

care, proper nursing of infants, and all the other factors which make for the growth and health of the individual.

The transition from mechanical to medical dentistry, however, will be anything but a simple matter, for there are many complicating circumstances. The ordinary dentist at the present time derives most of his income from certain types of restorative work—notably crowns and bridges. If he rejects them he starves. The average man is not willing to pay a dentist for services like those he expects from his physician. He demands a *quid pro quo*, a visible display of gold, for his money. He looks on his teeth as so many independent cutting instruments to be repaired like the tires on his automobile. The dentist, watching out for his income, has a hard moral struggle to ignore his patient's whims. Mrs. Smith, whose husband is vice-president of the local bank, prefers a putrid shell crown to what she considers the implication of old

age—the loss of a tooth. She gives her orders to the dentist as to the groceryman, and she pays good money for her idiosyncrasies. Mrs. Smith would not talk in that tone of voice to her physician or surgeon. If the former told her on consultation simply to stop eating eggs, she would as willingly pay his fee and recommend him to her friends as if he recommended the removal of her left lung.

On the other side, there is the factor of ignorance within the profession. If dentistry is to be allied with medicine, the dentists will have to be educated along medical lines. The dental schools, in the past, have been trade schools, providing their students only with the mechanical elements of their profession. But recently steps have been taken in some quarters to remedy this situation, and perhaps the time is not far distant when the dentist will be required to possess a full medical education.

Public Hygiene

WHY IS THERE LESS TUBERCULOSIS?

By JAMES A. TOBEY

TWENTY-FIVE years ago tuberculosis caused 200 deaths every year in each 100,000 of population in the United States. Today it causes less than one-half as many; the latest complete figures, those for 1921, show but 96. If the present rate of decrease continues, the malady which has been called "the captain of the men of death" will, within twenty-five years, be as rare among us as typhoid fever or smallpox.

Everyone admits that the tuberculosis death-rate has decreased so much since 1900 and that it has declined especially since 1904, when the organized campaign against the disease was launched, but a few iconoclasts, particularly certain biologists, point out that it had also been falling steadily for a number of years before that campaign was heard of. From this they proceed to argue that the efforts made

against the disease have had little, if anything, to do with its decrease. On the other hand, sanitarians who have specialized in anti-tuberculosis activities are quite positive in asserting, sometimes rather vehemently, that the only reason why there is less tuberculosis today than a quarter of a century ago is that scientific endeavors have been directed against it. Which is correct—those who think that purely biological causes, such as the development of immunity and resistance by natural selection and heredity, have achieved the decline, or those who hold that the application of the methods of hygiene and sanitation have promoted and fostered it?

The answer is not difficult if one studies and weighs the evidence in an impartial manner. If there had never been a National Tuberculosis Association (or, as it used to be called so clumsily, a National Association for the Study and Prevention of Tuberculosis); if there had never been

any ardent field workers at fancy salaries; if there had never been any Christmas seals; if there had been no crusades against spitting; if none of the other expensive accoutrements of anti-tuberculosis work had ever been indulged in, it is still possible that the mortality from tuberculosis would have decreased. But it would not have decreased—and this may be said very positively—anything like as much as it has. The conquest of the disease, in brief, has been due partly to natural causes, but it has been due very much more to the modern public health movement.

Those who scoff at the effects of environment—which may be controlled and improved—upon the tuberculosis death-rate instantly collide with many undisputed facts. Why is it, for instance, that tuberculosis is a city disease, the mortality in urban areas being invariably higher than in rural? What purely genetic explanation can be given for the fact that the death-rate varies greatly in different parts of the country? In Nebraska it was only 37 per 100,000 of population in 1921, whereas in Delaware it was 141, or nearly four times as high. Why is the rate in males so much higher than in females, especially after twenty years of age? How account for the fact that certain occupations show a high mortality, while others show a low one? Farmers have a rate one-twelfth that of miners. Why? How is one to explain these facts in terms of natural selection?

In the United States the fall in the tuberculosis death-rate has been continuous for several decades. It flared upward a little in 1918, following the influenza epidemic, but it has dropped abruptly since that time. In Europe, on the other hand, the mortality has recently been going up. It had been coming down prior to the World War, but since the end of the war it has soared to heights which remind one of thirty years ago. In urban Germany, the 1913 rate of 157 per 100,000 had risen, by 1918, to 287, and even greater rates have been reached in Austria, Poland and Serbia. Heredity requires generations to

accomplish changes like this; but environmental conditions can bring them about in a few years and almost in a few months.

What, then, have been the factors that have most contributed to the general decline in America? The three main ones have been: the provision of adequate sanatorium treatment of the tuberculous, the education of the general public in the principles of personal hygiene, and the improvement of the economic status of the people of this country. In 1904 there were not more than 10,000 beds in American institutions for the tuberculous; today there are seven times that number, with facilities for handling 110,000 patients annually. In spite of the efforts of quacks, faddists and cranks to disseminate misinformation about health and disease, the lay public of the United States knows more today about how to live properly (in the hygienic and not the Y. M. C. A. sense) than ever before, and it has better means to do it. In spite of Congress, the economic condition of the country has steadily improved. When that happens, it means better nutrition and better living conditions, and the two mean better health.

Among the specific measures that have assisted in the fight on tuberculosis, the most effective have been: improved and more accurate methods of diagnosis, especially of the pulmonary form of the disease; the pasteurization of milk supplies; the prohibition of common drinking-cups and other common utensils; the inspection of meat products; housing reforms; and, according to at least one fervid sanitarian, the war upon alcohol. In the early days of the anti-tuberculosis movement, much energy was expended, and, in the opinion of some, wasted, on campaigns against spitting. The theory behind these campaigns was that the sputum of infected persons, full of tubercle bacilli, dried and was blown about in dust to infect others. Many drastic and ridiculous laws were passed to cope with this menace. It was, and still is in some places, unlawful to spit on a sidewalk—but en-

tirely proper and correct to spit in the gutter or in the street! Such anti-spitting crusades probably had but slight effect on the death-rate from tuberculosis. What was enormously more important was the adoption of sanatorium treatment for active cases. In sanatoria the discharges of patients are safely disposed of, and even at home they are now taught how to get rid of them without infecting others.

An eloquent exhibition of the way in which the disease may be reduced by scientific methods of environmental control has been given recently at Framingham, Mass. During the seven years from 1917 to 1923 inclusive, the death rate from tuberculosis in this town was lowered from 121 per 100,000 to only 38, which is considerably less than half that of the country as a whole and also much lower than that of the rest of Massachusetts. In a group of seven nearby communities, used for control purposes, the rate went down from 126 per 100,000 to 85,—thus remaining more than twice as high as in Framingham. The devices utilized by Dr. D. B. Armstrong, who directed the demonstration, consisted, first, of special disease-detecting machinery; second, of adequate measures for treating and arresting (medically and not politically) the cases located; and, third, of developing a comprehensive civic health organization, both official and voluntary. To do all this cost about \$183,000, but it was worth it. The Metropolitan Life Insurance Company advanced the money, for more than 16 per cent of the deaths on which it pays death claims are from tuberculosis, and in one year it expended over \$4,000,000 on the lives of 14,325 such policy holders. It was thus directly interested in the war on the disease. Its original grant was for \$100,000 for a three-year period, but an appraisal committee appointed by the Surgeon General of the United States Public Health Service recommended a continuation for a few years more, and so the Metropolitan donated the additional sum.

Framingham was selected because it was a typical American town—that is, it had a foreign population of about one-third of the total, mostly Irish, Italians and Canadians, with the usual sprinkling of Jews. The experiment was announced as *by* the town and not *on* it. The results proved that scientifically directed activities, hygienic and sanitary, can bring down a tuberculosis death-rate enormously. The demonstration was the forerunner of many others, notably the child health experiments administered by the American Child Health Association at Mansfield, Ohio; at Fargo, North Dakota; at Athens, Georgia; and in Rutherford County, Tennessee; and three in New York, financed by the Milbank Memorial Fund. Two of these are now under way at Syracuse and in Cattaraugus county, and a third has been announced for the Bellevue-Yorkville district of the city of New York. The last one has been heralded by press reports to the effect that twenty years is to be added to the average span of life in the neighborhood. Perhaps it can be done—provided the local homicide rate can be kept down, which seems doubtful.

The present span of life in the United States is about 58 years. This does not mean, however, that most people die at that age, but simply that the deaths are so distributed between zero and one hundred years that the general average comes just twelve years short of the proverbial three score and ten. Tuberculosis now ranks third as a cause of death in the United States, being exceeded only by heart disease, and pneumonia and influenza combined, with cancer, kidney troubles and apoplexy following closely behind. But for many years tuberculosis led all the rest. Its conquest is only one phase of a general public health movement, which, during the last decade or two, has brought about a remarkable increase in the national longevity. The reason why so much stress is placed today on educational efforts is because in tuberculosis, as in most other communicable

diseases, there are two factors. One is the presence of the infecting micro-organism, the other the vital resistance of the individual. The tubercle bacillus probably gets into most of us some time during childhood. Once within the system, it may remain dormant forever, or, when circumstances are favorable, as by a weakened resistance, it may invade the receptive parts of the body and some form of tuberculosis result. Tuberculosis is not hereditary, though a predisposition to it, and, conversely, some immunity from it, may be inherited. This much we may grant to the biologists, but it is personal hygiene and the effect of environmental factors which induce the disease or pre-

vent it, according to the circumstances.

The anti-tuberculosis campaign, on the whole, has been well conceived and carried out with a reasonable degree of scientific precision, and it is justified by the results achieved. An eminent statistician, Dr. Louis I. Dublin, believes that a rate of 50 per 100,000 will be reached in 1930. If it is—and the prophecy is conservative—it will be due mainly to the activities of man, and not to natural selection. A rate of 50 was reached in Australia a few years ago and in three of our own States in 1921. A few decades more, and we may see the complete eradication of tuberculosis from the United States.

Music

FOLK-TUNES AS MATERIALS FOR MUSIC

By JOHN C. CAVENDISH

IN the popular mind each of the major arts is companioned by an aura of superstitions. Music, being the most abstruse and technical of them all, is especially rich in such appendages. They range in lushness and absurdity from the naïve concepts of the completely uninformed to the somewhat more sophisticated notions of the romantically educated. As examples of the first class, we have the fancies that a piano virtuoso's fingers, due to the shattering vigor of his execution, bleed copiously after every recital, that the pipe organ is the noblest of musical instruments, that to play the piano compositions of Liszt requires a colossal technique, that Bach wrote nothing but fugues, that Schubert wrote nothing but songs, and that Richard is a relative of Johann Strauss, or even that they are one and the same man.

As I have said, corresponding fictions exist in the faiths of the more sophisticated. They are, of course, less obviously jocose than the foregoing, they are tinctured with more sense, on the surface, but

they are often almost as unsound at bottom. Of these, one of the most interesting and widely held is the two-part doctrine, first, that a body of folk-tunes such as the Negro spirituals constitutes a profound and authentic contribution to the art of music, and second, that folk-tunes in general lend themselves most aptly to musical treatment and have thus proved a source of invaluable inspiration to the greatest of composers. The latter half of this doctrine takes root in the fact that many composers of the first order have used folk-tunes in their most serious compositions and often with indisputably good effect. But this is certainly no proof that folk-tunes yield themselves with any special grace to musical treatment. Quite the opposite is the fact. As I shall show, instances of their successful use simply provide examples of the triumph of virtuosity over difficulties. Such triumphs are, in a sense, moral instances. They are practical affirmations of a fundamental principle in the ethics of art, to wit, that the conscientious artist must be boldly experimental, hospitable to the point of audacity, even to folly.

But before going further it will be comfortable to dispose first of the common