

THE RESULTS OF THE APPLICATION OF SCIENCE IN THE FIELD OF MEDICINE

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The progress of modern medicine, in the broad sense of this term, means much to all of us, whether we are sick or well. Our happiness and well being may be greatly affected by public health measures and may be affected considerably by what aid can be given to friends and relatives in times of serious illness and injury. The fact that business men are willing to erect and equip large hospitals to facilitate the application of modern methods to those in need of care is ample demonstration of this general interest. This is being done throughout the world without any thought of financial return.

Scientific medicine has advanced more in the last fifty years than the arts of communication, navigation and transportation. The discoveries have been as marvelous as the development of the submarine, the aeroplane and the radio. We are amazed at these wonderful achievements of modern engineering skill, but what is more marvelous than the fifteen years of added life given to the civilized world by the application of the discoveries in modern medicine, surgery and their allied sciences?

The average length of human life in the sixteenth century was between 18 and 20 years. At the beginning of the last century it was still under 25 years. The average span of human life in this country in 1870 was 41 years. At the beginning of the present century it had advanced to forty-eight years, and today it varies considerably in different countries from about twenty-four in India, to fifty-six in the United States, and sixty in New Zealand. The death rate in the United States has been reduced from 20 per thousand of population in 1880 to about 11 per thousand in 1921. This represents a saving of 500,000 lives in one year alone.

If the knowledge of preventive medicine we now possess could be efficiently applied, the average length of man's life could be extended at least ten years, and his industrial efficiency increased in proportion. Insurance companies anticipate an average life expectancy of 75 years in the near future.

In the present seemingly satisfactory state of our public health, few of us realize what has happened to such once devastating diseases as typhoid fever, smallpox and diphtheria.

Typhoid fever was until recently a very common and dreaded disease. In the Spanish war, more American soldiers died of this disease than were killed in battle. In the recent World War, modern preventive measures made typhoid epidemics impossible. Through the discovery of its cause, and methods of transmission from one individual to another, it has become a preventable disease, and the application of this knowledge is rapidly making this once prevalent disease a rare one.

Yellow fever once ranked with cholera and bubonic plague as one of the most fatal scourges of the human race. The last great epidemic in this country occurred in 1878. It spread from New Orleans as far north as Missouri, embracing 132 towns in eight states. Seventy-four thousand people were infected, of whom over fifteen thousand died. The discovery by Doctor Reed that Yellow Fever was carried from one person to another by a certain specie of mosquito paved the way to banish this disease from this continent. Armed with this knowledge, Dr. Gorgas made it possible to complete the Panama Canal where the French company had failed. This was done at a saving of seventy thousand lives and eighty million dollars.

In the 18th century, smallpox occurred as commonly as measles does today. Forty-five thousand people died in England, 40,000 in Prussia and 150,000 in France, while it was estimated that the total number of deaths due to this highly fatal disease was over 600,000 each year. In London at that time it was the cause of about one-twelfth of all deaths.

Before the days of vaccination, smallpox was essentially a disease of childhood because practically all were susceptible to it. Nearly everyone had his attack early in life, as children have measles in our day. Only about 6% of the children were immune and therefore escaped its ravages. Smallpox not only destroyed life and disfigured its victims, but it was at one time the most common cause of blindness in London.

Thorough vaccination is a complete safeguard against this disease as is definitely proven by the perfect control of it in countries where vaccination laws are properly enforced. In Prussia where compulsory vaccination has long been in force, it has reduced the death rate of smallpox from 4000 per million of population to less than 2 per million. In Sweden where vaccination has been thoroughly and adequately applied for over one hundred years, the death rate has been decreased from 2,049 per million of population to one per million.

Contrast this with the present smallpox situation of our own country and state where vaccination laws are lax and poorly enforced. There have been reported during the five year period from 1918 to 1924 in the United States nearly 300,000 cases of smallpox. During the same period nearly 25,000 cases were reported in Illinois. In Massachusetts where a compulsory vaccination law is well enforced and free vaccine virus is distributed to its people only 114 cases of smallpox were reported in the same five year period.

In 1923 there were over 30,000 cases reported in the United States, over 31,000 in Russia as against 195 in France and 17 in Germany. We see therefore that where scientific knowledge is applied this great scourge of mankind is completely checked. But when we relax our vigilance and the various cults and anti-vaccination propogandists tend to break down the main barriers set up against disease we must expect exactly the situation that has developed here in the last few years. Smallpox epidemics are a disgrace to any country and are due to carelessness on the part of many people and ignorance on the part of others. Many of the propogandists fall under the latter class, but most of them belong to the various healing cults and are therefore prejudiced rather than ignorant.

Diphtheria, not long ago one of the most dreaded diseases of childhood, has been rendered almost innocuous by the discovery of the anti-toxin treatment. Many of you can recall how whole families of children were wiped out in a single epidemic. If this disease is recognized on the first day and proper treatment given no one need die from it. By applying the Schick test and giving

the toxin anti-toxin mixture to those found positive, the disease may be completely prevented.

Doctors Dick and Dick, working at the McCormick Institute for infectious diseases, have discovered the cause of scarlet fever and a specific curative serum which bids fair to do for this disease what anti-toxin has done for diphtheria. The triumphs of insulin, radium, the X-ray, aseptic surgery and numerous other scientific agents need only to be mentioned to be appreciated.

While tremendous strides in the progress of medicine have been made in the discovery of the cause of disease, the diagnosis, and the methods of treatment, surgical and medical, as applied to the individual patient by the physician, far more has been accomplished in preventing disease by the wide spread application of preventive measures to the public as a whole.

The number of human ailments is so large, the physical, chemical and biological processes of the body so complicated, and the avenues of infection and the influences causing disease so numerous, that a continuous process of education is essential to keep the coming generations supplied with the thorough knowledge necessary to conquer disease.

In many sections of our country, especially in the regions of the Great Lakes, goitre is very prevalent. In dogs it has been shown that 95% of these animals living in this region show more or less goitreous changes in their thyroid glands. A great majority of goitres are due to the lack of iodine in the water supply. In some cities where iodine has been given to the school children, goitres have been found to disappear almost as if by magic. Preventive medicine has gone farther and is now preventing goitre by giving iodine to the mother before the child is born. The prevention of goitre is more important than operating for it after it has developed and possibly done irreparable damage to the patient.

The idea of periodic health examinations is another step in advance. An increasing number of people are going to their physician for examination with only slight symptoms or none at all. In this way the diagnosis of serious and insidious ailments are discovered early and

the proper advice and treatment given before destructive lesions have developed and at a time when serious trouble can be prevented. This application of the doctor's scientific knowledge to the early recognition of human ailments in their incipient stage will do more to increase the efficiency and span of man's life than the older methods of trying to cure disease when it has become thoroughly established.