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# Jefferson Standard Life Insurance Company

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RALEIGH, NORTH CAROLINA

## What Medicine Knows To-Day

### SMALLPOX AND VACCINATION.

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It is just 210 years since Edward Jenner, the great English physician, vaccinated James Phipps, his first patient. During that long period, according to reliable statistics, more than four billions of human beings have been vaccinated.

When Jenner scraped the arm of the immortal Phlipps, smallpox was the king scourge of humanity. Every year more than 250,000 persons died from it in Europe alone. To-day it is growing rarer and rarer among all the civilized races of the earth, and in some countries it has disappeared almost entirely. Arm-scraping alone is to be thanked for this.

The gentlemen learned in pathology know a great deal less about smallpox than they know about most other infectious diseases. For one thing, they have been unable, as yet, to find the germ that causes it. Various minute bodys have been discovered in the blood and tissues of smallpox patients. Each of these has its school of partisans, who produce a great show of evidence that it, and it alone, produces the disease. But there is a unanimous lack of unanimity among the experts. Their various theories still remain to be demonstrated and accepted.

Despite these lamentable differences, there is one point on which all the doctors agree. It is this: When a man has once had smallpox, his chances of getting it again are infinitesimally small. In other words, the disease leaves almost perfect immunity behind it; and he who bears its scars may laugh at it for the rest of his life. This immunity follows a very mild attack just as certainly as it follows a severe attack. On that fact is based the theory of vaccination.

Jenner was not the inventor of inoculation. Five hundred years ago the people of the Levant practised it with success. Long experience had taught them that if smallpox were acquired by bringing the scabs of patients into contact with the skin, it usually appeared in a comparatively mild form. Therefore they immunized themselves in this manner: by direct inoculation from human subjects.

But this method was open to several very grave objections. In the first place, it happened sometimes that a person thus inoculated, instead of developing a mild attack of smallpox, developed it in a virulent form and died from it. In the second place, patients thus inoculated, even when they themselves got well quickly and easily, frequently gave rise to the

disease in virulent and fatal forms in those around them.

Thus the problem before Jenner was: To evolve a method of inoculation that would invariably produce a mild form of the disease and to keep those who had been inoculated from transmitting it, in worse forms, to others. He solved his problem by abandoning the use of scabs from human patients and by employing in their places scabs from cows suffering from cow-pox.

Jenner died believing that cow-pox and smallpox were separate and distinct diseases. Modern pathology has proved that they are one. The difference between their symptoms and effects is due to the fact that cattle possess a certain measure of natural immunity to the smallpox germ and that when it is introduced into their bodies it is strenuously fought and materially debilitated.

Thus if a healthy calf is inoculated with virus from a man dying from smallpox, the calf itself does not die, but battles with the germs and eventually throws them off. Now, if some of these germs are taken from a scab on this calf and introduced into the body of another calf, the latter combats them still more vigorously and successfully, and they grow still more debilitated. After a number of such transmissions, they lose their original virulence almost entirely. Then, if human beings, they will give them, if the horrible and fatal disease we call smallpox, but the mild and easily-cured malady we call cow-pox.

At bottom, smallpox and cow-pox are identical. The only difference between them is that the former is dangerous, while the latter is not. There are many proofs of this; but most of them involve so many technicalities that they cannot be discussed here. The one that best appeals to laymen is the fact that cowpox leaves behind it an immunity which is known as effective a bar to smallpox as an attack of smallpox itself. Experience shows that the immunity produced by any disease applies to that disease alone. In other words, it is against all experience that one malady should protect a patient against some other malady. Therefore, pathologists conclude that smallpox and cow-pox are one.

When you are vaccinated, a couple of hundred thousand weak and debilitated smallpox germs, from some calf whose blood has touched them, are introduced into your body. At the place of entrance a puslike forma, and for several days you feel ill. Later on you recover entirely. After that, even if virulent smallpox germs are introduced into your body, you do not take the disease. In a word, you have had cow-pox and it has made you immune to its other self, smallpox. It is a mistake, however, to suppose that this immunity lasts forever—that one vaccination is enough for a lifetime. As a matter of fact, the effect gradually wears off; and all the authorities agree that every one should

be re-vaccinated every ten years or so.

In Germany this idea is embodied in the imperial vaccination law. Every German child must be vaccinated during the calendar year of its birth and again at the age of 12 years. In addition, whenever a case of smallpox appears, every person in the area of possible infection must be vaccinated again. On account of this drastic law, smallpox seldom rages in Germany, and when it does it remains confined to a relatively small district.

In the United States vaccination is compulsory in the majority of States, but nevertheless the mistaken anti-vaccination sentiment, in many sections, is strong, and very often the arm-scraping doctors have to call in the police to make the opponents of inoculation bare their arms. Despite this opposition, very few escape. In consequence smallpox no longer is an epidemic disease in this country.

Once on a time the seacoast cities were ravaged by epidemics that killed thousands. But to-day the disease kills no more than 3,500 persons a year in the whole country, and the great majority of these are negro or foreign-born dwellers in filthy labor-camps, sailors' boarding houses or remote, backwoods settlements. Among the civilized inhabitants of the larger cities a case of smallpox is very rare.

The anti-vaccinationists' chief argument is the fact that vaccination is performed without aseptic precautions, there is danger of inoculating the patient with the germs of other diseases—such, for instance, as lockjaw. That this is true cannot be denied; but that such chances occur very often is not likely. Vaccines are now prepared and packed in a thoroughly aseptic manner and all but a small minority of physicians make the inoculation carefully. To avoid all danger of chance infection it is only necessary to employ a competent physician.

The vaccine virus usually is prepared at present by rubbing down scabs from an inoculated calf in chemically pure glycerine. The result is a thick emulsion that keeps well and is easily introduced into the abrasion made upon the arm. By another method, the ends of ivory points are covered with the virus which dries upon them. These points are rubbed into the wound.

In the laboratories wherein vaccine virus is made commercially, elaborate cleanliness is observed. Calves a year or so old are selected. Skilled veterinarians make sure that they are absolutely free from disease. The flank of each animal is shaved and cleaned with antiseptics. Lymph from an infected calf is introduced beneath the skin, either with a syringe or by rubbing it into long scratches. Within a week the whole flank of the animal is covered with cow-pox vesicles. The fluid within these is the vaccine virus.

Ordinarily it is squeezed out with forceps or scooped out with an appropriate instrument and mixed with glycerine. The mixture is then stored in a cool place for six weeks or two months, when it is ready for use. Glycerinated lymph retains its potency for several months or more. Besides preserving the virus the glycerine has the effect of killing a number of other common bacteria.

animal's attack of cow-pox makes it immune to the disease, in future, it can be employed only once for the production of virus. While it is in service, the animal is usually protected against lockjaw by the inoculation of tetanus antitoxin.

It is important to repeat vaccination when it does not "take." Only when the familiar swelling and malaise fail to follow two or three inoculations, is it safe to assume that the patient is immune. That certain persons are naturally immune to smallpox, and that, in consequence, vaccination, in their case, never "takes," is possible; but it is unlikely that such persons are numerous. In fact, one investigator found only one natural immune among 35,000 patients.

A great many pathologists, in all parts of the world, are now seeking the smallpox germ, as has been said. So far, their work has been without result. Several observers have found a minute parasite—a parasite differs from a bacillus in the fact that the former is a true animal while the latter is a plant—in the pustules of smallpox patients, but the relation of this parasite to the disease remains to be demonstrated.

Other observers have found that the blood of persons recovering from smallpox has the power of making vaccine virus inert, and in this fact lies a possibility that a curative serum for smallpox may be produced here long; but so far it is only a possibility.

Meanwhile there is ground for congratulation in the fact that vaccination has robbed the disease of its old terrors and that epidemics, in civilized countries, now are well-nigh unknown. Before vaccination was generally practised, smallpox was a frightful scourge. During the eighteenth century one-third of all the inhabitants of England were pock-marked. In one year, during the early part of that century one-fourth of the English people died of the malady. In Japan, before the country was opened to civilization, it was not uncommon for 250,000 deaths to be recorded in a single year. To-day, the Japanese doctors have it well in hand, and except in the seaports it is practically unknown.

The disease is thought to have originated in the far East shortly before the beginning of the Christian era. It was introduced into Europe by a Roman army returning from an Asian campaign. The first treatise on smallpox that we know of was written by Marius, a Swiss savant, in the year 1770. A. D. Soon after that it became epidemic in France and devastated the kingdom of Toulouse. It also spread along the Mediterranean and the Arab physicians of the time—who were a great deal more expert than their white brothers—made elaborate studies of it. By the time of the Crusades it was the king scourge of Europe and according to one historian, it sometimes caused a million deaths in a single year.

The Spaniards brought smallpox to the aboriginal inhabitants of Mexico. The Indians of what is now the United States also fell in multitudes. The epidemic spread to Alaska and thence to Siberia. It did not reach the Hawaiian Islands until 1825, but within a year after that it had laid low a per cent of its people.

So far the strict British quarantine has served to prevent an epidemic in Australia; and in view of the extensive vaccination practised there it is probable that the island continent never will suffer greatly from the malady. When Jenner introduced vaccination it was opposed on the ground that the virus from calves would make those who were vaccinated bellow like cattle. The theologians of the time also combated him on the ground that smallpox was a punishment laid on the human race for its admitted sins, and that any effect to escape it was an insult to the deity. Happily for mankind, such a view of things is no longer held by civilized white men.

## The Question Box

J. J. C.—In the early part of 1865 there was a conference at Hampton Roads between Lincoln and Seward and Hunter, Campbell and Stephens, the latter representing the Confederate States. I have heard it said that Lincoln told Stephens that if he would writ "Union" he could have had his own terms. But I have heard this denied, and the claim made that Lincoln demanded unconditional surrender. What were the facts relating to this conference? (2) Will you please give me the names of the fourteen or fifteen who are the electors in the Hay-Tilden election of 1877?

A. I have consulted many volumes but find no report of the language used. Probably none but the participants knew precisely what was said. (2) The electoral commission consisted of the following: Nathan Clifford, Samuel F. Miller, Stephen J. Field, William Strong, Joseph P. Bradley, Justices of the Supreme Court; Senators—Edmunds, Morton, Frelinghuysen, Bayard and Thurman; Representatives—Henry B. Payne, Eppa Hunton, Josiah G. Abbott, James A. Garfield and George F. Hoar.

J. N. A.—I would feel greatly obliged if you would, through your column, publish some recipes for keeping butter through the summer months?

A. Take two parts of the best salt, one part of good loaf sugar, and one part of salt-petre beaten and blended well together. Of this composition put one ounce to 15 ounces of butter, and work it well together in a mass. Press it into the pans after the butter has become cool, for friction, though it be not touched by the hands, will soften it. The pans should hold ten or twelve pounds each. On the top put some salt, and when that is turned into brine, if not enough to cover the butter entirely, add some strong salt water. Another method is to pour a pint of boiling water on one pound of common salt, add a half ounce of saltpetre, one ounce of lump sugar. Let it stand till cold. Pour it off clear of sediment and put the butter into it. This pickle will keep butter firm and sweet during the hottest weather.

J. H. M.—Will you kindly print a formula by which I can calculate the horse-power afforded by water flow-

ing perpendicularly down a pipe? I have a two-inch pipe kept full continuously by a spring fifty feet above the outlet, and I want to know what power I could derive from it.

A. The capacity of your spring in horse-power is equal to the weight of water, passing through the pipes per minute multiplied by 50 and divided by 33,000.

Mrs. C.—Please state the family name of Queen Victoria; the name of her father and the name of her mother? The family name of Albert, Prince Consort?

A. Queen Victoria was the daughter of the Duke and Duchess of Kent. Her husband was Prince Albert, of Saxe-Coburg-Gotha.

L. K.—Please tell me where to send an old coin to receive a premium on it?

A. Do not send it anywhere until you have sold it. There are coin dealers in every considerable town, but it does not follow that they are equally anxious to obtain specific coins.

B. S. B.—What is the horoscope of a person born June 6th.

A. Very restless, never satisfied, sociable and adjusted to the times. If the societies you ask about have branches in this vicinity they are certainly referred to in the news columns.

E. E. L.—What was Dan Emmet's native State? Did he compose the words of the song "Dixie" before or after Col. Will S. Hayes?

A. He was a native of Mount Vernon, Ohio, and originated the song as it was at first sung. Most of the verses were written by others at later times.

B. J.—Does the atmosphere rotate with the same speed as the earth? A. It does not. The further from the earth the less the air takes the motion of the earth.

H. C.—What is the date of the earliest exploration of the Panama canal route?

A. The first exploration for a canal across the Isthmus of Panama was made in 1527-28 by M. de la Serna.

G. E. F.—Please state how to secure a passport and how much it would cost and whether citizen papers are necessary?

A. Passports are issued by the Secretary of State, Washington, D. C. The fee is \$1. The application must be accompanied by an affidavit, the blank form for which can be obtained by writing to the Secretary of State. The passports are issued only to citizens of the United States.

W. P.—Was that portion of London now known as Whitefriars always so called?

A. Whitefriars was formerly known as Alsatia, a precinct in London which was for a long time an asylum for insolvent debtors and persons who had offended against the law.

W. F. K.—When and what was the lowest price paid for spot cotton (middling grade) on the Charlotte market since 1900? Did the staple sell for a lower price in 1898?

A. The lowest price ever paid for middling cotton on the Charlotte market was 4 1/2 cents on December 29th, 1904. The records prior to 1898 were destroyed by fire and the second query cannot be answered.

For a Sprained Ankle. A sprained ankle may be cured in about one-third the time usually required, by applying Chamberlain's Pain Balm freely, and giving it absolute rest. For sale by W. L. Hand & Co.

A. J.—What were the names of the "three wise men" who came to Bethlehem?

A. Their names are commonly said to be Jasper, Melchior and Balthasar. M. B.—What was the date of Robert Louis Stevenson's death?

A. December 8th, 1894.

K. L.—Is Opie Reed the author's real name or nom de plume?

A. Opie Reed is a real name. He was born in Nashville, Tenn., in 1850, and in early life was employed on several Southern papers. In 1883 he established The Arkansas Traveler, which he conducted about ten years.

J. F.—Is quicksilver found in so nearly the commercial form that it is liquid? (2) If not, from what is it got, and how?