



MEDICINE

Acme

Protecting Babies from Tuberculosis

Children of Tuberculous Parents are Saved from the Disease By Injections of Live or Dead Germs Into Their Bodies

By JANE STAFFORD

PROF. ALFRED CALMETTE of the Pasteur Institute, Paris, and his disciples throughout France are feeding live tuberculosis germs to day-old babies to give them immunity to tuberculosis.

In Baltimore, at the Harriet Lane Home of the Johns Hopkins Hospital, vaccination with killed tuberculosis germs is being practiced on a specially selected group of babies to increase their resistance to the great white plague.

Which method is best? Scientists disagree on this, and not gently.

Most dramatic, perhaps, is the method of the Frenchman; daring, as befits its war background, and successful, its friends claim.

The latest is the method developed and now being tried by conservative American scientists. The Baltimore institution is the first in this country, so far as is known, to start vaccination of babies with heat-killed tuberculosis organisms.

Both methods are directed especially toward those unfortunate infants who are born of tuberculous parents. Babies do not inherit the disease, but they have no resistance to it during the first few days of their life. If they are constantly exposed to it, every time their mothers feed and tend them or every time their fathers kiss them, they are almost certain to contract the disease. Such babies must be taken from their parents at birth and kept in foster homes or hospitals where there is no contact with tuberculosis, if they are to escape it. Gradually they will build up a resistance to the disease, just as children born of non-tuberculous parents do.

All of you have been exposed to tuberculosis at one time or another in your lives, but relatively few of you succumb. Tuberculosis germs, a few at a time, invade your bodies. Each of these invasions is resisted and overcome by the defensive forces of your body, and with each victory, these defensive forces grow a little stronger and your chances of succumbing to the tubercle bacilli and contracting the disease become a little less. Of course, if you are tired out, rundown, have had a long siege of illness or a severe operation, your body's defense is weakened, and if the tubercle bacilli select that time for an invasion, they are more likely to survive and grow. Then you may find yourself having tuberculosis.

Now if tubercle bacilli, a few at a time, are deliberately introduced into a new-born baby's body, it may hasten the development of the baby's defensive forces so that he will be able to withstand the invasions of quite large numbers of virulent TB germs to which he will be exposed if his parents or some member of his immediate family has the disease.

Weakened Germs Used

Prof. Calmette's method of immunizing babies to tuberculosis follows this line of reasoning. So does the recently developed method of American investigators. The trick is to use tuberculosis germs which cannot cause disease even in a baby's tender body and which at the same time are able to set up a defense reaction in the body leading to immunity or at least increased resistance.

For many years, ever since 1882 when Robert Koch discovered the tubercle

bacillus, the germ which causes tuberculosis, scientists have been searching for a way to make a protective vaccine or dose of these bacilli. Koch himself tried and thought he had succeeded. Terrible was the disappointment when his method failed.

Prof. Calmette did not start out with the idea of immunizing babies to the white plague. He, along with scientists in other parts of the world, was busying himself with the problem of how animals got tuberculosis. Not such an impractical problem, since many tuberculosis cases in children develop from drinking milk of tuberculous cows. Working hard in his laboratory at Lille in northern France in the dark days of 1914, Prof. Calmette hardly knew there was a war being fought all around him. He was far more concerned with getting his germs to growing properly for his investigations than he was in the roar of the big guns. He had grown used to danger, scorned it. The minute organisms he worked with constantly in his laboratory had just as much danger packed into their tiny forms as any 16-inch shell.

Besides, he was making remarkable discoveries. In 1908 he had planted tubercle bacilli from cows on a new kind of culture medium made from ox bile, glycerine and potato. To his surprise, he found that these bacilli began to lose their virulence after growing for several generations on this medium. Exploring the possibilities of this discovery made him nearly oblivious to the war and other outside considerations.

By 1920 this strain of germs had lost its virulence for all species of animals; that is, it could be injected into guinea pigs, rabbits, cows and pigeons without causing the development of tuberculosis. Then Prof. Calmette made the startling statement that vaccination with this

strain—called *Bacillus Calmette-Guérin* after himself and his colleague who developed it—gave considerable if not complete immunity to tuberculosis as long as the organisms remained in the body of the vaccinated animal.

Patriotic French physicians seized on this announcement. Here was a way to restore France's man power, so badly depleted during the war. Babies were being born in France in goodly numbers but so many of them were dying before they reached their first birthdays. Many of these babies' mothers had tuberculosis, the result of undernourishment during their girlhood days of war and poverty. The babies were almost sure to get the disease. So French physicians began vaccinating babies and later even the midwives gave the B.C.G.—shorthand for *Bacillus Calmette-Guérin*—to babies of tuberculous parents.

Americans Skeptical

The news spread and created a sensation in the medical world. In some quarters the French scientists' discovery was acclaimed and put to immediate practical use. Elsewhere, chiefly in the United States, Canada, England and Germany, scientists were more skeptical, more cautious. It was risky business giving live tuberculosis germs, no matter how weakened, to day-old babies, they argued. More laboratory studies and more investigations with animals was the advice of the conservatives. Others, investigating Dr. Calmette's statistics and records were not entirely satisfied that these substantiated his claims for B.C.G.

High in the Adirondack mountains of New York State one of these conservatives, Dr. S. A. Petroff, has been investigating tuberculosis for years.

It is at this laboratory that the vaccine was developed which is being used to protect Baltimore babies from tuberculosis. A peculiarly fitting place for its development and production, if this vaccine should turn out to be the means of saving American babies from the white plague. For it was on this Adirondack hillside that Edward L. Trudeau founded his famous cottage sanatorium, first of its kind in the world, and it was here that he introduced onto the American continent open air treatment for the disease.

On this historic spot, Dr. Petroff and his associates of the Trudeau Research and Clinical Laboratories, hearing of Prof. Calmette's claims for B.C.G., started investigations of their own. But their studies, with a strain imported directly from the Pasteur Institute, increased their skepticism about B.C.G.

They had previously found that tubercle bacilli, like some other bacteria, changed their form when grown on different kinds of culture media. Dissociation, scientists call this change. In the course of dissociation, a strain of harmless bacilli may develop into two strains, one harmless and one dangerous. Dr. Petroff and associates were able to dissociate the B.C.G. strain, getting one harmless strain, one small, virulent strain, and an intermediate one.

Guinea pigs vaccinated with B.C.G. for instance, had occasionally developed tuberculosis, even though apparently free from all contact with the disease and supposedly protected from it by the B.C.G. Dissociation of B.C.G. into a harmless and a harmful strain might account for this. And if it could dissociate in a guinea pig's body, it might likewise dissociate in a baby's.

They decided that the living tubercle bacillus was too uncertain an element to be injected or fed to babies. The only good tubercle bacillus is a dead one, is their contention. And they proceeded to make what they consider a safe vaccine of tubercle bacilli that have been killed by heat. After many experiments with animals, they found they had a vaccine that protected against infection with living tuberculosis germs.

Dead Germs Less Risk

In March, 1929, they said, "We believe that the use of a vaccine of heat killed tubercle bacilli can be put into practical use for the immunization of children."

This vaccine has been used for a year now at the Harriet Lane Home, the children's division of Johns Hopkins

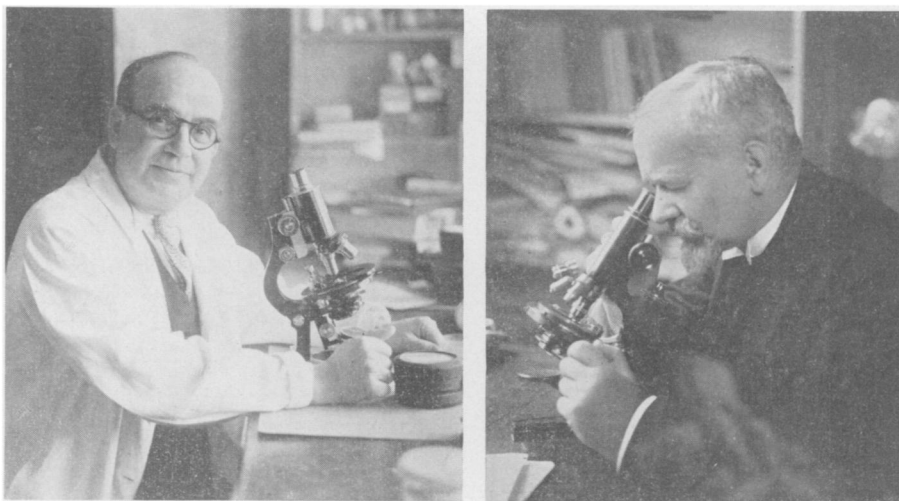
Hospital. Hopeful results have just been announced by Dr. Edwards A. Park, director of Harriet Lane, and Dr. Francis P. Schwenker, who has made the vaccinations.

It was the Lübeck disaster which inspired these Hopkins investigators to introduce vaccination with dead bacilli. They with the rest of the world had been hopefully watching the B.C.G. experiments, thinking that perhaps here was the long-wanted way to protect babies from tuberculosis, but not yet convinced. Even now, they state, they are not "taking sides." But they are taking no chances of actually giving babies tuberculosis, and the Lübeck affair showed that there was a risk with B.C.G. In this German town, 246 babies were given cultures of living organisms. Seventy-three of the babies died. An official investigation exonerated completely Prof. Calmette's cultures and his method. The disaster was due to contamination of the cultures after they left Prof. Calmette's laboratory, a slip in laboratory technic. Yet it is apparent that the use of B.C.G. is not fool-proof.

In Baltimore, 32 new-born babies of tuberculous families have been vaccinated with Dr. Petroff's vaccine during the last year. Not one of them has developed tuberculosis.

Twenty-one vaccinated babies have gone back into tuberculous homes. In some of them a member of the household has an open case of tuberculosis and is giving off live, virulent tubercle bacilli in his sputum. Ordinarily under such conditions, two out of every three babies develop the disease. Not one of the 21 vaccinated babies has done so.

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DISCOVER NEW METHODS OF FIGHTING TUBERCULOSIS

Dr. S. A. Petroff (left) in America vaccinates new born babies with dead tubercle bacilli. Prof. Alfred Calmette (right) in France uses live but weakened germs to protect children of tuberculous parents.