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Contents:

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IS THE CAREER OF CHOLERA ENDED?

Two hundred years ago there were two great pestilences which from time to time smote the human race with sudden and wide-spread destruction, hurrying vast numbers to untimely graves, and filling the hearts of survivors with unspeakable terror. One of these was the small pox, the other was called the plague. The small pox yet lingers among us, and the plague is still well known in the southern countries of Europe, but both diseases have ceased their ravages as epidemics, and have been shorn of their terrors. The small-pox is made harmless by the curious process of passing the disease through one of our domestic animals. The plague has probably been banished by the general improvement in modes of living, though its cessation has been attributed to the introduction of the potato as an article of diet.

About forty years ago a new and strange pestilence made its appearance in Europe in the course of its desolating march from Asia, and it has since repeatedly filled the world with fear like that which of old accompanied the plague. But there now seems good reason to believe that epidemic cholera, like its two predecessors, has been conquered by the power of intelligence.

Among the many substances that are produced when bituminous coal is subjected to destructive distillation at that temperature which is required for the manufacture of illuminating gas, is a compound which has acquired the name of carbolic gas, though, as its properties are those of an alcohol and not those of an acid, a more appropriate name would be carbolic alcohol. It is this substance which seems to have given man control over the last and most terrible of the pestilences that have desolated the world.

The New York Board of Health, in one of their reports in 1865, made the statement that pestilences among men have generally been preceded by epidemics in cattle, and they regarded the prevalence of pleuro-pneumonia as one reason for apprehending a visitation of cholera. Besides their advent as harbinger and follower, there are other intimate relations between these two epidemics.

In 1849 it was announced that a microscopist in Michigan had discovered minute animalculæ in the fæces of cholera patients, but this discovery being American, had to wait, like anæsthesia, the Ruhmkorff coil, and so many other American discoveries, till it could be rediscovered or appropriated by some European pretender. When an Englishman, Mr. Beale, found similar animalculæ in the blood of cattle suffering with pleuro-pneumonia, the most eminent masters of science proclaimed the important discovery.

In the case of pleuro-pneumonia, Mr. Crookes passed the breath of diseased cattle through tufts of cotton wool, and produced the disease in healthy cattle by inoculating them with the matter thus collected. In a recent lecture, Dr. F. Crace Calvert declared his agreement with Mr. Crookes in the inference that the breath of the diseased cattle must have transferred to the cotton wool the germs of the animalculæ which Mr. Beale found in the blood.

As the presence of carbolic acid even in the form of vapor, and in extremely minute quantities, is death to all organic germs, it was inferred that by its use the propagation of pleuro-pneumonia from diseased to healthy cattle might be effectually prevented. The brilliant success of Mr. Crookes in the practical application of this theory, as set forth in the report of the Royal Commission, has already been published in our columns. Dr. Calvert, in the lecture above referred to, says that the spread of pleuro-pneumonia was arrested in Belgium and Holland, as well as in England, by the use of carbolic acid. There is no room left to doubt that pleuro-pneumonia in cattle can be controlled by carbolic acid: will this substance also stop the spread of cholera?

During the summer and fall of 1866 the cholera several times secured a foothold in this city, and every time it was stamped out by the Board of Health. Dr. Harris and other members of the Board regard carbolic acid as the most efficient agent which they employed. It was also used with similar success in several other of our principal cities. Dr. Calvert refers to numerous cases in England where the spread of the cholera was absolutely stopped by the same agent.

Whatever may be the theory of the disease, the numerous and rapidly multiplying facts give us at least a reasonable hope that the means have been discovered for stopping effectually the spread of Asiatic cholera, and that terrible pestilence will scourge the earth no more. If this should prove to be the case, the discovery must take rank as by far the most valuable and beneficent of any one that has been made in the nineteenth century—a century so prolific in great discoveries.

PLASTER MOLDS FOR THE CASTING OF LOW FUSIBLE METALS.

Plaster of Paris is one of the most useful substances employed in the arts. Its generic name is gypsum, and it is largely used as a fertilizer, the mineral being coarsely ground in a mill and scattered broadcast over the land, or plowed in. Its constituents are sulphuric acid, 46.3; Lime, 32.9; water, 20 8, the nitric acid and lime combined being its fertilizing properties. It is known under various specific terms: as gypsum, alabaster, marble, etc., owing to the varying proportions of its constituents. It is the substance which ornaments subterranean caves with brilliant stalactites and stalagmites, and is known in the arts frequently by the name of crystal. French clocks, so popular as parlor ornaments, have their supports and frames composed of selected specimens of this widely diffused mineral, some of which are almost transparent and most of which are translucent.

The use, however, of the substance as a fertilizer and as an ornamental material in the fine arts is, in its application, less extensive than in mechanical processes. Our dentists would find much difficulty in the progress of their business if plaster of Paris was rejected. In the taking of casts of the mouth, and of the living, as well the dead, for portraits and busts this substance is invaluable. It combines readily with water and dries rapidly, taking the minuest lines of the pattern and faithfully reproducing them. Combined with sand and lime it makes a durable, hard, and smooth cement used in Spain and France for floors and vaults.

In the use of plaster of Paris for metal molds our mechanics require some instruction. It is adapted to the casting of the low fusible metals, if the mold after being once made is properly prepared. To prepare these molds they should first be submitted to the action of the atmosphere for several hours, that the water mechanically combined with the plaster shall be driven off or evaporated; then, to expel the water chemically combined with the plaster, it is necessary that the mold should be exposed to a heat of at least 400° F., for about four hours to make it fit to receive the metal without cracking and ruining the casting. By the following table it will be seen what is the fusible point of various metals and their combinations. We quote from a table arranged by Prof. P. H. Vander Weyde, all the compositions of which we believe can be cast successfully in plaster molds.

Boiling water is 212° F. But some metals or compositions of metals melt or fuse at a still lower heat. For instance, a composition of 5 parts bismuth, 2 of tin, 3 of lead. and 1 of mercury fuses at 167° F.; 4 parts bismuth, 1 of lead, and $\frac{1}{3}$ mercury melts at 185° F.; 4 of bismuth, 1 tin, 1 lead, at 203° F.; 5 bismuth, 4 tin, 1 lead, 257° F.; 1 bismuth, 1 tin, 284° F.; 3 tin, 2 lead, 329° F.; 3 tin, 1 lead, 338° F.; Tin, pure, 428° F.; Bismuth 500° F.; Lead 617° F.

All these compositions and others may be cast successfully in molds of plaster of Paris. The condition is that the cast or mold should be allowed to dry thoroughly in the atmosphere or rather in a warm room and then be exposed to a heat of at least 400° for several hours. If the mold becomes red hot so that it is nearly transparent it will not receive injury if properly treated. Such molds should be allowed to cool gradually, when, if they have been properly managed it will be found they will give sharp and clean impressions of the metals they receive.

THE DETROIT DILEMMA.

We are indebted to Stanley G. Wight, Esq., one of the commissioners, for the sixteenth annual report of the Detroit Board of Water Commissioners for the year 1867. There is the usual amount of statistical information of merely local value, but one feature of the report is of general interest. We refer to the efforts of the commissioners in devising some way of preventing the ice from choking up the main inlet pipe. This pipe extends 150 feet into the river, and terminates in a bell-shaped mouth elbow, three feet in diameter, turned upward, in water twenty-five feet deep. Covering the end of the pipe is a boiler-plate strainer, perforated with half-inch holes, 144 to the square foot. Inside the shell of the strainer is a diaphragm plate with similar holes, and below this the strainer shell has four-inch holes, to allow the sand to pass through, so as not to bank upon the outside of the strainer. When the engine is pumping, the water is required to pass through the strainer holes at the rate of 120 barrels per minute. This is the full supply, but in extreme cold weather, under certain circumstances, it is with great difficulty any water can be obtained, in consequence of the accumulation of ice. The circumstances under which the difficulty occurs are, when the weather is cold and ice is forming in the lake above, and on the shores of the river, and the river is free from ice over the strainer. But when the river is covered with ice over the strainer, the difficulty does not occur at any degree of cold. The great difficulty occurs when the thermometer ranges from 7° or 8° to 18° or 20° above zero; but when the mercury rises above 20° the difficulty soon ceases. The greatest number of detentions, it has been observed, occurs at night, and when the sun is obscured by clouds, but when the sun is unclouded, no difficulty is ever experienced.

With the rapidly increasing consumption of water, the commissioners foresaw that the time would very soon arrive when it would not be safe to permit any detention to the pumping engines, and that this remarkable phenomenon must be solved and the difficulty overcome. The committee have adopted every accessible means of investigation to obtain suggestions and information on this subject. Attention has been called to it in published reports, and by the press. Men of science have been seen and corresponded with, and scientific associations have been requested to investigate the subject, but as yet no complete remedy has been discovered. As no experiments had ever been previously made, and the theory was so strongly presented that the trouble was wholly from anchor ice forming on the strainer, an opening was cut through the down-stream side of the strainer, and a self-acting door was hung, but this and the plan of suspending a line of booms so as to retain a covering of ice over it when the rest of the river was not covered, both failed to accomplish the object sought. The theory that the covering of the entire surface of the river by ice prevented radiation, and by that means the ice did not form on the strainer, was strongly urged; but, if so, any covering over the strainer would answer the same purpose. To test it, last summer submarine divers built a submerged platform of planks immediately over the strainer, but this proved of no avail, for the stoppages occurred at a higher temperature than before.

On the 29th of last December, when but a very limited supply of water could be obtained, divers went down, examined the strainer, and found that it and its surrounding piles, were one mass of ice particles collected into a mound some ten feet high and about fifteen feet in diameter, and that large quantities of minute crystals of ice were rapidly passing and adding to the mass already collected. Specimens of the ice were brought to the surface in a bag. It was in sheets and particles thin as paper, translucent, with sharp, pointed edges. A further examination developed the fact that the small amount of water the pump was then receiving came through the lower or down stream side of the strainer, this being the only point where the diver could approach it, and which was found but slightly covered with ice. Having ascertained the existing state of affairs, the commissioners felt confident that a remedy could now be provided, and with a large piece of canvas they had the strainer completely covered and encircled, except on the down-stream side, but temporary relief only was afforded by this expedient, and another descent to the strainer was undertaken. The diver went down and found out this very important fact, that with the temperature of the atmosphere at 29°, the water at the surface was 33°, while at the bottom of the river it was 35°. At this descent much less ice was found on the strainer and its surroundings than at the first time. The lower side was clear, but on the upper side the action of the current had worn the ice into elongated cones, pointing up stream. At this time the pump was receiving a full supply of water. About three hours later, the diver again descended (thermometer 33°); he found the ice had entirely disappeared. The wooden platform was removed, since which time no trouble was experienced, until the surface ice of the river began to move, when there was a few hours during which no water could be obtained, but with this exception no further delays have since occurred.

It is clearly proved that ice particles are ever present in the river, and are continually passing down by the action of the current, collecting upon whatever obstructions they happen to meet with in their passage. The commissioners, therefore, advise the entire removal of all spiles and other substances adjacent to the strainer, believing that with nothing but the smooth dome of the strainer for these particles to lodge upon, the quantity that will accumulate cannot very seriously prevent the flow of water to the inlet pipe.

RELIEF TO MANUFACTURERS.

Probably no measure proposed in the present Congress is of more importance to the manufacturing and mechanical interests of the country, and to the country at large, than the bill reported by Mr. Schenck from the Commitee of Ways and Means and passed by the House of Representatives by a vote of one hundred and twenty-two, to two. It will also undoubtedly receive the sanction of the Senate and the President, when it will become a law, to take effect on the first of next May. Its most valuable provision is the total repeal of section 95 of the internal revenue law, which taxed and re-taxed manufactured articles at almost every step of their progress of manufacture. It repeals all revenue tax on manufactures of every description except on the manufacture of gas, petroleum, lubricating and illuminating oils, liquors, tobacco, and snuff.

When this bill, becomes a law, it will give an impetus to business which the country greatly needs, and remove a load grievous to be borne, from the shoulders of our industrial clases.

Rumford Chemical Works.

In the list of patents for the week ending March 11th, we notice an unusual number granted to Messrs. Horsford & Wilson, President and Treasurer of the Rumford Chemical Works, Providence, R. I., upon improvements relating to the manufacture of phosphoric acid. This article, which is the basis of the self-raising flour so largely manufactured by