EDITORIAL

The Death Struggle

The paper entitled "What Price Apathy—A School Epidemic of Tuberculosis" by Dr. Petter in this issue of Diseases of the Chest contains information of practical value to every one of the world's 3,000,000,000 citizens. Petter's method of managing this epidemic and his subsequent procedure is a fine example for physicians and others everywhere who desire to eradicate this disease.

The situations we now call tuberculosis outbreaks apparently have been operating since prehistoric days. The disease has depended upon them for its perpetuation. The unit has been and still is the individual with communicable tuberculosis and those whom he infects with tubercle bacilli. Through the centuries to the present moment in many parts of the world these units have been so numerous and so close together that they overlapped and fused. Hence, they were not visualized except when they constituted great masses.

In the United States, probably more than 40,000 of these units develop annually since this is approximately the number of new cases with advanced disease when first reported each year. For many of them apparently contacts have been ignored so that the disease of these contacts is left to ripen years and decades later to reenact the vicious cycle.

The natural history of tuberculosis in the human body is such that most chronic reinfection types of the disease develop among persons whose infections occurred from a few years to several decades before the disease evolves to clinical proportions. Without this information it is understandable why outbreaks have not been recognized as such since the number of sick persons who promptly appear among the contacts of the communicable case is small. It is true that occasional persons among such contacts develop acute forms of tuberculosis such as meningitis, and pleurisy with effusion. Their number is too small to suggest outbreaks. By the time other contacts break down years or decades later, they usually are no longer associated with the original cases who may even have been forgotten. An exception is a family or any group of individuals more or less bound together who lend themselves especially to prolonged observation and study. For example, in 1930, Roberts reported a family from his private practice in which he said, "The parents came from the old country where I am sure the mother contracted tuberculosis of the lungs. She gave birth to nine children quite close together; one by one they died from tuberculosis, the last at the age of 26 years. Later the father died and finally the mother." Thus, it was the longitudinal observations over more than 40 years by the same physician which enabled him to see this unit in its entirety as far as the family was concerned.

Until the tuberculin test became available, little could be determined about the epidemiology of tuberculosis. However, with the advent of this test the extent of dissemination of tubercle bacilli from the person with communicable disease to his associates could be quickly and accurately determined. Thus, the persons destined to break down years and decades later were also found.

During the last third of a century one of the most encouraging events in the tuberculosis eradication movement has been the recognition of so-called tuberculosis outbreaks and development of methods of managing them. This important triumph over tuberculosis has been achieved by reducing the number of persons and animals with communicable tuberculosis to such a level in many places that if sought, the clinical cases and others invaded with tubercle bacilli stand in bold relief. So much
so that tubercle bacilli become vulnerable and the outbreak becomes a death struggle for them.

Inasmuch as more tuberculin testing has been done among children than any other segment of the population, a considerable percentage of the outbreaks reported to date have been from the schools. Relatively few have been studied and documented and thus converted into death struggles for tubercle bacilli as well as the following.

In 1933, Jordan\(^1\) reported an outbreak caused by a teacher who taught on the day he was found to have advanced, communicable tuberculosis. A prompt survey of the children who had been in this teacher's classes revealed 33 per cent reactors, whereas among the other children of the school only 12 per cent reacted.

In 1933, an elderly woman was found to have advanced chronic pulmonary tuberculosis. Administration of the tuberculin test to her associates revealed a reactor daughter who was teaching. Although apparently in good health, the daughter also had communicable tuberculosis. When the children in her school were tested, 71 per cent reacted, but only 11 per cent of the children in the adjacent rural schools reacted.

In 1934, Slater reported a teacher who was found with advanced communicable tuberculosis. On testing, 71 per cent of the children in her school from the five families represented reacted to tuberculin. In adjacent schools, about 10 per cent reacted. Since these reports of 30 years ago, attention has been called to numerous others, but mention is made here of only a few of the more recent ones.

In the hamlet of Florida, Ohio, a senior high school student was found to have communicable tuberculosis. An epidemiologic investigation revealed demonstrable lesions in three of her sisters and a schoolmate. The real story was told when 20 per cent of all the children in the schools reacted to tuberculin with a rate of 10 times that in the average school of that county.

In April, 1961, a girl who had graduated from a high school in Superior, Wisconsin in June was admitted to a sanatorium. Another girl from the same group was found to have tuberculous pleurisy with effusion, and from the same school two other cases entered the sanatorium. A survey of students revealed 4.7 per cent reactors in this school, and only 1.1 per cent in the other high school of the city.

At Whitehall, Michigan, a student athlete developed advanced, communicable tuberculosis and tubercle bacilli spread through the bus he rode and to other school associates where seven active and 98 potential cases of tuberculosis developed.

In upstate New York, a bus driver for a large centralized school was found to have communicable tuberculosis. The following epidemiologic study indicated that he probably had infected 30 per cent of the 266 students whom he transported.

In 1962, an outbreak was reported in Edmonton, Canada. This resulted from a teacher who was found to be a disseminator of tubercle bacilli. Epidemiology then revealed that 90 of her students reacted to tuberculin.

In May, 1962, an outbreak was discovered in Stark County, Ohio. This was precipitated by a 23-year-old sixth grade teacher who began work in January, 1962 and therefore missed the routine employees' preemployment examination given in the fall. In April, one of his pupils being examined by a family physician reacted to tuberculin. The source was traced to the sixth grade teacher who was found to have advanced, communicable tuberculosis. The epidemiologic study revealed that 32 per cent of the personnel of that school and 100 per cent of the 44 sixth grade children reacted to tuberculin, whereas the testing of all others in the school resulted in only 3.7 per cent reactors.

Most of the above outbreaks have been published in considerable detail including management. Each report contains practical information.
Outbreaks of tuberculosis are easily prevented. They are nearly always caused by persons with longstanding infections like high school students and personnel members. Usually these persons can be found by the tuberculin test far in advance of breakdown and communicability of lesions. Periodic examination of such reactors will nearly always detect the presence of evolving lesions before they cause symptoms and when available treatment prevents them from becoming communicable.

This is the best that can now be done since we have no way of destroying tubercle bacilli in the foci of longstanding infections. Even if a germicidal drug should become available, it would not solve the problem because the bacilli in such lesions are secure from drugs in the blood stream.

In many places, the ideal situation with reference to children is being approached—namely freedom from infection. The problem of tuberculin reactor personnel members will require a longer time because from 15 to 20 per cent of them are harboring foci of tubercle bacilli.

Among children and personnel the smaller the number of persons infected, the fewer outbreaks will occur. However, a safe level will not be attained as long as there is one infected person in a school. This has been demonstrated among animals, particularly cattle, where outbreaks still occur despite an extremely small number of infections. In Minnesota, the number of tuberculin reactors among the four million cattle has been approximately two for each 10,000 tested for a number of years. The importance of continual tuberculin testing was emphasized in 1963 when a 7-year-old cow was slaughtered at a regular packing house. The carcass was found to contain extensive tuberculosis. With much effort this animal was traced back to the herd of origin. The owner had 30 head of adult cattle of which 25 reacted to tuberculin, all of which were slaughtered, and 18 showed slight to extensive disease. The herd also contained 28 young cattle of which nine reacted to the test. Ultimately the entire herd of 58 cattle was slaughtered.

With a total loss of the herd, special precautions were taken before a new herd was brought on the farm. The barn was torn down and burned and another one built. Moreover, the top layer of soil in the entire barnyard was removed.

The owner of the farm and his wife were 28 years old. They had six and one-half and five-year-old daughters, three-year-old and ten-month-old sons. When tested with tuberculin, all reacted except the ten-month-old baby. The family had regularly consumed raw milk from their herd and it was common practice for the wife and the three older children to be in the barn at milking time.

Dr. Chaloux said, “Once an animal is identified as tuberculous, either by post-mortem or testing, then it is essential to jump in with both feet. Just one tuberculous animal can be the beginning of an epidemic.”

All tuberculosis outbreaks among people can be converted to death struggles for tubercle bacilli, better still they can be prevented.

References
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