SARANAC LAKE AND THE SARANAC LABORATORY FOR THE STUDY OF TUBERCULOSIS

by EDWARD R. BALDWIN, M.D.[1]

WHEN in 1873 Dr. Edward Livingston Trudeau began a quest for personal health by taking up residence in a little community known as Saranac Lake, in the Adirondack Mountains of New York State, Pasteur had just completed his first work on the causes of fermentation, which resulted in the revolution of surgical practice. The inspiration of America's great movement for the conquest of tuberculosis began a decade later, in 1884, when Trudeau established at Saranac Lake the first semipublic institution in the United States for the treatment of tuberculous patients, the Adirondack Cottage Sanitarium, subsequently named the Trudeau Sanatorium.

During the intervening half-century, the obscure village that was the birthplace of this movement was closely identified with the many facilities for the study and treatment of tuberculosis which grew out of this institution. Indeed, the name of Saranac became synonymous with that of Trudeau. Other places in the West and South were renowned for climatic advantage; not so, at that time, the Adirondacks. All the more significant, therefore, was the message that cures were possible in the cold of the Saranac winter and during the more or less rainy summer. It was the personality of Trudeau that brought confidence to patients and physicians alike and made the village of Saranac Lake a resort for a private clientèle, while the sanatorium built on a nearby hill gave the same advantages to those of little means.

Today numerous facilities exist in Saranac Lake for private and institutional care of the tuberculous. Grouped about the

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hills of the village and its environs are adequate accommodations for private treatment at home or *en pension* as in the Swiss resorts. The scope of this medical center is not confined to the local requirements of New York State, but serves the country at large east of the Mississippi. Because of its adjacent location, Canada also receives a goodly share of its influence.

The growth of the village was slow until Trudeau and his sanatorium brought reputation to it. It was accelerated by the establishment in 1893 of the Saranac Laboratory, the first in the United States devoted to original researches in tuberculosis. The patients were hopeful that through laboratory research a cure for tuberculosis might be discovered. The first laboratory equipment had been set up in the Trudeau homestead, and in 1890 Trudeau was already doing experiments in his office with an enthusiasm that surpassed his knowledge. When a fire destroyed his house in 1893, there came the opportunity to build a modern laboratory, fireproof and durable, as Osler predicted. It was the late George C. Cooper of New York who "did the Phoenix trick," and provided funds for the building that is located in the village of Saranac Lake. In 1923 another building was erected on the grounds of the sanatorium to provide quarters for the Research and Clinical Laboratory, where there are ample facilities not only for routine examinations required for sanatorium patients, but for scientific research in the fields of bacteriology, chemistry, and treatment of tuberculosis. The original Saranac Laboratory, referred to later, was continued with the aid of the Milbank Memorial Fund and other gifts. It provides diagnostic facilities to the patients outside the Trudeau Sanatorium, and opportunities for research and teaching. The combined library and lecture room is the center of medical interest in the village.

Coincident with the growth of the sanatorium in the nineties came a number of young medical men who, while under treatment, engaged in some medical activities. They also took up their residence in the village and became tuberculosis doctors, following the lead of Trudeau. The cohesion was strong among the Trudeau group, and gave rise to a spirit widely recognized as unique among health resort physicians.

Meanwhile the movement for establishing tuberculosis institutions spread over the country, bringing a demand for physicians with training. Just before the death of Dr. Trudeau in 1915, the postgraduate course known as the Trudeau School of Tuberculosis was founded by the late Samuel Mather, whose interest was enlisted by Dr. Robert H. Bishop, his son-in-law. An annual stipend of $5,000 was contributed by Mr. Mather for the first eleven years. Thus far seventeen sessions have been held with an average annual attendance of twenty-five physicians. Over 375 doctors have taken the course. Scholarships covering tuition are provided for about six students each year. Practically all the tuberculosis physicians and surgeons in Saranac Lake take part in the teaching by clinics at the hospitals and sanatoria. There are over 800 beds in these institutions, which include, besides Trudeau, the New York State Hospital at Ray Brook, Stony Wold and Gabriels sanatoria, the Reception Hospital, and the Saranac Lake General Hospital. All are within easy reach and are well equipped with X-ray and other laboratories for clinical study and for surgical treatment, now an important adjunct. The Saranac Laboratory remains the headquarters for the school.

The death of the leader came before there was any assurance of permanency for the research and teaching then in progress. It was then that the sanatorium trustees decided to establish a memorial endowment fund to maintain these activ-

ities. Created by gifts from Dr. Trudeau's friends, this fund was called the Edward L. Trudeau Foundation. The endowment now amounts to $550,000, of which $93,000 is specifically for the support of the Saranac Laboratory. Besides the Trudeau School and the Research and Clinical Laboratory, the Foundation supports a medical library, a statistical department, and fellowships. Through this fund and annual donations the institution at present gives employment to twenty-six full or part-time ex-patients, an unique service in the history of sanatorium operation. The stated objects of the Foundation are:

1. To maintain laboratories and carry on research into the causes and treatment of tuberculosis.

2. To maintain regular courses of instruction for physicians and others in the most advanced knowledge of tuberculosis, under the name of the Trudeau School of Tuberculosis.

3. To offer young physicians and others the opportunities for research work while undergoing treatment for tuberculosis, through the establishment of fellowships.

The administration of the fund is the duty of the sanatorium trustees, aided by a council of well-known advisors: Dr. William H. Welch, professor emeritus of the history of medicine at the Johns Hopkins School of Medicine; Dr. William H. Park, director of Research Laboratories of the New York City Department of Health; Dr. Theobald Smith, Department of Animal Pathology of the Rockefeller Institute; Professor Thomas McCrae of Jefferson Medical College; and Professor Hans Zinsser of Harvard University. The annual report containing published studies is issued in conjunction with the Trudeau Sanatorium medical report.

The separate organization of the Saranac Laboratory was made necessary by the terms of the legacy of Dr. Trudeau and by the addition of the John Black Room, a lecture room

and library for physicians and students. Mr. and Mrs. Frank B. Black of Mansfield, Ohio, and the Milbank Memorial Fund each pledged $100,000 as a special endowment for the laboratory, which assures the maintenance of the research work on a small scale.

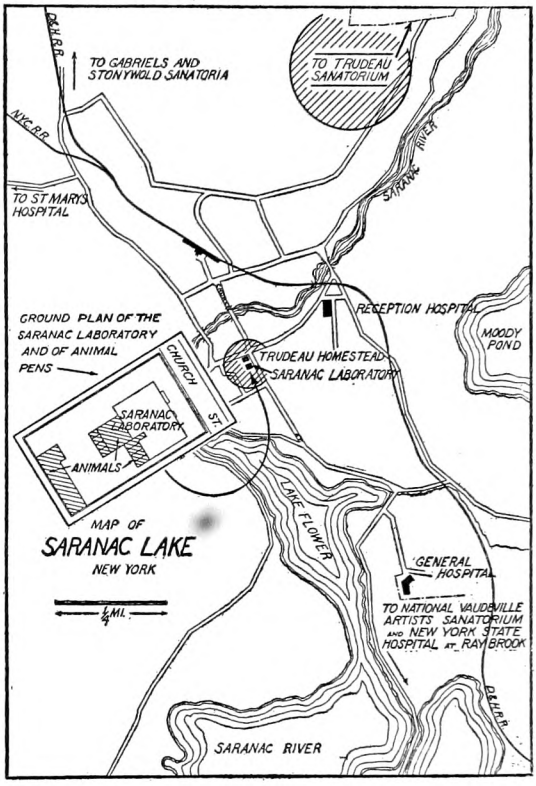
Other donations, including gifts by local physicians organized in a group known as the Saranac Lake Academy of Medicine, enable the Saranac Laboratory to maintain a full-time staff. The Metropolitan Life Insurance Company, the United States Public Health Service, the Chemical Foundation, and former patients, aided by an appropriation from the Trudeau Foundation, are supporting a program of experimentation for the prevention of tuberculosis in industry, especially in the dusty trades. The support for this important research is inadequate, and an additional endowment of $300,000 is being sought to carry on the work.

The part played by the Saranac Laboratory in advancing the knowledge of tuberculosis has been a matter of common knowledge to physicians for many years. It may be less well-known by workers in the public health field outside of tuberculosis.

The early efforts of Dr. Trudeau to carry on laboratory investigations in tuberculosis are graphically described in his "Autobiography." The difficulties were many, and much ground work had to be done before practical results could be seen. He began with primitive apparatus, but aided by a microscope he was able to see the tubercle bacilli, and to isolate and grow them in a home-made culture oven. Immediately afterwards he inoculated animals, which were then treated with germicides like creosote, hydrofluoric acid, and hot air, to learn whether the disease could be aborted or cured.

The methods of Pasteur by which rabies, chicken cholera,

and anthrax had been conquered by vaccination with weakened virus, appealed to Trudeau's imagination. In the early nineties we find him experimenting with tubercle bacilli of low virulence, with the purpose of protecting animals from disease-producing bacilli. In fact his work was simultaneous with that of Koch, who in 1890 brought out tuberculin, which, however, failed to be the hoped-for preventive and curative specific.



After the gift of new buildings in 1893 by Mr. Cooper, a new impetus was given to continuous work.

At that time Mrs. Elizabeth Milbank Anderson, founder of the Milbank Memorial Fund, began her support of the pioneer work on experimental immunity stimulated by the discovery of tuberculin in 1890.[2] It was likely that she was quite as much persuaded to lend her aid because of the practical support it offered to young physicians suffering from tuberculosis as by the ardent enthusiasm of Dr. Trudeau for science in the wilderness. It is doubtful whether she expected

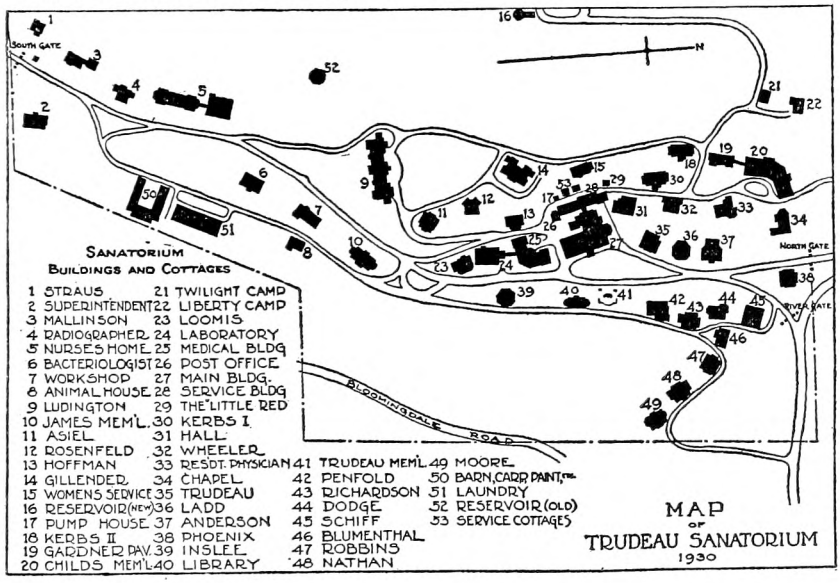
[2] Mrs. Anderson also gave the funds for the erection of Anderson Cottage, shown as building number 37 in the map on page 9.

any tangible results other than the benefit derived by the workers themselves.

In discussing the hope of discovering a cure, she once stated that she was more interested in the benefit to young men disabled and yet with ability to keep up a degree of interesting study and experimental research while recovering their health. It is to be kept in mind that all the investigations undertaken under Dr. Trudeau's direction were done by convalescent tuberculous patients. In spite of the physical limitations of these workers, the results obtained exerted a powerful influence on the practice of medicine and the development of sanatorium treatment. Reference to those deemed most important may be allowable.

The knowledge of immunity to disease was in its infancy. Serums had been discovered for diphtheria and tetanus, but as yet little was known about the principles governing their use. Many serum cures were promoted for tuberculosis, but awaited proof of their activity.

In the decade from 1890 to 1900 the problems of tubercu-



lin, its nature, the chemistry of the tubercle bacillus and supposedly antitoxic serums were given much study. The fact that no specific serum was found to counteract tuberculosis saved many from expensive and dangerous treatment.

The absence of a true toxin or poison in the bacillus was clearly demonstrated during the next decade by the chemist, Dr. P. A. Levene, now chief of the chemical division of the Rockefeller Institute, but for several years a worker in the Saranac Laboratory.

The special studies on tuberculin and hypersensitiveness made in the period between 1910 and 1920 by various workers, notably Dr. Allen K. Krause, were the means of explaining many obscure problems. A fuller understanding of the symptoms of tuberculosis was for the first time made possible by these experiments. How tuberculosis is resisted in the body is also becoming better known as the result of these experiments in immunity. Much of this spade work has been tedious and required years of effort.

Simultaneously with the study of immunity begun by Trudeau himself, the dangers of infection from room dust, clothing, table utensils, et cetera, were examined. Disinfectants and methods of fumigation of rooms were investigated, resulting in practical rules for institutions and patients.

It is not possible to relate here details of other contributions to the treatment and the tests of alleged cures that have been vaunted for tuberculosis. The Saranac Laboratory was founded for such practical objects as were intimately connected with the cause, prevention, and treatment of tuberculosis. Hence at various times it has carried out experimental investigations on animals of the creosote cure; the peppermint inhalation cure; the effects of gold and soda, copper, cinnamon acid, and carbolic acid; and of a score of tuberculins and gland extracts. These were being promoted by enthu-

siasts, or for commercial gain, and usually without proof of usefulness or harmlessness.

For the past ten or twelve years the Saranac Laboratory has been carrying on an intensive study of industrial tuberculosis, with special reference to its manifestations in dusty trades. This field has recently become recognized as the most important source of tuberculosis cases. At the 1931 annual meeting of the American Public Health Association, Dr. Louis I. Dublin stated that among industrial policyholders of the Metropolitan Life Insurance Company the tuberculosis rate was over 83 per 100,000; among those able to afford a policy of $5,000 or more, the rate was only 17 per 100,000; while in the intermediate group it was 48. He said that the high rate in the industrial group was almost wholly due to the hazard of inhaled silica or quartz dust. He emphasized the necessity of concentrating the attack upon the remaining strongholds of tuberculosis, now that the general rate is so consistently falling. This elimination of the major portion of industrial tuberculosis is theoretically easy; remove silica dust from the atmosphere of mines, quarries, and factories, and the incidence of tuberculosis will unquestionably fall. In practice, however, it is not easy or economically possible to remove such dust below dangerous limits in some of the industries. Experiment must demonstrate whether the dangerous effects of silica cannot be neutralized.

The Saranac Laboratory has supplied the method of attack. It has carried on systematic investigations of a series of industrial dusts which have indicated their possibilities for harming the lungs and creating susceptibility to tuberculosis. It has for the first time demonstrated the possibility of producing in animals the chronic disease of the lungs resulting from long-continued inhalation of quartz dust, known as silicosis. It has shown that dusts other than pure quartz when

inhaled for a very long time do not predispose to tuberculosis.

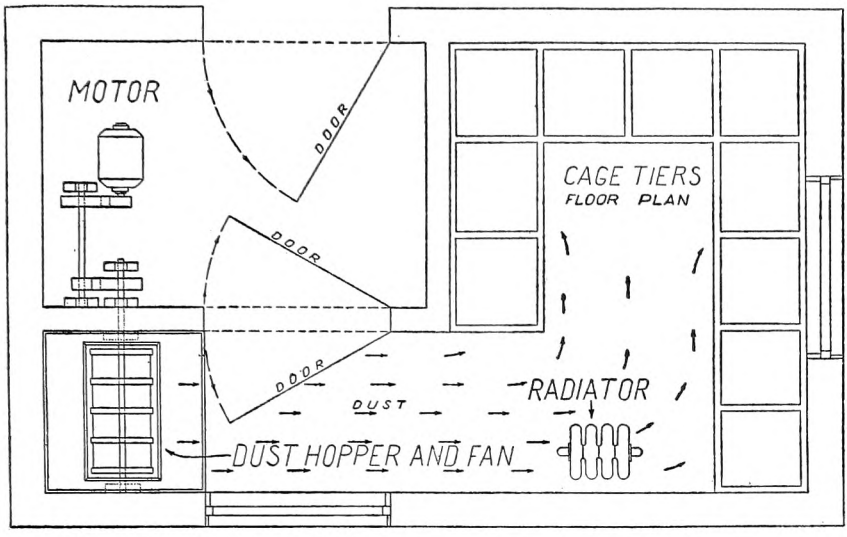
It is now engaged in a study of methods designed to neutralize these dangerous properties of quartz dust. The laboratory has also carried on a clinical study among quartz miners which has demonstrated that chronic infections other than tuberculosis may complicate silicosis and incapacitate the workers. Some of these infections are amenable to specific treatment. When the complication is eliminated, the worker is able to return to his occupation.

The compilation of exact data on the action of various industrial dusts is of special importance at the present time, because adequate legislation must be provided to control the production of dusts. Suits against manufacturers of quartz and asbestos products, aggregating over $3,000,000, are pending in the courts of America today. In most states they are not referable to the compensation commissions but are being tried as civil suits for damages. For the framing of intelligent compensation laws, clinical, statistical, and experimental investigation of the action of various dusts is imperative.

The years of experience in the study of tuberculosis complicating disease produced by inhaled dust has laid the foundation for productive work in the field of prevention. The staff and equipment of the Saranac Laboratory are organized for this specific purpose, and with adequate financial support this institution is in a position to make valuable contributions. The Milbank Memorial Fund gift toward endowment, with others, is a substantial help at this time.

What is the future of tuberculosis, its prevention and treatment, and what may be the place of Saranac Lake in the completed plans for its control?

The present remarkably successful effort to isolate patients in sanatoria and hospitals is bearing fruit in lessened mortality. Any observer can note the gradual segregation of pa-



Floor plan of equipment for subjecting animals to dusts encountered by workmen in various industrial processes.

tients, with the tendency to restrict their employment when actively diseased. In and about Saranac Lake, sanatoria have sprung up as a result of the special knowledge of medical and nursing care available in the community and the absence of prejudice and fear of the disease. These special advantages have resulted from years of experience in the sanitary control and supervision of rooming and boarding cottages. The possibility of rearing healthy families in private homes in such a community has been demonstrated, and an adequate school inspection has afforded results that are most gratifying.

Situated in an invigorating climate, an area of immense population within a day's journey, this tuberculosis colony has already grown to a population of 8,000. Of this number perhaps 2,000 have been or are patients, among whom are many transient dwellers. Except for the few, idleness is forced upon them whether at home or elsewhere. It would seem, therefore, that as a colony for invalids with no manufacturing industries, Saranac Lake is proving its superior worth.

Its position as a medical center is being made secure, but its educational work for tuberculous patients must be extended to include vocational training and reeducation. The suggestion has already been made to the Trudeau Foundation that it enlarge its objectives to include the teaching of undergraduate college subjects in the arts and sciences. Such a project would require large resources but undoubtedly would find favor, for many young persons who now have to abandon further education after treatment could continue their studies if they were offered under the sheltered conditions of sanatorium supervision. The problem of the tuberculous unemployed awaits solution, for hundreds are physically able under skilled medical supervision to do useful work.

The Trudeau School has found increasing favor with young physicians who desire to complete their hospital training. Little attention is given to tuberculosis in general hospitals and frequently such cases are transferred or excluded when discovered. Hence postgraduate courses under conditions where all the complications of the disease can be studied are likely to be needed indefinitely.

Concerning the goals in view for laboratory research, the Saranac Laboratory has a definite field in the prevention of industrial tuberculosis under the direction of Dr. Leroy U. Gardner, a pathologist of experience.

Nor is this all. The causes which lie back of tuberculosis are yet very obscure in many respects. These must be investigated from the standpoint of chemical, physiological, and clinical aspects, in laboratories and sanatoria. The epidemiology of the disease has thus far been regarded as a field problem in the homes and public places. Epidemiology is now being transferred to the laboratory where suitable control experiments can be made. These studies promise great rewards in the prevention as well as the cure of tuberculosis.