically responsible for the home supervision of every registered case of tuberculosis in New York not under the care of a private physician or in an institution.

The organization of the work of the new Health Department tuberculosis nurses has been based upon the district system in force among the Associated Clinics. In each clinic district a staff of Health Department nurses is maintained, charged with the sanitary supervision of cases of pulmonary tuberculosis in that district. They visit at least once a month all "at home" cases; that is, cases not regularly attending clinics, not in an institution, or not under a private physician's care. These nurses report daily at the tuberculosis clinic, which is used as a district headquarters, and there receive assignments. One nurse is detailed as Captain, or supervising nurse of the district, and acts as official intermediary between the clinic and the Department of Health. Each morning the nurse telephones to the Department of Health the daily report of her staff and

of the clinic, and obtains information received at the Department regarding cases in the district. In case of death or removal of tuberculous patients from a home the district nurses order disinfection of the premises and bedding; they make arrangements for admission of patients to hospitals or sanatoria, investigate complaints made by citizens, see that regulations of the Department of Health regarding expectoration are observed, and use their authority to induce delinquent cases to resume attendance at the proper clinic. They also visit families of patients in hospitals at intervals. Each nurse keeps a complete index of all cases of pulmonary tuberculosis in her district, which is at all times accessible to nurses and physicians at the clinic.

In the Department of Health clinics, the plan is as follows: a supervising nurse who does no district work, and several field nurses, each assigned to special duties on clinic days, such as registration room, throat room, examining rooms, etc. Field nurses are also responsible for the care of patients in their sub-districts, each nurse carrying an average of about 125 patients on her visiting list at one time.

BOSTON

A staff of twenty-five nurses, working from the Out-patient Department of the Boston Consumptives' Hospital, has the supervision of all tuberculosis cases in their homes, and the follow-up work on all discharged sanatorium and hospital cases in the city of Boston.

All cases of tuberculosis reported to the Health Department, whether under the care of a private physician or not, are visited at least once by a nurse from this staff, to see that they are carrying out a proper plan of isolation.

The Boston Consumptives' Hospital Dispensary, centrally located, is open every morning and one or two evenings a week. Three or four nurses are on duty in the clinic each morning, taking histories, attending nose and throat room and preparing patients for examination. At the dispensary only a medical history of new patients is taken, the social history being obtained by the nurse on her first visit to the home. Pulse, temperature and weight are also taken at the dispensary, after which the patient waits his turn for examination. Each new patient is given an examination in the nose and throat room; old patients also, if necessary. After examination or treatment, all patients return to the general waiting room. From here each patient is called before the Chief of Clinic, who notes the general progress of the patient, the results of the last examination

or any remarks recorded by the physician, and the report of home conditions as reported by the nurse. The Chief of Clinic advises the patient in accordance with the needs indicated. He makes no examinations, but sees each patient every time he comes to the clinic and is thus able to follow very carefully the progress of each patient and to advise such changes in treatment as may seem necessary.

The city is divided into twenty-two districts, each nurse being responsible for the care of all tuberculous patients in her district. The number of patients cared for by each nurse is from 100 to 180. A very small percentage of bedside care is given; far advanced patients as a rule are sent to hospitals.

Boston tuberculosis nurses do not wear uniforms. They are paid \$900 a year, with no increase for length of service or efficiency.

BUFFALO

The purpose of the Buffalo Association for the Relief and Control of Tuberculosis has been to stimulate progress in fighting tuberculosis. It very modestly shares with the city officials and with private charities the credit for the work accomplished. All it claims for itself is that it has been able, and will continue, to "point the way." How thoroughly it has succeeded in this may be seen by the progress made since 1909 when the Buffalo Association made its first appeal for funds. At that time Buffalo had:

- (1) A dispensary maintained by the Buffalo Charity Organization Society.
- (2) The Erie County Hospital for advanced cases.
- (3) A day camp, with a capacity of thirty patients, supported by a group of women.
- (4) One visiting nurse supplied by the District Nursing Association.

The present facilities are:

- (1) A dispensary, open every day and one evening a week, with a nose and throat clinic, and a dental clinic with a paid dentist in attendance.
- (2) The J. N. Adam Memorial Hospital for early cases, capacity 125, supported by the city.
- (3) The Municipal Hospital for the care of advanced cases, supported by the city.
- (4) The Erie County Hospital, as before.
- (5) Tuberculosis Division of the Department of Health with two tuberculosis inspectors and six visiting tuberculosis nurses.

- (6) An Open Air Camp, with a capacity of from seventy to one hundred patients, with a special department for children. Patients are kept day and night. The camp has three resident trained nurses and one interne, and is visited daily by the Association's paid medical director.
- (7) Two open air schools, with another promised.
- (8) A City Hospital Commission, with a plan for the erection of a pavilion for 500 advanced cases as the first of a general hospital scheme.
- (9) Teachers soon to be appointed for the education of tuberculous children.
- (10) The trades unions organized to promote the campaign among their own members in a unique organization.
- (11) The whole community alert to the menace of tuberculosis, willing to shoulder the community burden and to assume the community responsibility.

The Dispensary is now operated by the Association for the Relief and Control of Tuberculosis, and the nurses are supplied by the Health Department. The nursing staff consists of a supervising nurse and six field nurses, the latter receiving \$720 per year. They wear no uniform. They give a limited amount of bedside care, some member of the family being taught to properly care for the patient, if he cannot be sent to a hospital. Recently an additional nurse was engaged by the Association to follow up cases on whom no diagnosis has been made and who have not returned to the dispensary for re-examination. Since the Dispensary was opened in 1909, there have been over one thousand such cases. Many of these had suspicious signs when examined, but there has hitherto been no means of keeping in touch with them, as the nurses have been obliged to confine their attention to positive cases. One of the chief difficulties of the Buffalo campaign, as elsewhere, has been the fact that more than half of the cases have probably already infected others. This latest movement of the Association should anticipate this condition to a certain extent, and is one more means by which it is "blazing the trail" toward its goal,—
"No uncared for tuberculosis in Buffalo in 1915."

PHILADELPHIA AND PENNSYLVANIA

In the General Appropriations Act of 1907 the Legislature of Pennsylvania granted to the State Department of Health, in addition to its regular budget, the sum of \$400,000, "to establish and maintain, in such places in the State as may be deemed necessary, dispensaries for the free treatment of indigent persons affected

with tuberculosis, for the study of social and occupational conditions that predispose to its development, and for continuing research experiments for the establishment of possible immunity and cure of said disease."

Immediately after securing the above appropriation, the State Department of Health began to establish dispensaries throughout the state, one or more in each county. The staff of each dispensary consists of a chief, who is also county medical inspector, and a corps of assistant physicians and visiting nurses. There is a supervising nurse with one assistant at Harrisburg, who oversee and inspect the work of the staff nurses.

The number of nurses in the dispensaries throughout the state varies from a nurse shared by another organization or a practical nurse giving part time, to from four to seven nurses in one dispensary. There are now more than 115 State Department Tuberculosis Dispensaries in Pennsylvania, Philadelphia having three.

An idea of the general plan of the work may be gained from a description given of the State Department Dispensary No. 21 located in Philadelphia, by Dr. Francine:

"There are at present five nurses employed at Dispensary No. 21, two of whom give their whole time to following up the return cases from the State Sanatoria. As soon as the case is discharged from the sanatorium, that information, with other data regarding the condition on discharge, etc., is sent to us at once. At the end of a stated period, if that case has not been returned, the nurse looks it up, and gets it to come in. The nurses make out detailed reports on all cases discharged from the sanatoria, at periods of six months, whether our own patients or not. These will be and are valuable for statistical data. Practically all the data for reports as to subsequent results in cases discharged from the sanatoria, which have appeared in this country at least, have been made up from information gleaned by writing the discharged patient and having him fill out his own report. It does not tax the imagination unduly to conclude which is the more accurate, the answers to questioning by a trained worker (we have selected for this work the two nurses who have been with us longest) who in addition takes the temperature, pulse, etc., herself, and usually succeeds in getting the patient back to the dispensary for at least one re-examination; or such answers as a patient may see fit to make to a printed questionnaire.

For the purpose of regular dispensary and inspection work, the dispensary limits itself to receiving patients from certain districts of the city, though as a state institution it is impossible for the dispensary to refuse any case, no matter where they live, if they insist upon treatment. Usually by a little persuasion, however, we can get the patients to go to the dispensary in their district, co-operating in this way with the Phipps Institute of the University of Pennsylvania, the Gray's Ferry State Dispensary, the Kensington Tuberculosis Dispensary and the Frankford State Dispensary. The section of the city from which we draw our cases is divided, for purposes of inspection and Social Service Work, into three districts with a nurse assigned to each, and this gives each of our nurses, roughly speaking, about seventy-five patients per month to take care of. These patients

must be visited regularly every two weeks, which gives the nurse at least one hundred and fifty visits a month to pay, not including the visits to new cases.

Every new case which is admitted to the dispensary must be visited within one week of the day of admission. The nurses come in from their visiting work and report daily at 12:30 o'clock, for one hour in the dispensary office, and new cases, according to the district in which they live, are assigned to the nurse having charge of that district. The advantage of having a nurse report daily to the dispensary at a time when all the doctors are there, lies in the fact that the doctor has thus the opportunity of talking over with the nurse the new cases which she is to visit and of making any suggestions which he has gleaned from the history and examination of the patient. It is thus possible for the nurses to visit the new cases in the afternoon of the same day. The advantage of this close co-operation between doctor and nurse must be at once apparent. Further, each nurse is required to report to every physician one morning a month, with the histories in hand of all the patients of that particular doctor which are on her list. This is valuable, because in no other way can the doctor get so thorough an understanding of the home conditions and social problems of a given patient as by talking the situation over directly and personally with the nurse in charge."

A similar plan is in operation at the other two State Department Clinics in Philadelphia.

The best known tuberculosis dispensary in Philadelphia, conducted by a private organization, is the dispensary connected with the Henry Phipps Institute. This dispensary during the eleven years of its existence has contributed greatly to the standardization of tuberculosis dispensary work, not only in Philadelphia, but throughout the entire country. Connected with a scientifically conducted hospital for advanced cases, with its laboratories and other improved medical facilities, the Dispensary of the Henry Phipps Institute occupies a high place among the similar institutions of this country. The nursing staff of the Henry Phipps Dispensary consists of three visiting tuberculosis nurses, aided by two additional nurses (both colored) assigned by other organizations to work on the Phipp Dispensary staff, one by the Whittier Centre, and the other by the Pennsylvania Society for the Prevention of Tuberculosis. Some of the important features of the work of this dispensary in its relation to nurses are as follows:

- (1) An efficient training school for tuberculosis nurses, affording the opportunity of hospital and dispensary training.
- (2) A course of lectures on tuberculosis given to the nursing profession at large.
- (3) Intensive home work among tuberculous families.

Visiting tuberculosis work in Philadelphia is also done in connection with the Presbyterian Hospital Tuberculosis Clinic, St. Stevens Church Tuberculosis Clinic, and by the Visiting Nurse Society of Philadelphia.

PITTSBURGH

The Tuberculosis League Hospital of Pittsburgh was opened in 1907 for incipient and advanced cases, with a capacity of eighty beds. The League conducts at present a night camp, an open air school, a farm colony, a post-graduate course for nurses and tuberculosis clinics for medical students at its dispensary. There is also a post-graduate course in tuberculosis for nurses. The course requires eight months and nurses receive during that time \$25 a month. Only registered nurses are accepted. The training is along the following lines: nursing advanced cases in hospital, open air school work, sanatorium care of early cases, service in dental, nose and throat clinics, and in the dispensary for ambulant cases, district nursing, service in baby clinics, educational work, and laboratory work. Patients discharged from the hospital, families of patients in the hospital, and cases reporting at various tuberculosis dispensaries, are given complete follow-up care by the nurses taking the course, thus giving them excellent training in public health work, especially that phase of public health nursing dealing with tuberculosis. At present there are nine nurses taking the course. The Dispensary of the Tuberculosis League employs six nurses.

Pittsburgh has also a State Department of Health Tuberculosis Clinic, with ten nurses, each caring for from 90 to 100 patients per month. These nurses give a small percentage of bedside care and are not in uniform, except when on duty in the dispensary. They are paid \$70 per month. The plan of work is similar to that of the Philadelphia State Dispensary.

The Department of Public Health of Pittsburgh employs four visiting nurses, who investigate home conditions and instruct patients reported to the department who are not under the close supervision of a private physician, the State Department Clinic, or the Tuberculosis League Clinic. The nurses are able to correlate, in a way, the work of the two dispensaries by assigning patients to the clinic in the district in which they live. They receive \$75 per month and are not in uniform.

Pittsburgh, then, has in all twenty visiting tuberculosis nurses, under three separate and distinct organizations.

CLEVELAND

In Cleveland, as in nearly every other city, the work of organizing the fight against tuberculosis was accomplished by private organizations, the Anti-Tuberculosis League and the Visiting Nurse Association. For a number of years the Health Department con-

fined itself to keeping a card catalogue of reported cases. In 1910 sufficient funds were voted by the City Council to enable the establishment of a separate Bureau of Tuberculosis, whose duty should be the development of municipal tuberculosis work. This Bureau has taken over and gradually developed five dispensaries, with a staff of twenty-four visiting tuberculosis nurses, and paid physicians, besides the director and office force. The work in Cleveland is centralized in its Health Department.

General dispensaries are required to refer all cases of tuberculosis to the tuberculosis dispensaries, and physicians are required to report all cases to the Health Department. On report cards and sputum blanks is the statement: "All cases of tuberculosis reported to the department will be visited by a nurse from this department unless otherwise requested by the physician." With very few exceptions the physicians are glad to have a nurse call, and every effort is made to co-operate with the physicians in handling the case.

The city is divided into five districts, with a dispensary located in each district. Patients are treated only at the dispensary serving the district in which they live. "This plan prevents cases wandering from one clinic to another and enables the nursing force to do more intensive work in each district."

Once a week the chief of the Bureau of Tuberculosis and the Superintendent of Nurses meet with each separate dispensary staff, and cases are carefully considered and work discussed. In addition, meetings of the active nursing staff are held, informal talks on tuberculosis being given, or the work of allied organizations studied, speakers coming from the Associated Charities, Department of Health, Settlement Houses, etc. Each nurse is held responsible for the handling of every individual case in her district. By thus making the nurse responsible, the interest in her work is increased and much better results are obtained. If the problem presented is one that will take more time and energy than the busy dispensary nurse can give, it is referred to a Special Case Committee.

All dispensary cases are visited in the home within twenty-four hours after the first visit to the dispensary, where a complete history of the case is taken. The patient and family are instructed and each member urged to come to the clinic for examination. Homes where a death from tuberculosis has occurred are visited immediately, with the consent of the physician. The family is carefully instructed as to disinfection, and advised to go to the physician or dispensary for examination.

Cleveland nurses wear uniforms. Each nurse carries about three hundred patients, a very small percentage being bed cases, usually not more than two patients at a time. Nurses receive \$60 for each of the first three months; \$65 for each of the next nine; \$70 a month for the second year; the third year \$80; and the fourth year \$85.

DETROIT

The Detroit Board of Health maintains a staff of ten visiting tuberculosis nurses. They give a small percentage of bedside care, wear a uniform, and receive \$1,000 per year. They work in connection with the Board of Health Dispensary and have the same general follow-up plan as other cities.

MILWAUKEE

The head of the Division of Tuberculosis of the Milwaukee Health Department is a trained nurse. She has six field nurses under her, each handling about 100 patients. Nurses are in uniform, give bedside care when necessary, and receive \$900 per year. The dispensaries are operated jointly by the Health Department and private charities. Each case of tuberculosis reported to the Department is turned over to a nurse, who visits the physician to see whether or not he wishes the help of the Department. If he does, the nurse instructs the patient and family, arranges for the patient's removal to a sanatorium upon the physician's advice, attends to disinfection of premises and examination of remaining members of family. If the family is in need of material relief she arranges for a pension. All returned sanatorium cases are kept under the supervision of this staff.

ST. LOUIS

The St. Louis Society for the Relief and Prevention of Tuberculosis has a staff of seven nurses, a social service department, a relief department, and an employment bureau. Conferences of nurses and workers are held three times a week, the social workers assuming the various problems met by the nurses in their daily work. St. Louis nurses carry on an average 100 patients each, about 25% being bed cases. Nurses are in uniform, and receive from \$60 to \$75 per month. Patients report to the City Dispensary or to the Washington University Dispensary, and the usual plan of home supervision is in force.

ATLANTA

Atlanta, Ga., has a staff of four nurses and a dispensary under the Atlanta Anti-Tuberculosis and Visiting Nurse Association. They

seem to have a particularly well organized plan of work, very hearty co-operation from the entire city (although the city government has appropriated nothing for the work), and are doing much good along lines of prevention, with dental, and nose and throat clinics, and open air schools. They have had difficulty in obtaining nurses with social training, and have been at some pains to arrange a social service training school, the program of which seems very admirable.

According to the latest report of the National Association for the Study and Prevention of Tuberculosis, there are 4,000 visiting tuberculosis nurses in the United States. There are more than 400 special tuberculosis clinics as compared with 222 in 1909. This paper deals with only a few of the larger cities.

There are many other cities and small towns having tuberculosis nurses doing work well worthy of mention. Several states have adopted the plan of carrying on the work by visiting nurses in each county. These nurses have a wide field, and are accomplishing much along educational lines, the territory which they have to cover making any great amount of actual nursing impossible. It is interesting to note their varied experiences. We read of patients prepared and sent to sanatoria and hospitals, the family and neighborhood protesting against every step; of county agents, churches, lodges or communities called upon to assist in caring for families; of long drives into the country to inspect and practically reorganize some home where several members have died, or are dying with tuberculosis; of repeated admonitions to keep windows open in rural communities, "where the air is pure because all the bad air is kept closed up in the homes and school houses." When the city tuberculosis nurse reads of all this, she feels like taking off her hat to the rural tuberculosis visiting nurse and wishing her success and fair weather.

CHICAGO

The history of the present comprehensive tuberculosis work in Chicago is closely interwoven with the history of the Chicago Tuberculosis Institute, which was organized in January, 1906. The Institute succeeded the Committee on Tuberculosis of the Visiting Nurses' Association (the pioneer Tuberculosis Committee in Chicago).

The Chicago Tuberculosis Institute gives the following as its chief aim: "The collection and dissemination of exact knowledge in regard to the causes, prevention and cure of tuberculosis." The

progress made in the tuberculosis situation of this city in the last seven years is directly due to the systematic campaign of the Institute. By exhibits, lectures, literature, stereopticon views and moving picture films, the Institute was energetically spreading during these years the knowledge concerning tuberculosis and its proper methods of prevention.

In the winter of 1906-07 a small and unpretentious sanatorium called "Camp Norwood" was built on the grounds of the Cook County Institutions at Dunning, with a total capacity of 20 beds. The Edward Sanatorium at Naperville, made possible by the munificence of Mrs. Keith Spalding, was under construction at the same time and was later made a department of the Chicago Tuberculosis Institute. The Edward Sanatorium was the chief factor in demonstrating and convincing this community that tuberculosis can be successfully treated in our climate.

In 1907, the Chicago Tuberculosis Institute established a system of dispensaries with a corps of attending physicians and nurses. The purpose was given as follows:

- (a) Early diagnosis of tuberculosis.
- (b) Control of tuberculosis by means of personal instruction and home visits.
- (c) Education of the community in the necessity of further development of the dispensary and nursing systems.
- (d) Spread of the gospel of fresh air and "right living."

Dispensaries were opened during the latter part of 1907 as follows:

- (1) Jewish Aid Society Tuberculosis Clinic in existence since 1900; joined the Chicago Tuberculosis Institute, December 13th, 1907.
- (2) Olivet Dispensary, May 15, 1907; transferred to Polyclinic in December of same year.
- (3) Central Free Dispensary at Rush Medical College, November 16th.
- (4) Northwestern Tuberculosis Dispensary, November 21st.
- (5) Hahnemann Tuberculosis Dispensary, December 9th.
- (6) Polyclinic Tuberculosis Dispensary, December 13th.
- (7) West Side Dispensary at the College of Physicians and Surgeons, December 17th.

The South West Dispensary was opened in August, 1909.

The underlying and controlling belief of the Chicago Tuberculosis Institute has always been that no great progress can be made in the campaign against tuberculosis, or in any other reform movement, until the soil is sufficiently prepared. The soundness of this

policy may be seen in the fact that the activities of the Institute, its exhibits, more especially the success of the Edward Sanatorium, and also the work of the dispensaries, led finally to the adoption by the City of Chicago of the Glackin Municipal Sanitarium Law and made possible the Municipal Tuberculosis Sanitarium now nearing completion.

The maintenance of the seven dispensaries having become a source of considerable expense to the Institute, they were turned over to the city and became a part of the Municipal Tuberculosis Sanitarium in September, 1910.

The Institute continued its activities as "an educational institution for the collection and dissemination of exact knowledge in regard to the causes, prevention and cure of tuberculosis." It concerns itself also with keeping before the minds of the public the proper standard of care for the tuberculous in public and private institutions. Through its Committee on Factories, the Institute conducted during the last three years a vigorous campaign for the adoption of the principle of medical examination of employees. The Robert Koch Society, an organization of physicians, is the outgrowth of the Institute. In brief, the Institute for years has led the fight against tuberculosis in this city.

The dispensary system of the Municipal Sanitarium, organized as above stated, has gradually developed into ten dispensaries with a superintendent of nurses, ten head nurses and fifty field nurses. A staff of thirty-one paid physicians are a part of the organization. The ten dispensaries hold twenty-six clinics a week. In 1913, the attendance at the Municipal Tuberculosis Sanitarium clinics was 43,989 patients. Nurses made in all 39,737 visits to the homes of the tuberculous patients. The system of visiting tuberculosis nursing in Chicago is steadily moving toward greater efficiency in coping with the existing situation. The chief features of the Chicago arrangement are as follows:

(1) Nurses are classified into:

Grade II. Field Nurse

Group C	\$ 900.00
Group B (At least one year's service in lower group)	960.00
Group A (At least one year's service in next lower group)	1080.00

Grade III. Head Nurse

Group B	1200.00
Group A (At least one year's service in lower group)	1320.00

Supervising Nurse

Group B 1440.00

Group A (At least one year's service in lower group) 1560.00

Grade IV. Superintendent of Nurses

Group D 1920.00

Group C (At least one year's service in lower group) 2100.00

Group B (At least one year's service in next lower group) 2280.00

Group A (At least one year's service in next lower group) 2400.00

(2) Civil Service examinations for all of the above positions render possible the selection of the best candidates.

(3) Efficiency of the nursing force is stimulated by conferences of various groups of nurses:

(a) Weekly conferences of junior nurses.

(b) Weekly conferences of head nurses.

(c) Conferences of the entire nursing force twice a month.

(d) A well organized system of lectures on various phases of tuberculosis by authorities.

(e) Bi-monthly meetings of the Nurses' Tuberculosis Study Circle, the proceedings of which are published in this pamphlet.

(4) A centralized system of administration, with brief medical and social records of all dispensary cases for the purpose of clearing and information, in the office of the Superintendent of Nurses located in the down town General Offices of the Sanitarium.

(5) Nurses wear uniforms beginning with the middle of October of this year (1914).

(6) Before January, 1915, all tuberculosis cases in their homes will be cared for by the Municipal Tuberculosis Sanitarium. This includes both far advanced and surgical cases.

The Chicago Anti-tuberculosis movement has been more fortunate in its development than that in other cities where the dispensaries are under one organization and the nurses under another. Here the dispensaries and their nursing and medical staffs have steadily developed under the same direction, the advantages of such an arrangement being clearly evident.

We look into the future with confidence. The Chicago Municipal Tuberculosis Sanitarium, with its 900 beds and its compre-

hensive medical and laboratory facilities for the study and treatment of cases, is to open before the year 1914 expires. The County Tuberculosis Hospitals for advanced cases are undergoing a revolutionary change in the direction of administrative and medical efficiency. The Dispensary Department of the Municipal Tuberculosis Sanitarium is extending sanatorium care to the homes of tuberculous patients by building and remodelling porches and supplying, if necessary, all equipment required for outdoor sleeping.. We have eighteen open air schools. We have an effective tuberculosis exhibit. The principle of early detection of illness is being adopted by many business concerns and the sanitary conditions are gradually improving. The future is full of promise.



CITY	POPULATION 1910 CENSUS	PRIVATE OR PUBLIC FUNDS	NUMBER OF NURSES	AVERAGE NUMBER OF PATIENTS PER NURSE	BEDSIDE CARE	UNIFORMS	YEARLY SALARY
New York	4,767,000	Public (city) Private	158 102	About 125	Yes	No	\$900.00 average
Chicago	2,185,000	Public (city)	50	135	Yes	Yes	\$900.00 to \$1,320
Philadelphia	1,549,000	Public (state) Private	12 4	Varies 150	Yes No	Yes No	\$900.00
St. Louis	687,000	Private	7	100	Yes	Yes	\$720.00 to \$900.00
Boston	671,000	Public (city)	25	100 to 180	Yes	No	\$900.00
Cleveland	561,000	Public (city)	24	300	Yes	Yes	\$720.00 to \$1,020.00
Baltimore	558,000	Public (city)	16	212	Yes	Yes	\$900.00
Pittsburgh	534,000	Public (city) State Private	4 10 6	100	No No Yes	No No Yes	\$900.00 \$840.00 \$300.00
Detroit	466,000	Public (city)	10	100	Yes	Yes	\$1,000
Buffalo	424,000	Public (city)	6	125	Yes	No	\$720.00

PROVISIONS FOR OUT-DOOR SLEEPING

By MAY MacCONACHIE, R. N.

Head Nurse, St. Elizabeth Dispensary of the Chicago Municipal Tuberculosis Sanitarium.

In the treatment of tuberculosis, the best results have been obtained in sanatoria. In most cities, however, sanatorium treatment is not possible for many patients; consequently home treatment must be provided. This can be done most successfully when we imitate as far as possible the sanatorium method. This paper describes some of the arrangements for out-door sleeping which may be provided for a patient taking the "cure" at home.

The Fresh Air Room.

Select the best lighted and best ventilated room, preferably one with southern exposure, for the patient to sleep in. All superfluous furniture and hangings should be removed. In doing this, however, the room need not be made cheerless; small rugs, washable curtains and one or two cheerful pictures may be allowed.

There should be some means of securing cross ventilation in all sleeping rooms, as for the ideal fresh air room this is most essential. When this cannot be arranged and when there are windows only on one side of the room and a transom is lacking, the window should be open at both upper and lower sash. This arrangement allows the bad air to escape through the opening at the top, while the fresh air enters below. The "French window" which opens from floor to ceiling by swinging inward is to be recommended for the ideal sleeping room. In ventilating a room which is used for a sitting room in the daytime, especially in stormy weather, it is sometimes necessary to protect the patient from a direct draft. For this purpose a shield may be made from an ordinary piece of hardwood board, eight inches wide (or larger) and long enough to fit in between the side casings. It can be covered with wire netting, cheese cloth or muslin. There are a variety of wind shields on the market called sash ventilators, or air deflectors.

Window Tents

In the treatment of tuberculosis the window tent was originally devised to give fresh air to patients in their own rooms. To a poor family the window tent has an economic advantage, especially if the room where the patient lies serves as a living room for the rest of the family. The fact that the well members should not shiver is of vital importance in many respects. A simple home window tent, and one which can be made easily in the homes of the poor, consists of a straight piece of denim or canvas hung from the top of the window casing and attached to the outer side of the bed. The space between this and the window casing on each side is closed with the same material properly cut and fitted. Ten to twelve yards of cloth is necessary. If made of denim, the price of the tent would be about \$3.00; if of canvas, about \$4.50. If this cannot be obtained, take two large, heavy cotton sheets, sew them together along the edge, tack one end to the top of the window casing and fasten the other end to the bed rail with tape. There will be enough cloth hanging on each side to form the sides of the tent, and this should be tacked to the window casings. The manufactured window tents are all constructed practically on the same principle. The difference between them is in their shape and the manner of their operation. There are two types: the awning variety, as illustrated by the Knopf and the Allen tents; and those of the box order, of which the Farlin, Walsh, Mott and Aerarium are examples.

KNOPF WINDOW TENT. The Knopf window tent* is constructed of four Bessemer rods furnished with hinged terminals, the hinges operating on a stout hinge pin at each end with circular washers so that it can be folded easily. The frame is covered with yacht sail twill. The ends of the cover are extended so they can be tucked in around the bedding. The tent fills half of the window opening and can be attached to the side casings three inches below the center of the sash, this space being for ventilation. The patient enters the bed and then the tent is lowered over him, or he can lower the tent himself by means of a small pulley attached to the upper portion of the window. The bed can be placed by the window to suit the patient's preference for sleeping on his right or left side. A piece of transparent celluloid is inserted in the middle of the inner side so that the patient can look into the room or can be watched.

ALLEN WINDOW TENT. The Allen window tent† is on the same order as Knopf's, the difference being chiefly in size. The

*For illustration, see Knopf, "Tuberculosis," Chap. IV, page 67.

†See Carrington, "Fresh Air and How to Use It," Chap. II, page 29.

Allen tent covers the entire window and has the appearance of an ordinary window awning turned into the room, ventilation being secured from openings above the upper and below the lower sash.

BOX WINDOW TENT. The box variety of window tent consists of a light steel frame covered with canvas or cloth. The frame fits between the window casing like a wire screen frame. The bottom, through which the head is passed, can be made of flannel and can be drawn closely around the neck.

AERARIUM. Dr. Bull's aerarium* is another device similar to a window tent. This arrangement consists of a double awning supported on a wooden or steel frame and attached to the outside of the window with a special ventilating arrangement. The head of a cot bed is put through the window and the patient's head rests out of doors. The lower window sash must be raised about two feet and a heavy cloth or curtain hung from its lower edge so that it will drop across the body and shut off the room from the outside air.

Window tents have a few advantages. The patient's prolonged rest in bed will be more endurable when he is permitted to look out on the street and watch life than when obliged to gaze at the four walls of his room. Also patients, who can be persuaded only with difficulty to sleep with the window wide open, will not hesitate when they have this tent as an inducement. Draft which the patient usually dreads, particularly in cold weather and when he perspires, need not be feared when sleeping in a window tent. Further, this limits the possible infection to the interior of the window tent, which is obviously an advantage. While, as a matter of course, the patient will have been taught to always hold his napkin before his mouth when he coughs or sneezes, this is not always done, and cannot be done when coughing in sleep. The constant exposure to air and light of the bacilli, which may have been expelled with the saliva and remain adhered to the canvas, will soon destroy them. Also the canvas of the tent is attached to the frame by simple bands and its removal from the frame for thorough cleansing, washing and disinfection is thus made easy.

Tents

Tents are frequently used for open air living. However, they are not to be recommended for those who can afford to construct open buildings of more durable material. Ordinary tents hold odors. They are often very hard to ventilate; for a strong draft is produced when the flaps are open. There is no ventilation

*For illustration, see Carrington, "Fresh Air and How to Use It," Chap. II, page 37.

through the canvas, as it is impenetrable by currents of air. In order to make a tent comfortable for a sick person it should have a large fly forming a double roof with an air space between, a wide awning in front where the patient can sit during the day, a board floor laid at least a few inches above the ground, and the sides boarded up two or three feet from the floor. Many modifications of the ordinary tent have been made for the purpose of obtaining a well ventilated canvas shelter.

GARDNER TENT. The Gardner tent* is conical in shape with octagonal floor area, with an opening in the center of the roof and one at the bottom between the floor and the sides. These openings act like a fireplace and produce a constant upward current of air through the interior. "The floor is in six sections and can be bolted together. It is made of 1x4-inch tongued and grooved boards supported eight inches above the ground on 2x4-inch joists. Around the edge of the floor is a wainscoting of narrow floor boards four feet in height. There is no center pole, as the tent is supported by an eight-sided wooden frame. The roof and sides are of khaki colored duck. The lower edge of the canvas walls are fastened several inches below the floor and one inch out from the wainscoting on all sides. This leaves an opening through which a gradual inflow of air is obtained without causing a draft. The opening in the center of the roof is one foot in diameter and is covered with a zinc cap." The cap is raised or lowered by a pulley attachment.

TUCKER TENT. The Tucker tent is similar to the Gardner in that it is supplied with ventilation in the wainscoting near the floor and in the center of the roof. It is rectangular rather than octagonal in shape and is made in two sizes—one, eight feet wide by ten feet long, and the other, twelve feet wide by fourteen feet long. It has a wooden floor, wooden base and canvas side, with window openings on each side. "The canvas above the base in the front is attached to awning frames so that it can be raised or removed altogether for the free entrance of air and light." The roof and fly are made of 12-ounce army duck.

LA POINTE TENT. The La Pointe tent is similar to the Tucker tent. It is a canvas cottage with doors, windows and floor. The top is made of canvas, with a fly which projects two inches on all sides. The windows have a wire netting and canvas shutters, the canvas being so arranged that it can be pulled up as a curtain, or extended as an awning. Its cost is \$85 to \$100.

*For illustration, see Carrington, "Fresh Air and How to Use It," Chap. VIII, page 128.

ARMY TENT. A simple ordinary tent is the United States Army tent. There are two different styles, one with closed corners and one with open corners. It is made of army duck with poles, stakes and guys, and costs according to size. A small tent eight feet four inches long and six feet eleven inches wide would cost \$7.50, and lumber for floor about \$2.00 extra. This tent is easily put up, care being taken to select a dry soil, places where the water stands in hollows after a rain should be avoided. A small trench about one foot deep around the tent will help in keeping the soil dry.

TENT COT. For experimenting in outdoor sleeping a tent cot is a very simple arrangement. It consists of a plain canvas cot with a frame supporting a small tent. Ventilation is secured by openings at both ends; also at the side where the patient enters. These openings are covered with flaps which can be opened or closed. It is light, weighing from twenty to fifty pounds, and its position and exposure can be conveniently changed. The cost is \$9.

KNOPF'S HALF TENT. Another simple arrangement is Knopf's half tent.* It consists of a frame of steel tubing covered with sail duck and secured with snap buttons on the inside. It is used for patients sitting out of doors. The reclining chair is placed in the tent with its back to the interior. Its weight helps to hold down the floor bracing attached to the frame.

Sleeping Porches

One of the most important arrangements for outdoor sleeping is the sleeping porch. To be convenient, it should have an entrance from a bedroom and, when possible, from a hall; for every outdoor sleeper should have, during cold weather, a warm apartment in connection with his open air sleeping room. The best exposure in Illinois is south, southeast or east. Sleeping out should be a permanent thing during all seasons. The sleeping porch must be kept neat and attractive. A cot placed between the oil can and the washtub on a dingy back porch is very dismal and bound to have a depressing effect on the sleeper.

It costs very little to arrange an ordinary sleeping porch provided you have the porch to begin with. If a porch is fairly deep and sheltered on two sides by an angle of the house, sufficient protection for moderately cold weather can usually be obtained by canvas curtains tacked to wooden rollers. These can be raised and lowered by means of ropes and pulleys, the bed being placed so that the wind will not blow strongly on the patient's head.

*For illustration, see Knopf, "Tuberculosis," Chap. IV, page 58.

ORDINARY PORCHES.* A useful porch can be built for \$15 to \$25 with cheap or second-hand lumber, and if only large enough to receive the bed and a chair will still be effective for the outdoor treatment. The roof can be made with canvas curtain, or a few boards and some tar paper. The end most exposed to the wind and rain and the sides below the railing should be tightly boarded to prevent drafts.

Second or third story porches are supported from the ground by long 4x4-inch posts, or when small they can be held by braces set at an angle from the side of the house. When the long posts are used they are all placed six feet apart and the space between them is divided into three sections by 2x4-inch timbers. The interior is protected by canvas curtains fastened to the roof plate and arranged so as to be raised or lowered by ropes and pulleys. These curtains are made about six feet wide and fit in between the supporting posts and rest against the smaller timbers. This arrangement keeps the curtains firm during a storm, as both rollers and canvas can be securely tied to the frames. This porch would cost between \$30 and \$50.

PORCH DE LUXE. When a bed on a porch is not in use it is often unsightly and in the way, while in winter, unless well protected, the bed clothes and bedding become damp. In order to overcome this, the Porch de Luxe* has recently been devised. This consists of a low-built bedstead arranged to slide through an opening in the wall of the house between the porch and bedroom.

SLEEPING CABIN. To lessen the disadvantages of the high roofed, windy porch, the home-made sleeping cabin is to be recommended. This cabin is built on the porch. The frame is braced against the side of the house and rests on the floor of the porch, but the top of the cabin is much lower than the roof of the porch. The frame consists of 2x4-inch timbers. The sides and roof are of canvas curtains; these can be rolled up separately. Some of these cabins have had the roof hinged so that it can be raised in warm weather. The greatest advantage of the cabin is the control of the weather situation. The cost is \$15 to \$20.†

KNOPF'S STAR-NOOK. Another arrangement is Knopf's "Star-nook."‡ This is a wall house supported by the roof of an extension, or on a bracket attached to the wall of the building. This fresh air room consists of a roof, floor and three walls and, with the exception of the roof and the floors, is built of steel frames holding movable shutters. It is nine feet long by six feet deep, the height being

*For illustration, see Carrington, "Fresh Air and How to Use It," Chap. VII, page 108.

†For illustration, see Journal of Outdoor Life, January 1914.

‡For illustration, see Carrington, "Fresh Air and How to Use It," Chap. IV, page 55.

eight feet at the inner side with a fall of two feet. At both ends are windows which can be opened outward. The roof can be raised entirely off the apartment by means of a crank. Also the upper sections of the front windows can be opened or closed. Sometimes new doors or windows will be needed to give access to a desired position. The "Star-nook" can be secured with safety, and when strongly supported there need be no fear in regard to its stability.

Roofs

The value of roof space for outdoor treatment in cities is gradually being appreciated. They can be made splendid sites for various kinds of little buildings. The roof of an apartment house offers a choice of situations, but there are different conditions to be considered, such as the best exposure and the most protected place, one that cannot be overlooked from neighboring buildings; also security from severe storms. Tents have been erected upon the roofs of city buildings, but they are not to be recommended for such positions unless they can be placed in the shelter of a strong windbrake. When erected upon the roof of high buildings they should be protected on two sides by walls, or by other parts of the structure upon which they are to be placed.

A cabin is most desirable for the roof. In its construction it is best to use a wooden frame for the foundation. It can then be moved and its position and exposure changed easily. This frame should be made of 2x6-inch planks laid flat on the roof. The upright frame and siding boards for the back and sides should be of 2x4-inch timbers. The front of the cabin should be left open, but arranged with a canvas curtain tacked on a roller so that it can be closed in stormy weather. Tar paper is used for the roof. When completed, the framework should be braced to give firmness. If two buildings connect and one is taller than the other with no space between, a lean-to cabin is most desirable.

With the devices just described the home treatment can be secured with little cost. Patients who are afraid of outdoor sleeping should begin in moderate weather. All shelters should be as inconspicuous as possible. In choosing a suitable position for a fresh air bedroom, it should be remembered that early morning sounds and sunlight should be eliminated, if possible. This can sometimes be done by selecting a room far from the street and by shading the bed with blinds. One's neighbor should be taken into consideration, and a position decided upon which does not overlook his windows, porches or yards, and when arranging for the rest cure in the reclining chair during the day one should always bear in mind that it is much more agreeable and conducive to the well-being of the patient to have a pleasant view to look upon.

SOME POINTS IN THE NURSING CARE OF THE ADVANCED CONSUMPTIVE

By ELSA LUND, R. N.

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The problem of caring for the advanced consumptive is a very complicated one; it involves not only the patient, but the whole family as well. A complete rehabilitation of the entire family is necessary in most of the dispensary cases.

The first thing the nurse must do is to gain the confidence of both the patient and the family. The chief requisite in the nursing of the advanced consumptive is a clean, careful, patient and sympathetic nurse. Frequently she finds her patient extremely irritable, and often this mental condition has affected his whole family, or whoever has been associating with him. A painstaking, sympathetic nurse will readily understand that the causes for this state of affairs are most natural. The consumptive may have spent wakeful nights, due to coughs and pains and distressing expectoration; the enforced cessation of work may have caused pecuniary worries; all his customary pleasures are now denied him, and he has strength for neither physical nor mental diversion. Realizing this, the nurse must kindly but firmly impress upon the patient the necessity of co-operation and the danger of infecting others and of reinfecting himself. She should at once create a more cheerful atmosphere by repeated suggestions that if he will only do his duty as a hopeful patient, he will not be considered a menace by those who come in contact with him, and his family will gladly associate with him.

Next comes the concrete problems which the nurse must solve. That of proper housing of the patient is one of the most important, and especially so in the case of the advanced consumptive, because of the greater danger of spreading the infection if the conditions are unfavorable. Where it is necessary that the family should move, the nurse should assist in the selection of a new home. If possible, a detached house should be chosen, affording plenty

of light and sunshine, away from dusty streets and roads. Offensive drains and other insanitary conditions should be avoided. The water supply should be abundant and the plumbing in good repair.

The room of the patient should be well lighted and well ventilated, and preferably have a southern exposure. Cross ventilation is very desirable. When all unnecessary furniture and all hangings and bric-a-brac have been removed, and the old paper stripped from the walls, the walls should be whitewashed, or covered with washable paper, or painted. Painted walls are inexpensive, and they have the further advantage that they can be washed frequently. The floor should be bare and likewise frequently washed. Simple furniture is commendable, and old pieces can be made very attractive by having them enameled. Proper furnishings include a comfortable bed (one made of iron and raised on wooden blocks makes nursing care easier), a bedside table, chairs, a rocking chair, a washstand, and even a couch on which the patient could be placed occasionally to relieve the monotony. Two or three pictures which can be readily dusted and cleaned will brighten the bare walls one finds in what are generally recommended as sanitary rooms. Flowers always add to the attractiveness of a room, and when the bed is placed near the window the patient is given the opportunity of enjoying, to some extent, at least, the pleasures of out-of-doors. The mattress should be provided with a washable cover. Strips of muslin sewed across the tops of the blankets will protect them from sputum, in case the sheets happen to slip. Soiled bed linen must be handled as little as possible, soaked in water, washed separately and boiled. If sputum-covered, it should be soaked in a five per cent solution of carbolic acid or a solution of chloride of lime. Instead of dry sweeping and dusting, the floors should be washed with soap and water and dusted with wet cloths. Great care should be taken in instructing and demonstrating to the family how to properly care for the room. Special attention must be given to the bed, its comforts and its cleanliness. Every nurse is familiar with what is known as the "Klondike" bed, and it is unnecessary to discuss it here in detail. Since both patient and family derive such direct benefit from a constant supply of fresh air, too much attention can not be given to proper ways of securing it, and at the same time keeping the patient warm. Where bed coverings are limited, warmth can be secured by sewing layers of newspapers between two cotton blankets; again, sheets of newspapers or tar paper keep out the cold to a great extent. Proper ventilation prevents night sweats. Means of heating the room must be provided,

because of the low vitality of the patient and the need of frequent care.

The patient's clothing needs to be light but warm; where wool proves irritating to the skin, a heavy linen mesh has been found a good substitute, due to the fact that it dries quickly when the patient perspires. The patient should have two good soap and water baths a week. The nurse should let the family know when she is coming to give these baths and explain to them that she expects them to have ready for her towels, soap, clean bed linen, wash basin, wash cloths, newspapers and hot water. Night sweats demand careful rubbing, first with a dry towel; vinegar sponging is found to be very effective; alcohol rubs prevent bed sores.

The hair, nails and teeth require special attention; beards and mustaches should be shaved. Every patient must learn to use the tooth brush after meals, that the mouth may be kept scrupulously clean. Gargling should also be insisted upon. Tooth brushes can be kept in a 50 per cent Dobell's solution, Liquor Antiseptic (U. S. P.), or a 2 per cent solution of carbolic acid colored with vegetable green coloring matter as a warning against swallowing. As an aid in hardening the gums, all foreign deposits should be removed, the gums massaged by the patient and normal salt solution used as a gargle. Where the patient is suffering from pyorrhea, the gums may be painted, on the order of the physician, with tincture of iodine (U. S. P.) or a 2 per cent solution of copper sulphate. While the patient is learning to cleanse his mouth carefully after every meal, he may also be instructed to avoid placing anything in his mouth, except food, drink, gargling solution or tooth brush. The reason for using some kind of mouth wash, instead of merely water, is because in that way the need of cleanliness is more forcibly impressed upon the patient.

Such matters as the use of separate dishes, etc., are so well known to every tuberculosis nurse that it is unnecessary to dwell on them at length in this paper.

Difficulties always arise regarding proper method for the care and disposal of sputum. The following are some of the plans adopted by tuberculosis hospitals for advanced cases:

1. Infirmary of Eudowood Sanatorium, Towson, Maryland.

Pasteboard fillers in such quantities as will be required during the current day are issued to the patients. When the filler becomes not more than two-thirds full, it is carefully filled with sawdust, wrapped in a newspaper, tied with a cotton cord and deposited in a large galvanized

iron bucket, in which it is carried, with the others, to the incinerator.

2. North Reading (Mass.) State Sanatorium.

A room specially equipped for the disposal of sputum is recommended. Paper sputum boxes are changed twice daily, inspected as to character, quantity and presence of blood. Then the box is filled with sawdust, wrapped in newspaper and carried to the incinerator for burning.

3. Montefiore Home Country Sanitarium, Bedford Hills, N. Y.

In cases where bed patients have a very large amount of sputum, large cups of white enamel are used, with a hinged lid that lifts readily. The sputum is from there thrown into receptacles containing sawdust, taken to the incinerator and burned twice daily. Both sputum cups and the large container holding sawdust are sterilized by live steam.

4. House of the Good Samaritan, Boston, Mass.

Paper handkerchiefs and bags are recommended when the quantity of sputum is small. Burnitol sputum cups without holders are used; the bottom of each cup holds a small amount of sawdust, which serves the purpose of hindering the sputum from penetrating through the cup. All the cups are carefully tied up in newspaper by the nurse or the patient before they are sent to the incinerator.

5. Chicago Fresh Air Hospital.

Paper fillers and metal holders are used. The fillers are placed in a large can, covered with sawdust, and then burned in the incinerator. The holders are sterilized daily. The Hospital recommends paper napkins where the quantity of sputum is small; if there is no possible means of burning the sputum, it should be treated with a strong solution of concentrated lye and then poured into the water closet.

The chief source of infection is undoubtedly the expectoration of the consumptive, spread by careless coughing and spitting. Be very emphatic in instructing the patient to cover his mouth with a paper napkin when he coughs and then to dispose of it carefully in such a way that no particle of the sputum touches either his hands or his face. Insist on frequent washing of the hands.

The following methods and solutions are employed in the treatment of laryngeal tuberculosis in various institutions:

North Reading (Mass.) State Sanatorium.

The following are used as *gargles*:

Dobell's solution; Dobell's solution and formalin (one drop of formalin to an ounce of solution); alkaline antiseptic N. F. (one to four water); salt and sodium bicarbonate (one dram of salt and two drams sodium bicarbonate to a pint of water).

Sprays used at this institution are as follows:

Spray No. 1. Menthol spray in proportion of fifteen grains of menthol to one ounce of alboline.

Spray No. 2. Menthol (4 drams plus 10 grains); thymol (7 drams plus 25 grains); camphor (7 drams plus 25 grains); liquid petrolatum (64 ounces).

Heroin spray. From one to three grains of heroin to one ounce of water.

Cocaine spray. From one-half to two per cent, usually before meals, for dysphagia.

For *local applications*: Argentide, 1 to 200; argyrol, 10%; iodine, potassium iodide and glycerine; heroin powder applied dry to ulcerations; orthoform powder applied dry.

Montefiore Home Country Sanitarium, Bedford Hills, N. Y.

In the *routine treatment* of laryngeal tuberculosis at the Montefiore Home Country Sanitarium orthoform emulsion is used, made up as follows: Menthol, 2-5 grams; oil of sweet almonds, 30 grams; yolk of one egg; orthoform, 12.5 grams; water added to make 100 grams.

In addition, silver salts are used in various strengths; also lactic acid in various strengths. These two agents are applied by means of applicators, whereas the emulsion is injected by a laryngeal syringe. The laryngeal medicator of Dr. Yankauer, made by Tiemann, is also employed. By means of this little apparatus a patient may medicate his own larynx, using the emulsion mentioned or any other agent (such as formalin) which may be desired.

Eudowood Sanatorium, Towson, Md.

At the Eudowood Sanatorium, Towson, Maryland, the following procedure is used in the treatment of tuberculous ulcers of the larynx:

Topical applications of lactic acid, 15 to 50%, followed by a spray composed of 20 grains of menthol to 1 ounce of liquid alboline.

A *spray* of 2% cocaine is used as often as is necessary to relieve the pain.

Insufflation of orthoform powder, or the patient is directed to slowly dissolve an orthoform lozenge in his mouth.

These treatments are enhanced by the application of an ice bag to the throat, enforced rest of the vocal cords and rectal feeding, if necessary.

In laryngeal complications, semi-solid diet is generally more easily swallowed. This is facilitated by a reclining position. Cold compresses give some relief.

Chicago Fresh Air Hospital

For the relief of pains and difficulty in swallowing, the nurse is instructed to spray the larynx with a 3 per cent solution of cocaine before each meal.

As a more efficient treatment, but slower in action, the administration of anaesthesine to the ulcerated epiglottis with a powder blower is recommended. This is usually done by the physician, as is, also, the insufflation of iodoform.

Cold packs are also used to give temporary relief, but they are not recommended as being very reliable.

Authorities differ regarding the proper *diet* for the advanced consumptive. It is generally conceded, however, that it should not vary to any great extent from the ordinary liberal diet, unless intestinal or other complications arise. The physical idiosyncrasy of each patient must first of all be taken into consideration, and this is primarily a matter to be decided upon by the physician in charge. The nurse should, however, be resourceful in her suggestions as to preparing a variety of palatable dishes. According to Walters ("The Open Air Treatment"), in intestinal tuberculosis, such foods as oatmeal, green vegetables, fruit and various casein preparations are better dispensed with, as they are likely to cause irritation and diarrhoea. Meat and meat juices should also be given with caution, as they, too, cause diarrhoea.

In hemorrhage, a cold diet should be given, such as milk, eggs, gelatin and custard. The nurse must insist in absolute rest and the patient should not be permitted to move until the danger of bleeding is over. Nervousness always accompanies hemorrhage, and the nurse can do much to allay this by assuring the patient that few people die from hemorrhage.

In closing, it might be well to mention some points relative to the nurse's equipment, her mode of dressing, etc. Her dress should be simply made and washable. Aprons made of soft cotton crepe are recommended because of the small space they occupy in the bag.

The contents of the bag, which should be lined with washable, removable lining, should include: Alcohol, tr. iodine, green soap,

olive oil, boric acid powder, boric acid crystals, vaseline, cold cream, mouth wash, tongue depressors, adhesive plaster (3" wide), bandages, safety pins (small and large), applicators, scrub brush, face shields, probe, scissors (2 pair), forceps, thermometers (3), medicine dropper, bags of dressings, dressing towels, hand towels (2), apron.

Because tuberculosis is so lasting and makes a family, ordinarily self-supporting, frequently dependent, it will be absolutely necessary for the nurses to have access to a loan closet. This closet should contain the following articles: Sheets and pillow slips, bed pan, blankets, rubber rings, gowns or pajamas, rubber sheets, tooth brushes, cold cream, rubber gloves, glass syringes, pus basins, enema bags, connecting tubes, rectal tubes, nurses' hand towels, surgical towels, instrument cases, aprons and gown, loan book.

Up to the present time the field nurses of the Dispensary Department of the Chicago Municipal Tuberculosis Sanitarium have taken care chiefly of ambulant cases, the total number of cases under observation in 1913 being 12, 397, with 39,737 visits by nurses to positive and suspected cases in their homes. Lately (September 1914) the nursing force of the Dispensary Department has been increased to fifty nurses to take care of all tuberculosis cases in their homes, including advanced cases and those of surgical tuberculosis.



OPEN AIR SCHOOLS IN THIS COUNTRY AND ABROAD

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In every community where the tuberculosis problem has been seriously taken in hand the importance of the presence of the infection in children had to be considered and this has been carefully studied by those who realize that tuberculosis, far from being a disease chiefly of adult life, is intimately associated with childhood. Therefore, is it not most important that all children, who have either been exposed to tuberculosis through the presence of an active case in their home, or show a family predisposition to the disease, should be given special consideration, and every opportunity furnished to make it possible for them to withstand the latent infection or to overcome the inherited lack of resistance? The best means of meeting this important problem, as far as school children are concerned, is through the medium of Open Air Schools, not only because of the benefit to the individual case, but also because of the very important educational influence on the community at large.

The first Open Air School was opened in Charlottenburg, Germany, a suburb of Berlin, in the year 1904, a school of a new type, to which the Germans gave the name Open Air Recovery School. The object was to create a school where children could be taught and cured at the same time, and this same purpose has obtained in all other schools of similar type which have since been opened. This new educational venture was designed for backward and physically debilitated pupils who could not keep up with the work in the regular schools and who were not so mentally deficient that they were fit subjects for the classes of mentally subnormal children. It was felt that if these children were sent to sanatoria they would undoubtedly improve physically, but would fall back in the class work; while, on the other hand, if they remained in the regular school they would deteriorate physically. It was to meet

these needs, then, that this new type of school was devised. As the name implies, the school was held almost entirely in the open air, the regime consisting of outdoor life, plenty of good food, strict hygiene, suitable clothing, and school work so modified as to suit the conditions of the children.

During its first year the Charlottenburg School was open for only three months, but upon publication of the first report of the results accomplished it was decided to keep the school open a longer period. The desire to open other schools of similar type spread rapidly throughout Germany, as well as the rest of Europe and other parts of the world.

Probably the best argument for maintaining such schools was not only the physical benefit derived, but the actual advance made by the children in their studies, although they spent less than half as much time on school work as did their companions in the regular schools, not only fully maintaining their standing, but ever surpassing their companions in the regular classes. Through results obtained from this first experiment in Charlottenburg came the resolve on the part of school authorities of other cities to inaugurate Open Air Schools in their respective localities, and in less than three years the movement had spread to England, where, in 1907, London opened her first school, modeled after that of Charlottenburg.

The same remarkable results obtained during the first season here, as in the three years previously reported from Charlottenburg, awakened such popular enthusiasm that towns and cities in different parts of England began to plan for similar schools in the communities most needing them.

Meanwhile, the movement spread to the United States. In 1908, one year after England had established her first Open Air School, this country opened its first Open Air School in Providence, Rhode Island. Although Providence has the distinction of priority in this matter, the school inaugurated by Providence was not, strictly speaking, the first Open Air School established on American territory, as a school of this type was opened in 1904 in San Juan, Porto Rico, by L. P. Ayres, now Associate Director of the Department of Hygiene of the Russell Sage Foundation, at that time Superintendent of Schools for Porto Rico. The San Juan school was an experiment. It was built to accommodate 100 children. It was simple in its arrangements; it had a floor and roof but no sides. Venetian blinds were provided to keep out rain and the too direct sunlight. The school was designed for children of no particular class, but was established in the endeavor to demon-

strate that the regime which has proven beneficial for weak and ailing children will also benefit those that are strong and seemingly healthy. The results demonstrated fully the correctness of this idea. The children greatly preferred the outdoor classes, and even the teachers were most anxious to be assigned to outdoor work. Since then at least one more school of similar type has been opened in Porto Rico.

Before showing what the United States has done in this very important movement, it might be interesting to learn how Germany and England have further developed their program, as the work done in these countries, particularly in Germany, served as the basis of the Open Air School movement in this country in the initial stages of its development.

For the past fifteen years Germany has carried on medical inspection of schools in a very thorough and efficient manner. This has drawn special attention to backward children. These children are treated there in special classes and sometimes in special schools. The quantity of instruction given them is reduced and every endeavor is made to increase its effectiveness. The classes are taught by capable teachers and the children have the benefit of suitable dietary, bathing and other hygienic provisions.

In Charlottenburg, in 1904, there were a large number of backward children who were about to be removed from the ordinary elementary schools to special classes. When examined, it was found that many of them were in a debilitated condition owing to anaemia, or various other ailments in an incipient stage. This circumstance afforded an ideal opportunity for the co-operation of the teacher and the school physician in devising and operating, for such children, an Open Air School. The general school regime was modified to meet the educational and physical needs of these children, the treatment consisting, as above stated, of abundance of fresh air, pleasant and hygienic surroundings, careful supervision, wholesome food and judicious exercise. The ordinary school work was modified to meet the individual condition of children; the hours of teaching were cut in two and the classes so reduced that no teacher had more than twenty-five pupils under her care. The site chosen for the first school in Charlottenburg was a large pine forest on the outskirts of the town. The sum of \$8,000 was granted by the municipality for carrying out the plan, and inexpensive but suitable wooden buildings were erected. At first ninety-five children were admitted to the school, but later the number was increased to 120, and still later to 250. These children were mainly anaemic or suffering from slight pulmonary, heart or

scrofulous conditions. Those suffering from acute or communicable diseases were rigidly excluded. Of the five buildings erected, three were plain sheds about 81 feet long and 18 feet wide, one of them being completely open on the south side and closed on the other sides, of sufficient size to shelter during rainy weather about 200 children. The other two sheds contained five classrooms and a teachers' room. These were closed in on all sides, provided with heating arrangements, and used for classrooms during very cold or unpleasant weather, only one of the buildings was fitted with tables and benches intended for meals, or for work in inclement weather. This building was open on all sides. All over the school grounds, which were fenced in, there were small sheds open on all sides, fitted with tables and benches to accommodate from four to six children. These served as shelters. There were small buildings for shower baths, kitchen and a separate shed where the wraps of the boys and girls were kept. In these were individual lockers which contained numbered blankets for protection against cold, and waterproofs against rain.

The children in this school report at a little before 8 a. m. and leave at a quarter of 7 p. m. For breakfast they are given a bowl of soup and a slice of bread and butter. Classes commence at 8 o'clock and continue with an interval of five-minutes' rest after each half hour. At 10 a. m. the children receive one or two glasses of milk and a slice of bread and butter. After this they play, perform gymnastic exercises, do manual work or read. Dinner is served at 12:30 p. m. and consists of about three ounces of meat, with vegetables and soup. After dinner the children rest or sleep for two hours on folding chairs. At 3 p. m. comes more class work and at 4 p. m. milk, rye bread and jam is given. The rest of the afternoon is given over to informal instruction and play. The last meal consists of soup, bread and butter, after which the children are dismissed. Some walk home; some use street cars. In case of the very poor children the city pays the fare, while the transportation is furnished for others through the generosity of the street car company. The expense of the feeding is borne by the municipality, in the case of those who can not pay, and, for the others, is defrayed in part or whole by the parents.

The work of the school physician consists of careful examination, treatment and supervision of these children. Attention is principally directed to heart, lungs and general condition with respect to color, muscular and flesh development. Weight and measurements are taken every two weeks, and at the end of the school period the children are very carefully examined and condition compared with that noted upon their admission.

The regime covers such important phases of hygiene as suitable clothing, attention to daily habits, bathing, giving of warm baths for those who are anaemic and nervous, and of mineral baths for those who are scrofulous. Bathing plays a very important part. All of the children receive two or three warm shower baths a week. A trained nurse is in attendance.

The educational, physical and moral results obtained are remarkable. There is a great improvement in their behavior, especially with regard to order, cleanliness, self-help, punctuality and good temper. This is undoubtedly due to their removal, during practically all of their waking hours, from the influences of the street life to the more wholesome influences of the school. The children are taught to regard themselves as members of a large family, are trained to assist in the daily work and are taught to be helpful and considerate of each other.

This, in detail, is the regime of the first Open Air School conducted in Germany.

The number of Open Air Schools at present in Germany is at least ten, with an attendance of approximately 1,500.

In England the Open Air Schools were made possible through the work of the local educational authorities and co-operation of dispensaries for treatment and care of tuberculous children.

As in other countries, general legislation for the control of tuberculosis has had considerable bearing on the Open Air School situation in England. Among the legislative acts should be mentioned:

(a) The Act of 1911 providing building grants for the establishment of sanatoria, dispensaries and other auxiliary institutions.

(b) Compulsory notification of tuberculosis, etc.

Notification of tuberculosis, for instance, besides bringing to notice of the school medical officer cases of tuberculosis which might otherwise not come before him until a late period, serves in many cases to keep him informed as to "contact cases"—cases of children in contact with communicable tuberculosis.

At Burton-on-Trent a system was instituted for periodical examination of school children who are either members of a family in which there is or has been a case of pulmonary tuberculosis, or who are attending school while residing in houses in which there is an existing case of this disease. All notified cases of tuberculosis are visited by the Assistant Medical Officer of Health, who is also Assistant School Medical Officer, and the names of any children

living in the house, or related to the case, are ascertained, together with the school they are attending. These names are entered in a special register and when the pupils of a school, at which any of these children are attending, are examined, a special examination is made of the latter. This examination is repeated two or three times a year.

In another part of England a special letter is sent to the occupants of all houses from which the disease has been notified, calling attention to the special importance of early detection of tuberculosis in children, and asking that the children should be brought to the school clinic for examination.

In Lancashire the Medical Inspector calls on the Medical Officer of Health and obtains a list of names of persons suffering from tuberculosis, so that the children, if of school age, may be examined.

At Newcastle-on-Tyne all children exposed at any time to infection are kept under observation and re-examined. The re-examination continues even after fatal termination of the tuberculosis case with which the child was in contact.

Under the Finance Act of 1911 a sum of about \$500,000 was especially appropriated for providing what are known as "Sanatorium Schools" for children suffering from pulmonary or surgical tuberculosis. These schools are known as the Residential Open Air Schools of Recovery, and the need of such schools for children requiring more continuous care than is provided at a day Open Air School is becoming widely recognized. Many children of the type already mentioned can not be satisfactorily treated unless they can be taken completely away, for a time, from their home environment. Such treatment as is needed for many of these children is not and can not be offered in the ordinary hospital and certainly not at their homes.

The designs and arrangements of the Residential Open Air School of Recovery are very attractive. They are well equipped to fulfill their function. The children, received between the ages of seven and twelve years, are those suffering from anaemia, debility, or slight heart lesions. Cases of active tuberculosis are barred. No child is received for a shorter period than three months, and this period may be prolonged on the recommendation of the Medical Officer.

The children rise at 7 a. m. and retire at 6:30 p. m. Those who are able, make their own beds and do some of the domestic work. The diet is liberal, with abundance of milk and eggs. Careful attention is given to inculcating habits of personal and general hygiene. All children receive a daily bath. Careful attention is

paid to the teeth, tonsils and adenoids. All these conditions must be attended to before admission. Beyond this, very little treatment is given. Children are weighed once in two weeks. Instruction is chiefly practical. Instruction in gardening is given twice a week and other occupations taught are raffia work, plasticine modeling, cardboard modeling, brush work and needle work.

The number of Open Air Schools at present in England is at least thirty-five, with an attendance of at least 2,500. Forty-two other cities are listed as carrying on some form of open air education.

In the United States the Open Air School movement, from its inception, has been closely connected with the general anti-tuberculosis movement.

The credit of establishing the first Open Air School in America belongs, as previously stated, to Providence, Rhode Island, where the work was begun in January, 1908. The school was opened in a brick school house in the center of the city. A room on the second floor was chosen and remodeled by removing part of the south wall. For the wall thus removed windows were substituted. These extended from near the floor to the ceiling, with hinges at the top and with pulleys so arranged that the lower ends could be raised to the ceiling. The desks were placed in front of the open windows in such a manner that the children received the fresh air at their backs and the light over their shoulders. Suitable clothing was provided for cold weather and, in case of necessity, soapstone foot warmers were used.

The school was started as an ungraded school and ten pupils were enrolled at the time of its opening, the number later increasing to twenty-five. Practically all children were selected by the visiting nurse of the local League for the Suppression of Tuberculosis from infected homes under her supervision. In a few instances children with moderately advanced lesions were admitted.

The children reported at 9 a. m. and a recess was given at 10:30, when they were served soup. At noon they had a light lunch of pudding served with cream, hot chocolate or cocoa made entirely with milk. Some of the children brought additional food from home. All of the cooking was done by the teacher. Careful attention to is given. Children are weighed once in two weeks. Instruction is chiefly practical. Instruction in gardening is given twice a week general cleanliness and hygiene of the teeth was insisted upon. Individual drinking cups and tooth brushes were provided. The children took turns in washing dishes, setting the table and helping

to serve. Children were dismissed at 2:30 p. m. They were provided with car tickets by the League for the Suppression of Tuberculosis, some for traveling both ways, some for one way only, depending upon the means of the family. During school session light gymnastic exercises were given and proper methods of breathing taught. In the spring they had a garden to work in.

The Providence school is at present a part of the general school system. The school supplies and teacher's salary are furnished by the Board of Education. Food and carfare are supplied by the League for the Suppression of Tuberculosis. A physician is delegated by the League and one of the regular Medical Inspectors of the city schools works in co-operation with him.

Providence has at present two schools, with an attendance of forty. One more Open Air School and two roof classes may be provided by the Board of Education in 1914. In addition, the Providence League for the Suppression of Tuberculosis conducts a Preventorium for thirty children at the Lakeside Preventorium, Rhode Island.

Boston started its first Open Air School in July, 1908. The work was carried on by the Boston Association for the Relief and Control of Tuberculosis. The school was located at Parker Hill, Roxbury. The same regime was followed as in previously reported schools. No formal instruction, however, was attempted at first. The school was simply a day camp. The benefit derived by the children in the first open air camp for children led the Association to ask the Boston School Board to co-operate with them in converting the camp into an outdoor school. This was agreed to, the School Board supplying teacher, desks, books, etc., the Association furnishing the necessary clothing, food, a nurse, attendants, home instruction and medical services. The same schedule was followed here as in the other Open Air Schools. General and personal hygiene was insisted upon. The school was kept open Saturdays and during the holidays. The children who were able paid ten cents a day to help defray the cost of food. In case they could not afford this, the money was supplied by some charity organization. While the combined public and private support had proved satisfactory, it seemed best, for many reasons, to reorganize the school so that it would be entirely under municipal authority, and this has since been done. At the present time the school is maintained by the Boston Consumptives' Hospital and the Boston School Board. The hospital furnishes transportation, food, etc., while the School Board gives school supplies, books, desks, etc.,

and pays the salaries of the teachers. The children are selected by the school physicians, the type considered being the anaemic, poorly nourished, those with enlarged glands, or convalescents. Cases of active tuberculosis are not admitted.

Boston has at present fifteen Open Air Schools, with a total enrollment of about 500 children.

The first school established in New York City was started under the auspices of the Department of Education and was located on the ferryboat Southfield, which was maintained as an outdoor camp for tuberculous patients by Bellevue Hospital. It was through the special desire of the children who were patients at the camp that the school was started, for they banded together one day and informed the doctor that they wanted to have a teacher and attend school. When their action was reported to the Board of Education it was felt that such an unusual plea should be given a favorable response, and in December, 1908, the school on the ferryboat was made an annex of Public School No. 14.

This school, except for its location, does not differ from other schools of similar type. The Board of Education pays the teacher and furnishes the school supplies. Food and clothing are supplied by the hospital. The school is an ungraded one and the number of children taught by one teacher averages thirty.

Four more Open Air Schools have since been established, three on ferryboats and one on the roof of the Vanderbilt Clinic at West Sixtieth street. Officially, all these schools are considered to be annexes of the regular public schools.

In October, 1909, \$6,500 was granted to the Board of Education by the Board of Estimate and Apportionment for the purpose of remodeling rooms in some of the public schools for use as Open Air Rooms. A special conference was held in December of that year by medical and school authorities to decide how best to remodel, furnish and equip these new rooms for this purpose; also how the children should be chosen for these classes.

It was decided that the maximum number of children admitted to any one open air classroom should not exceed twenty-five, the children to be chosen by the director of the tuberculosis clinic nearest the school and the school principal. No child was to be assigned to the room until the parents' permission had been secured in writing. Children moving from one district to another were to be followed up and cared for in the new district. No special rule was adopted defining the physical condition entitling the child to admission. Each case was to be considered indi-

vidually, and the only definite rule was that no open case of tuberculosis should be admitted. The minimum temperature of the room was 50 degrees F. The rooms, wherever possible, were to be located on the third floor. The first of these open air classes was established in April, 1910. Such popular interest was awakened by the inauguration of these classes that, as a direct result, a special privilege was granted by the Commissioners of Central Park permitting children of the kindergarten classes of the public schools to pursue their studies in the open air in Central Park.

At present New York has thirty-three Open Air Schools and Open Window Rooms, with a total enrollment of at least 1,000.

Chicago's first Outdoor School for Tuberculous Children was inaugurated as a result of the joint co-operation of the Chicago Tuberculosis Institute and the Board of Education. This school was opened during the first week of August, 1909, on the grounds of the Harvard School at Seventy-fifth street and Vincennes Road. The Board of Education assigned a teacher to the school and furnished the equipment, while the Tuberculosis Institute supplied the medical and nursing service, selected the children and provided the food.

Except during inclement weather, the children occupied a large shelter tent in which thirty reclining chairs were placed. Meals were served in the basement of the school building, where a gas range, cooking utensils and tables were installed for this special purpose.

The nurse, who was assigned by the Tuberculosis Institute on half-time attendance, visited the school each afternoon, took daily afternoon temperatures, pulse and respiration, looked after the general physical condition of the children, made weekly records of their gain or loss in weight and did instructive work in the home of each pupil.

Of the thirty children selected, seventeen had pulmonary tuberculosis, two had tubercular glands, and eleven were designated as "pre-tuberculous." None of the children had passed to the "open" or infectious stage. On admission two-thirds of the children showed a temperature of from 99 to 100.2 degrees.

The daily program was similar to that already described for the Providence and Boston Schools. The school was kept open for a period of only one month, with excellent results. During this time the thirty children made a net gain of 115 pounds in weight, and at the close of the period practically all of them showed a normal temperature, with their general condition greatly improved.

It is needless to say that the experiment created a great deal of local interest in the problem of better school ventilation. Those who had the success of the movement most intimately at heart realized, however, that the undertaking lacked the element of permanency and that the results accomplished by it lacked that degree of conclusiveness which would attend the same results if secured through the operation of an all-the-year-round school.

The opportunity to demonstrate the effectiveness of such an all-the-year-round school was realized in the Fall of 1909 by a grant from the Elizabeth McCormick Memorial Fund to the United Charities for the purpose of conducting such a school on the roof of the Mary Crane Nursery at Hull House. This school was opened by the United Charities in October with twenty-five carefully selected children, and was conducted throughout the following winter and spring with the co-operation of the Board of Education and the Chicago Tuberculosis Institute. During the same winter the Public School Extension Committee of the Chicago Women's Club, co-operating with the Board of Education, established two classes for anaemic children in open window rooms—one in the Moseley and one in the Hamline School. Here the regular regime was broken by a rest period, and lunches of bread and milk were served twice each day. "Fresh Air Rooms," in which the windows were thrown wide open and the heat cut off, were also established for normal children in several rooms in the Graham School. No attempt was made here to furnish lunches and no rest period was provided.

There were, then, during the school year of 1909 and 1910, three distinct classes of children cared for by three distinct agencies—the classes for normal children in the low temperature rooms at the Graham School; anaemic children, with rest period and two lunches, in the Moseley and Hamline Open Window Rooms, and the Roof School for Tuberculous Children, with specially provided clothing, sleeping outfits, three meals a day and medical and nursing attendance, at the Mary Crane Nursery.

The same condition existed throughout the following year—1910-11—with the addition of one Open Air School on the roof of the municipal bath building on Gault Court, given rent free by the City Health Department, and two Open Window Rooms for anaemic children in the Franklin School, all maintained by the Elizabeth McCormick Memorial Fund.

In 1911 the Elizabeth McCormick Memorial Fund assumed the responsibility for all the open air school work carried on in the

Chicago Public Schools, and began the standardization of methods which should be employed in the conduct of such schools.

Through the initiative of the Elizabeth McCormick Memorial Fund the Chicago Open Air School work has been rapidly developed during 1912 and 1913, the program being along the line of additional roof schools for tuberculous children and an increasing number of open window rooms for anaemic children and children exposed to tuberculosis. In all this work the Elizabeth McCormick Memorial Fund has had the co-operation of the Board of Education, the Chicago Tuberculosis Institute and the Municipal Tuberculosis Sanitarium. The Board of Education has supplied teachers and furnished rooms wherever there has been a distinct demand for such a provision. During the past two years the Municipal Sanitarium has made appropriations aggregating \$12,000 to pay the cost of food for these schools, in addition to furnishing the necessary nursing service.

At the present time four Roof Schools and sixteen Open Window Rooms, with an enrollment of 500 pupils, are being maintained.

For full information concerning the Chicago Open Air School movement, see "Open Air Crusaders," January, 1913, edition, published by the Elizabeth McCormick Memorial Fund, 315 Plymouth Court, Chicago; or write Mr. Sherman C. Kingsley, Director, Elizabeth McCormick Memorial Fund, for more recent developments.

Space will not permit a statement of the development of the Open Air Schools in other cities in the United States since this movement was started in 1908. It is, however, encouraging to note what has been accomplished and the comprehensive plans which are being made to further this great movement for the good of the future citizens of America.



NOTES ON TUBERCULIN FOR NURSES

VARIETIES OF TUBERCULIN—THEORIES OF TUBERCULIN REACTION—TUBERCULIN TESTS.

By THEODORE B. SACHS, M. D.

VARIETIES OF TUBERCULIN AND METHODS OF PREPARATION

OLD TUBERCULIN—T. Announced by Koch in 1890.

Tubercle Bacilli of human origin.

Grown on beef broth containing 5% glycerine, 1% peptone, sodium chloride; growths 6 to 8 weeks.

Sterilized by steam one-half hour.

Evaporated (at a temp. not higher than 70° C.) to $\frac{1}{10}$ its volume. Filtered.

$\frac{1}{2}$ % carbolic acid added. Let stand.

Filtered (porcelain filter).

Old Tuberculin contains :

1. 40 to 50% glycerine (a small percentage of glycerine is evaporated)
2. 10% of peptones or albumoses
3. Toxic secretions of the tubercle bacilli into the culture fluid, or such of them as are soluble in 50% glycerine
4. Substances extracted from the bacterial bodies by the alkaline broth during the process of boiling and evaporation.

Appearance and Characteristics :

1. A clear brown fluid
2. Of syrupy consistency
3. Mixes with water in all proportions without producing any turbidity
4. Keeps indefinitely, but not advisable to use brands older than one year.

BOULLION FILTRATE—B. F. Denys—1907.

Method of preparation same as Old Tuberculin, with the exception of subjection to heat;

B. F. is a filtered, unconcentrated culture.

Contains less peptone and less glycerine than Old Tuberculin.

Contains no substances extracted from tubercle bacilli by heat.

Some toxic substances may be more active (not having been subjected to heat).

TUBERCULIN RUCKSTAND (Residue)—T. R. Announced by Koch in 1897.

Ground, dried tubercle bacilli

Distilled water added

Centrifugalization

Supernatant fluid removed (not to be used)

Sediment dried and ground; distilled water added; centrifugalization

Fluid removed and *set aside*.

Sediment dried and ground again; distilled water added; centrifugalization

Fluid removed and set aside

Sediment dried and ground, etc., as above.

The process continued until water takes up the sediment, then all the fluids set aside (except the first one) mixed together

Glycerine 20% added.

The mixture is T. R.

Koch was prompted by the following consideration in bringing out T. R.: He thought that the Old Tuberculin conferred only a toxic immunity, not bacterial. T. R. was supposed to confer bacterial immunity.

Each 1 cc. of T. R. contains 10 milligrams of dried bacilli.

BACILLEN EMULSION—B. E. Announced by Koch in 1901.

Finely powdered tubercle bacilli— $\frac{1}{2}$ gram.

50 cc. of water and 50 cc. of glycerine

All mixed together—prolonged shaking.

B. E. is supposed to contain not only the extract of the body of the tubercle bacilli, as in T. R., but also its soluble products (which in the case of T. R. were discarded in setting aside the supernatant fluid).

THEORIES OF TUBERCULIN REACTION

- a* ROBERT KOCH ascribes the tuberculin reaction to the increased necrotic process around the tubercle, the histological changes consisting of hyperaemia, exudation and softening.

- b** EHRLICH considers the formation of antibodies an essential feature in the mechanism of reaction. Formation of antibodies takes place in the middle of the three layers encircling the tubercle, the layer damaged by toxins, but not yet rendered incapable of reaction.
- c** WASSERMANN maintains that the antituberculin found in the tuberculous process draws the injected tuberculin out of the circulation to the tuberculous focus. The interaction that takes place between antituberculin and tuberculin results in formation of ferments which digest albumin, resulting in the softening of tissue. Absorption of softened tissue causes fever.
- d** CARL SPENGLER—Toxins in the blood of the tuberculous are kept in check by antibodies. Injected tuberculin unites with antibodies, thus setting the toxins free. Result—autointoxication.
- e** WOLFF-EISNER—Bacteriolysin is present in the organism of the tuberculous, as result of previous infection; bacteriolysin sets free the potent substances of the injected tuberculin; this acts on the body and the tuberculous focus, producing a reaction. †

TUBERCULIN TESTS

- I. SUBCUTANEOUS (hypodermic); introduced by Robert Koch in 1890.
- II. CUTANEOUS; introduced by Von Pirquet in 1907.
- III. CONJUNCTIVAL (ophthalmic); introduced about the same time by Wolff-Eisner and Calmette in 1907.
- IV. PERCUTANEOUS (inunction or salve); introduced by Moro in 1908.
- V. INTRACUTANEOUS (needle track reaction); introduced as a test by Mantoux in 1909. Described previously by Escherich.

I. SUBCUTANEOUS TUBERCULIN TEST

1. APPARATUS AND SOLUTIONS NECESSARY :

Glass cylinder graduated to cc.
 1 cc pipette graduated to $\frac{1}{10}$ cc. *
 10 cc pipette graduated to $\frac{1}{10}$ cc. *
 Hyperdermic needle suited to the syringe
 Two or more $\frac{1}{2}$ oz. bottles
 $\frac{1}{2}$ % carbolic acid solution
 Normal salt solution
 1 cc. Old Tuberculin.

* Not absolutely necessary; may get along with graduated cylinder and syringe.

† For a diagrammatic presentation of Wolff-Eisner's theory, see "Tuberculin Treatment" by Riviere and Moreland, page 6.

2. PREPARATION OF APPARATUS :

Glass apparatus, syringe and needles boiled before use.
Some keep needles and syringe in 95% alcohol.

3. MAKING SOLUTIONS :

Tuberculin No. I		Tuberculin No. II	
Label one bottle		Another	
	.1 cc.=1 mg. T		.1 cc.=.1 mg. T
No. I	{	Put .1 cc. T in bottle No. I	
		Add 9.9 cc. of ½ % carbolic acid solution	
No. II	{	Put 1 cc. of Tuberculin solution from	
		No. I into bottle No. II	
		Add 9 cc. of ½ % carbolic solution	

In making dilutions you may use your syringe instead of pipette.
Dilutions can be kept *one week* in a dark, cool place.
Discard turbid solutions.

4. PREPARATION OF THE PATIENT FOR THE TEST :

Patient to keep quiet in bed, or reclining chair, for two or three days before injection.

Take temperature every two or three hours for two or three days (daytime).

If the test is to be applied, highest temperature should not be above 99.1 F, by mouth, according to Koch ; not above 100 F, according to others.

Site of injection—back, below the level of the shoulder blades, alternately on the two sides.

Rub skin with ether or alcohol.

An exact record of physical signs, *just before injection*, should be made by the physician.

5 TIME OF INJECTION :

Between 8 and 10 A. M. (Bandelier and Roepke).

Late in the evening, 9 or 10 P. M., or later (others).

6 DOSE :

According to Koch : Begin with $\frac{1}{2}$ mg., or 1 mg., according to condition of patient ; give larger dose if no reaction. Order of increase : 1 mg. ; 5 mg. ; 10 mg. (last dose repeated if necessary).

Interval between injections : two or three days.

Present Usage : First dose in adults, $\frac{1}{2}$ mg., or $\frac{1}{5}$ mg., or smaller, according to physical condition.

First dose in children : $\frac{1}{10}$ mg., or $\frac{1}{20}$ mg., or even smaller.

Thus, in adults : $\frac{1}{2}$, or 1, 3, 5, 8, and rarely 10 ;

In children, $\frac{1}{10}$, $\frac{1}{2}$, 1, 3.

Loewenstein and Kaufmann's Scheme: Repetition of small dose, relying on exciting hypersensibility — $\frac{2}{10}$ mg.; in 3 days, $\frac{2}{10}$ mg.; in 3 days, $\frac{2}{10}$ mg.; in 3 days, $\frac{2}{10}$ mg.

Some use $\frac{1}{10}$ mg., or $\frac{3}{4}$, or $1\frac{1}{4}$, in same way.

This scheme is based on hypersensibility created by repetition of same dose in tuberculous subjects. Scheme not used at present.

Some advise single dose: 3 or 5 mg., (on the ground that gradual increase of doses creates tolerance).

7 RULES TO FOLLOW IN INCREASING DOSE:

- a* If no reaction with one dose, give a larger one next time, according to *b*.
- b* If temperature rises less than 1 degree F, repeat same dose; otherwise increase.
- c* Avoid large doses in cases of weakness, nervous temperament, children, etc. In a majority of cases smaller doses suffice.

8 AFTER INJECTION:

- a* Rest in reclining chair two or more days, unless severe reaction requires absolute rest in bed.
- b* Take temperature every 2 or 3 hours for 2 or 3 days.

9 GENERAL REACTION:

- a* Rise of Temperature. Positive reaction, if temperature rises at least $.5^{\circ}$ C. ($.9^{\circ}$ F.), higher than previous highest temperature.

		C.	F.
Degree of reaction according to Bandelier and Roepke	Slight reaction if temp. rises to	38	100.4
	Moderate " " " " to	39	102.2
	Severe " " " " above	39	102.2

Typical reaction temperature curve: Rapid rise, slower fall, normal temperature after 24 hours.

Rise begins, in average case, 6 to 8 hours after injection (may begin within 4 hours or be delayed for 30 hours).

Acme of rise in 9 to 12 hours

Duration of reaction, 30 hours or longer.

Rise, acme and duration of reaction vary.

b Symptoms:

May begin with rigor or chilliness, followed by feeling of warmth.

Following symptoms may be present:

Malaise, giddiness, severe headache, pain in limbs, pain in affected organ, palpitation, loss of appetite, nausea, vomiting, thirst, sleeplessness, lassitude, etc.; in short, a general feeling of "illness."

With fall of temperature—disappearance of symptoms.

- 10 REACTION AT POINT OF INJECTION: Area of redness, swelling, tenderness; important as indicative of sensitiveness, pointing to probable general reaction with repetition or increase of dose.
- 11 FOCAL REACTION: Reaction at site of process, due to congestion around it.

Focal reaction is demonstrable by:

- a Change in physical signs; breath sounds, resonance, appearance of rales, etc.
- b Localizing symptoms, pointing to location of the tuberculous process.
 - Lungs—increase of cough, sputum, appearance of bacilli, pain in chest, etc.
 - Kidney—pain in the region of kidney, changes in urine findings, etc.
 - Joint—swelling, tenderness, etc.
 - Lupus—redness and exudation.

Focal reaction is an important feature of the subcutaneous tuberculin test; it permits localization of the disease in a certain percentage of cases.

Physical examination, sputum examination, urinalysis, etc., are very important *during the course of the reaction*.

12 CONTRAINDICATIONS:

Subcutaneous tuberculin test should not be employed in:

- 1 Cases with temperature above 100° F, by mouth (99.1° F, by mouth, according to Koch).
- 2 Cases in which the clinical history and physical signs make the diagnosis certain (presence of tubercle bacilli in the sputum render, of course, any other test unnecessary).
- 3 Cases of recent haemoptysis.
- 4 Grave conditions, as severe heart disease, nephritis, marked arteriosclerosis, etc.
- 5 Convalescence from acute infectious diseases, typhoid fever, pneumonia, etc.

13 INTERPRETATION OF THE POSITIVE SUBCUTANEOUS TUBERCULIN REACTION:

Occurrence of reaction, following the subcutaneous tuberculin test, signifies the *existence of infection*; it does not signify that the individual is *clinically tuberculous*. To quote E. R. Baldwin, of Saranac Lake: "The tuberculin test is of very limited value in determining tuberculous *disease*; it is of extreme value in detecting tuberculous *infection*."

The test results in positive reaction in cases with latent as well as active processes.

The decision as to the patient being clinically tuberculous (ill with tuberculosis) must rest on the consideration of the clinical history and the results of the physical examination.

It is maintained by some that the subcutaneous tuberculin reaction is *more rapid in onset and more marked in degree* in cases of *recent* infection. On the other hand, the test is negative in a certain proportion of far advanced cases.

Occurrence, then, of a subcutaneous tuberculin reaction does not indicate necessarily sanatorium or institutional treatment; neither does it absolutely indicate the necessity of tuberculin treatment. The decision rests on the consideration of all the clinical features of the case.

In the absence of any symptoms or physical signs of disease, a reaction should call for regulation of every day life, tending to increase the state of general resistance (improvement of nutrition, etc.) frequently without discontinuance of work.

The occurrence of reaction, *in the presence of slight symptoms or physical signs*, calls, according to individual condition, either for home treatment with or without discontinuance of work, or sanatorium treatment.

14 INDICATIONS FOR THE SUBCUTANEOUS TUBERCULIN TEST:

The following considerations should guide its employment:

- 1 A thorough study of the history, thorough physical examination, examination of sputum (if any) give sufficient data for a reliable diagnosis in the vast majority of cases.
- 2 Cases, with uncertain symptoms or inconclusive physical signs, pointing to possible existence of tuberculous infection, may be treated as "suspicious" cases (without resorting to subcutaneous tuberculin test), the treatment consisting of rearrangement of mode of life, diet, work, etc., that would tend to increase of general resistance of the patient. This can and should be done in the vast majority of suspicious cases.
- 3 The subcutaneous tuberculin test is indicated in cases in which, in the absence of conclusive symptoms or signs, an absolutely positive diagnosis is desired; then the test should be applied, with the consent of the patient, *after all other methods of diagnosis are exhausted* (thorough study of the case, thorough physical examination, repeated examinations of sputum, etc).
- 4 The focal reaction (the reaction pointing to the seat of the disease) occurs in about $\frac{1}{3}$, or less, of the general reactions following the subcutaneous tuberculin test; this enhances the value of the test in some cases where a focal reaction would clear the diagnosis.

Above all, the subcutaneous tuberculin test should be used rarely, and then only after all other methods of diagnosis were thoroughly applied.

II. CUTANEOUS TUBERCULIN TEST

1 SYNONYMS : Von Pirquet Test or Skin Test

2 APPARATUS AND DILUTIONS NECESSARY:

Inoculation needle of Von Pirquet	Ether
Koch's Old Tuberculin (undiluted or dilutions according to method).	Alcohol lamp
A centimeter tape measure (divided to $\frac{1}{10}$ cm.) to measure reactions	Medicine dropper

3 APPLICATION OF TEST:

Inner surface of the forearm; clean the site with ether; place two drops of tuberculin 4 inches apart; stretch the skin and scrape off the epidermis (at a point midway between the two drops of tuberculin) by rotating the Von Pirquet needle between thumb and index finger, with slight pressure on the skin; repeat same through the two drops of tuberculin; let the tuberculin soak in for a few minutes. No dressing is necessary. The middle scarification is the control test. One tuberculin and one control test may suffice. A separate needle should be used for the control test.

After each inoculation, clean the needle of tuberculin and heat the point red hot in the alcohol flame before applying it again.

4 REACTION:

Gradual elevation and reddening of skin around the point of tuberculin inoculation, beginning in 3 hours or later; the reaction (papule) well developed, generally, in 24 hours and most distinct in 48 hours after inoculation.

Size of papule varies from a diameter of 10 millimeters in average case to 20 mm. occasionally, and 30, rarely (Bandelier and Roepke).

At the end of 48 hours the swelling and redness subside gradually, with the subsequent bluish discoloration of the skin, remaining for various periods of time, and slight peeling of the epidermis. Individual reactions vary in degree of redness, elevation, size, contour of the border, etc. All these points should be observed and recorded.

Time of inspection—24 and 48 hours after inoculation.

Single inspection—best time in 48 hours.

5 CAUSE OF REACTION:

Interaction between inoculated tuberculin and the antibodies (bacteriolysins, according to Wolff-Eisner) present in the skin of a tuberculous individual; interaction results in hyperaemia and exudation (papule).

6 INTERPRETATION OF REACTION:

Occurrence of positive reaction signifies presence of a tuberculous focus somewhere in the body. No indication as to activity or location of the focus.

A negative reaction in adults (especially if repeated) signifies non-existence of tuberculosis (unless great deterioration of health, far advanced process, or tolerance to tuberculin established by tuberculin treatment).

A positive reaction in children under two years of age signifies, generally, active tuberculous process; with the advance of age the determination of active tuberculous processes by means of cutaneous tuberculin test becomes impossible.

III. CONJUNCTIVAL TUBERCULIN TEST

1 **SYNONYMS:** Eye Test; Ophthalmic Test; Wolff-Eisner's Test; Calmette's Test.

2 **APPARATUS AND DILUTIONS NECESSARY:**

1 cc. pipette graduated to $\frac{1}{10}$ cc.

10 cc. pipette graduated to $\frac{1}{10}$ cc.

10 cc. glass cylinder

Medicine dropper

Koch's Old Tuberculin

$\frac{1}{2}$ % and 1 % dilution of Old Tuberculin in .85% sterile normal salt solution.

To make 1 % dilution, add .1cc. Old Tuberculin to 9.9cc. of diluent.

3 **APPLICATION OF TEST:**

Patient sitting, with head thrown back

Lower eyelid drawn slightly down and toward the nose—to form a small pouch of the lid;

One drop of 1 % or $\frac{1}{2}$ % instilled in that pouch and the lower lid moved up gently over the eye until the lids meet;

Eye kept closed for one minute or so.

4 **REACTION:**

Onset in 12 to 24 hours (may begin earlier); acme in 24 to 36 hours; duration of reaction—3 to 4 days or even longer (in severe cases). Some reactions are of short duration. 3 grades of reaction, according to Citron:

1 Reddening of caruncle and palpebral (lid) conjunctiva.

2 More intense reddening, with involvement of ocular (eyeball) conjunctiva, and increased secretion.

3 Very intense reddening of the whole conjunctiva, with much fibrinous and purulent secretion, etc.

5 TIME OF INSPECTION :

12 and 24 hours after instillation; then once a day.

6 CAUSE OF REACTION :

Hyperaemia and exudation resulting from interaction between *instilled tuberculin* and *antibodies in conjunctiva* (bacteriolysin, according to Wolff-Eisner).

7 INTERPRETATION OF REACTION :

Wolff-Eisner maintains that positive conjunctival tuberculin reaction means *active tuberculosis*, a conclusion accepted by but a few.

8 FIELD OF APPLICATION OF CONJUNCTIVAL TUBERCULIN TEST :

Should not be used; connected with *danger* to the eye.

Conjunctival test used very rarely at present.

IV. PERCUTANEOUS TUBERCULIN TEST

1 SYNONYMS : Salve Test ; Moro Test.

2 SALVE : Equal parts of Old Tuberculin and anhydrous lanolin

3 APPLICATION OF TEST :

Site : abdominal wall below ensiform process, or breast below nipple, or inner surface of forearm.

Application : rub in with the finger (using moderate pressure) a small particle of salve about the size of a pea.

Rub it in into an area about 5 cm. ; rub 1 minute.

4 REACTION :

In 24 to 48 hours—*either* numerous small reddened spots which disappear in a few days, or numerous small nodules, or coalescing nodules on a red base, etc.

5 INTERPRETATION OF REACTION :

Positive reaction is assumed to indicate existing tuberculous infection somewhere in the body ; does not indicate that the process is active.

6 FIELD OF APPLICATION OF PERCUTANEOUS TUBERCULIN TEST :

The percutaneous tuberculin test fails in a large proportion of tuberculosis cases.

The test is used rarely at present.

LIGNIERES TEST

A modification of the Moro Test

Instead of salve, a few drops of Old Tuberculin rubbed in.

Used rarely at present.

V. INTRACUTANEOUS TUBERCULIN TEST

1 SYNONYMS—Mantoux Test

2 APPLICATION OF TEST:

Injection into skin (needle parallel to skin) of $\frac{1}{100}$ mg. of Old Tuberculin (according to Mantoux).

3 REACTION:

Onset in a few hours, well developed in 24 hours, acme in 48 hours. Reaction consists of a central nodule surrounded by a halo of redness.

This is the intracutaneous test as originally suggested by Mantoux.

CONCLUSIONS

Comparing the various tuberculin tests we find that:

1 *The Subcutaneous Tuberculin Test* has the advantage of focal reaction, disclosing in a certain percentage of cases the seat of the disease.

The subcutaneous test should, however, never be employed unless *as a last resort*, and then only after all other methods of diagnosis are exhausted and an absolute diagnosis is very essential.

In the vast majority of suspected cases of tuberculosis, thorough study of the history of the case, combined with thorough physical examination, furnishes all the necessary data for diagnosis and an efficient plan of treatment.

2 *The Cutaneous Tuberculin Test* is a very efficient diagnostic measure in children under two years of age in whom a positive cutaneous tuberculin reaction indicates active disease.

Positive cutaneous tuberculin reaction in adults indicates existence of a tuberculous process, somewhere in the body; it does not indicate that the process is active.

Negative cutaneous tuberculin reaction is one of the corroborative evidences of absence of tuberculosis, unless reaction is prevented by very advanced disease or tolerance to tuberculin established by tuberculin treatment.

3 Thorough study of the history and thorough physical examination of each individual case are more important and should precede the application of any test.

