

country of excessive rainfall; the long detour required for commerce; the instability of the governments and people through which they pass; these are some of the objections to the canals.

The strategic advantages of the Ship Railway are very important—Mexico and the United States together can protect the railway against any foreign power. Our navy can hold the approaches to the Gulf; there is a capacious and protected harbour in the contzaconcos on the Gulf and in Lake Superior on the Pacific, and two railroads leading into Mexico from the United States could quickly concentrate a large army at the Isthmus.

7,000,000 tons of freight are in sight for transmission over the railway in 1889. The railway can be built and equipped in four years' time. \$50,000,000 in cash will complete everything ready for business. The estimate in stock and bonds, allowing for all possible contingencies, is \$75,000,000.

Even with only 4,000,000 tons the net profit would be 14½ per cent. The beneficial results cannot be overestimated.

Industry, commerce, society and religion, in fact in all his relations, will man be benefitted.

The success of the projector of the Ship Railway in his other important works—iron clads during the war, the magnificent bridge at St. Louis, the Mississippi Jeaties and other works, gives standing to this new work and leads to confidence in the ability of Mr. Eads to carry it through to a successful conclusion.

The address, printed in full, is illustrated by plates of the plans and by maps of the world and the Isthmus.

FEED-WATER PURIFIER.

This is a device for removing impurities from the feed-water by submitting it to the same heat as the water in the boiler, by which means the impurities are precipitated, and prevented from entering the boiler.

The water is fed in at the upper pipe *D*, passes down and up the central pipe, as shown, being highly heated in its passage. It is then sprayed from the top of this central pipe, falling down over the spider-like projections by which it is subdivided and thoroughly subjected to the temperature due to the pressure of steam in the boiler, precipitating the foreign matter. The whole mass then passes down through the concentrating pipes shown in the lower section of the feeder to the mud-well at the bottom. The separation of the foreign matter from the water is here completed, the deposit remaining in the mud-well, from which it is from time to time blow off. The purified water rises and passes to boiler through pipe *C*.

The advantages claimed for this purifier are, that it will keep boilers from scaling, and that from feeding water free from scale-making ingredients, any scale that is on the boiler will be gradually removed that it will prevent forming, because purified water only enters the boiler; that there will be no leakage from unequal expansion and contraction caused from comparatively cold water coming in contact with the sheets; all the water entering the boiler will be of a temperature nearly equal to that of the water already in the boiler.

The purifier can be readily cleaned, either by washing or blowing out; by closing valves on pipes *B* and *C*, and opening blow-off *E*, it can be washed out, or by closing valve on *C*, and opening *E*, it can be blown out.—*Am. Mach.*

ELEVATOR INSPECTION.

We have frequently called attention to the fact that more people were killed by elevator accidents than by boiler explosions, and expressed the opinion that there was even more need of regular inspections of elevators than of boilers. At length the authorities in this city have stirred themselves in the matter to the extent of ordering that passenger elevators shall be inspected once each three months. According to the rules to be enforced, manufacturers of elevators must furnish the Superintendent of Buildings a list of the elevators made by them and put into buildings, and shall not permit them to be used until duly inspected. Any person employed to run a passenger elevator shall be over eighteen years old, sober and trust worthy and shall have had not less than one month's instruction in his duties.

This is all very well, so far as it goes; but, in taking account of passenger elevators only, it stops short of the desired end. Accidents from passenger elevators are of comparatively rare

occurrence. It is the ill constructed; out of the way, uncared for freight elevator that is dangerous to life; that never receives any attention from any one until it "lets go" some day with disastrous results. It is these elevators that especially need "inspecting," and to which the Bureau of Buildings should have its attention directed. Until this is done, elevator inspection will not amount to much.—*Am. Mach.*

A FEW FACTS REGARDING VACCINATION.

SIR,—In view of the dangers which now threaten us, I think the people ought to be informed in reference to certain facts in connection with vaccination. Many who think they are safe because, after the operation for vaccination they had a very sore arm and can show "a large scar," may find to their sorrow that they have only passed through what medical men have called the "spurious" or "imperfect" vaccination. Permit me therefore to point out to your readers the characteristics of the genuine and the spurious vaccine disease.

1st. In the genuine vaccine disease there is little or no inflammation until or after the third day from the time matter is inserted.

2nd. About the fourth or fifth day a small point of inflammation appears, which gradually enlarges, and in about two days later a small vesicle is formed, which is depressed in the centre, and without inflammation in the adjoining skin. The vesicle enlarges, remains circular, with a regular and well defined margin, more depressed in the centre, and a small crust begins to form in the centre of the depression by the seventh or eighth day.

3rd. Between the seventh or eighth days there is an aureola or blush of inflammation formed around the margin of the pustule.

The circle of inflammation enlarges, and frequently by the ninth day it will be two or three inches in diameter, but remaining circular. The crust in the centre grows darker, the turbid margin shining as if the lymph were assuming the character of pus.

4th. The vesicle generally reaches its acme by the eleventh day, when the surrounding inflammation begins to subside, first immediately around the pustule, and gradually declines towards the circumference, where it leaves at last a mere ring.

5th. The fluid in the vesicle becomes thick and turbid, and soon forms into a smooth crust of a dark brown mahogany colour. The crust, in many instances, does not loosen and fall off under three weeks. It leaves a permanent circle or cicatrix about five lines in diameter and a little depressed, the surface being marked by many little pits or indentations, denoting the number of cells of which the vesicle had been composed.

The constitutional symptoms attending the course of the vaccine disease are generally very slight, especially in children. In some instances there are chills and fever and headache, which may need some attention, though generally they soon subside without any treatment.

The glands under the arm are apt to be swollen and sore, and care should be taken to avoid lifting a child with the hands under its arms, as is the usual practice.

Characteristics of spurious or imperfect vaccination:—

First, there is generally considerable inflammation and raising of the skin, on the second day after the matter is inserted.

Second, the scabbing commences by the third or fifth day from the commencement of the inflammation, and runs its course in a much shorter time than genuine.

Third, there is no depression in the centre of the pustule; it is raised up high and has an irregular margin.

When the inflammation commences on the formation of the vesicle, and assumes an erysipelatous character early, with much swelling, and the pustule assumes a blue appearance, it should not be considered genuine. Genuine cowpox—that which was first considered the protection against small pox—was gotten by inserting the lymph from the udder of the cow or heifer. It is very fair to conclude that most, if not all the bad effects following vaccination have been when the matter has been used from the arm of some diseased or scrofulous person. The safe plan is to use only the lymph obtained from a healthy animal.

Only one pound in ten of what is sold as butter in Chicago, according to the Health Commissioners of that city, is the genuine unadulterated article.