

SMALLPOX.

There are few diseases that possess more interest, both for the physician and the public, than smallpox, and hence we take pleasure in laying before our readers a description of the treatment which has been used for many years with great success by Dr. Alban S. Payne, late Professor of Theory and Practice in the Southern Medical College, Atlanta, and Honorable Fellow of the Medical Society of Virginia, etc. The following is an abstract made by his permission from one of his lectures on smallpox.

Prof. Payne states that as early as 1846, when at the Smallpox Hospital in New York city, he noticed that the primary or initial fever of smallpox could be detected by the pulse before any other symptom appeared. This pathognomonic pulse is one peculiar to smallpox, a pulse *sui generis* difficult to describe, but recognizable by any physician who will patiently and carefully investigate the subject until his finger becomes educated. When once recognized it can never be forgotten, any more than a physician who has once learned to detect the hemorrhagic pulse could forget its peculiar thrill imparted to his educated finger.

Having learned to recognize the initial fever by its peculiar pulse, he next proceeds to vaccinate. If this is done within ten or twelve hours after inception of the initial fever the patient will have slight indisposition, without a sign of eruption, and as positive exemption from a recurrence of the disease as if he had had it in the most malignant form. The most remarkable feature about the whole thing is that if the patient is vaccinated early after the initial fever sets in, he may be then allowed to go where he pleases without fear of giving the disease to others. The ingrafting of the vaccine matter upon the primary variolous fever seems to have the power to destroy its ability of reproduction or propagation entirely. Another peculiarity is this: If an unprotected patient is vaccinated before the inception of the initial fever, and the vaccine takes, but does not prevent, only modifies the disease, the eruption will be varioloid in its appearance and characteristics. But if vaccinated after the commencement of the initial fever, and too late to entirely prevent an eruption, the eruption will resemble in size and other characteristics the smallpox eruption, it matters not whether there is one or a hundred pimples. There is as great a difference in the appearance of the varioloid eruption and the smallpox eruption as there is between gray and yellow.

Dr. Payne divides smallpox into confluent, semi-confluent, discrete, modified, and manipulated, the latter being a term of his own invention. In 1873 smallpox broke out in his neighborhood, in Virginia, and was of the variety known as *variola nigra*, and when not modified by some benign influence was invariably confluent. Those in and around Manassas were of the same variety. Being called to attend a colored chambermaid who had but recently aborted, and who was in a room over the kitchen of a large hotel near his own dwelling, he recognized in her the pulse peculiar to smallpox, and the next day the eruption appeared. In regard to isolation he says: "I saw it would never do to remove this woman, and I determined to isolate the case and abide the consequences, be they what they might. If I have her removed, I said, the poor woman must die, and the prevailing winds will blow the virus for miles down the valley below, and the disease will spread beyond control. But by isolating the case I have every confidence in my ability to check it. But should she die, she must be removed for burial (and that she will die there is a strong probability), and my plans will be defeated, and I shall incur the reproach of all my friends and neighbors. These were grave considerations, and I was by no means reclining on a bed of roses. Firm in faith of the greatest good to the greatest number, I never faltered. I said to myself, if she dies I will wrap her from her toes to the crown of her head in double linen, and with the aid of some one who has had the smallpox I will bury her." This was January 11, 1873. By the 30th she was convalescent, having had it in the semi-confluent form. Three persons who were in the room at the time were ordered to report to the doctor twice daily. One of them gave the peculiar pulse on the 24th and was then vaccinated. He was indisposed for two days, arm sore, but no pustules appeared. The others, who had been vaccinated before, did not take it.

Another case described by Dr. Payne occurred in January, 1873. He was called on the 24th to see W. J., suffering from an eruption which he recognized as varioloid. He vaccinated the father and two sisters, but an old aunt refused to be vaccinated, although she had not been vaccinated in many years, and she died on the 10th of February. The next day, January 25, he found the brother at home with the peculiar pulse. As he was unprotected Dr. Payne vaccinated him at once, and the very next day his arm looked as if vaccinated eight days before; it rapidly became sore; he was indisposed for two or three days, and recovered without a single sign of eruption.

In another case of an unusually poor and shiftless colored people, the whole family of eight persons, of all ages and both sexes, occupied a house that had only one room, in which the cooking, washing, and everything else had to be done. Good air and cleanliness were impossible. The father suffered from a very malignant case of varioloid and was terribly scarred up, but the rest of the family, none of whom had ever been vaccinated before, were vaccinated after the initial fever began, and escaped with slight attacks. One of the women had twenty pustules, but no scars; another had two or three pimples; a third had two on her face and one on the bottom of each foot; a fourth had no eruption. The

boys had about twenty pustules each. We might quote numerous other cases of whites and blacks where vaccination after the initial fever had set in was followed by the arms becoming rapidly sore, malaise continued for a day or two, and rapid recovery with slight eruption or none at all.

On the 28th of January Prof. Payne's own family were exposed to smallpox, and the initial fever revealed itself in all their pulses on February 2. He revaccinated them; their arms became rapidly sore; there was very slight malaise for two days, and convalescence without any eruption.

Let us suppose a house located in the middle of a large prairie, and we see the grass burning at a distance, but the flames bending straight in the direction of the house. Would it not be the most sensible thing we could do to fight fire with fire, and, starting a counterfire, burn the grass around the house so that when the approaching flames reached the ground burned over the fire would have to stop for the want of combustible material and save the house? This is just what Dr. Payne proposes to do in treating smallpox. He recommends isolation, and giving the smallpox to all near by and likely to be exposed to its direful influences. Visit the parties twice a day, and as soon as the fever of inception is recognized vaccinate them, and the disease must stop for the want of material to feed upon. Hauling around to hospitals and pest houses is the best way to spread the disease.

Prof. Payne has tried his plan in more than a hundred cases, extending over a period of thirty-four years, without a failure. He now calls upon medical men to repeat his experiments and report on them.

STEAM BOILER NOTES.

It seems from a letter to the *Railroad Gazette* from London (England), date of October 1, that Glasgow locomotive builders almost invariably make their boilers with longitudinal butt joints, having inside and outside covering plates quadruple riveted. For the transverse or circumferential seams the practice is about equally divided between butt joints with outside covers only, with two rows of rivets, and the ordinary single riveted lap joint. The longitudinal joints are invariably placed above the water line. The one that joins the ends of the plate to which the dome is attached is generally put directly under the dome, and in some shops this is made a welded joint. The shell plates are thicker than those used by American builders, being from seven-sixteenths to nine-sixteenths of an inch thick. Rivet holes are sometimes drilled, other times enlarged from smaller punched holes by reaming, but neither of these methods is as common as one would infer from reading English engineering journals. Builders who drill the rivet holes do not complain of the extra cost of doing it, while those who are not prepared, suitable facilities being absent, to drill are inclined to exaggerate the cost of drilling or reaming over that of punching. In all these respects the writer of the letter referred to seems to approve of the English methods of locomotive construction.

It may be doubted whether with our superior American plates we may not make as good boilers by punching as the English can by drilling. Experiments showing that American punched plates have as much remaining strength as the same plates have with drilled rivet holes have been made, and in some exceptional cases punched bars have shown greater strength than drilled ones. Notable among such experiments are those made by Hoopes and Townsend, of Philadelphia, and published in the *Railroad Gazette* some time prior to 1880. It is claimed that soft tough iron will be somewhat compressed and strengthened just around the hole if proper tools are used to do the work, while hard, brittle, and granular iron will be injured by crumbling under the action of the punch; such plates are stronger when drilled; they are, however, unfit for boiler construction.

A question may also be raised as to the method of placing the dome upon a longitudinal seam. Much depends on the skill and faithfulness of the workmen in fitting the dome flange to the true cylindrical form of the shell, and it is probable that a riveted seam would tend to complicate the work and cause imperfections that would be less likely to occur in fitting the flange to a smooth and perfectly rolled portion of the plate at some distance from the seam. Therefore, unless it can be shown that the dome actually strengthens the seam, which is probably the notion that induces this practice, it will be an open question whether or not it is advisable to follow the plan.

With a perfectly smooth welded seam, which can be rolled into a perfect cylindrical form after being welded there can be no objection, provided always that the dome flange also coincides with the true cylinder of the same radius as the exterior of the shell. Slight variations even in the form of these parts when separate become important when riveted together; the dome flange, being imperfect and rigid, will distort the shell, and when acted upon by an internal pressure of 150 pounds to the square inch, tending to cause sections made on central planes cutting the envelope in any and all directions into true circles; in other words, to make the envelope a hollow globe, will place the parts in an unnecessary and exaggerated state of tension. The letter says:

"The method of supporting fire-box crown plates seems to be about equally divided between the system of direct staying with screw-stays, and cross bars or 'girder-stays,' as they are called here, slung to the outside shell or roof of the fire-box. Both methods are very unsatisfactory, and in a great measure unmechanical."

It will probably appear on carefully studying this subject that the thrust of the expanded furnace acting through rigid

stays, which are not only slings but also struts, has a greater effect on the shell than the internal pressure itself; moreover, the thrust tends to distort while the pressure tends to restore the supposed true curve, and these antagonistic forces not being always evenly balanced cause motion, cross bending, and tensions concentrated in limited areas, resulting in grooving, which is simply an indication that the part grooved has become a hinge upon which the adjacent parts turn, exposing the disturbed structure of the metal to the chemical—meaning simply the corroding—effect of the steam or water, either of which, if they are moist and contain air or free oxygen, as they always do unless specially deaerated, will almost equally cause grooving of a bent or over-strained plate or brace inside of a steam boiler.

At a late meeting of the Common Council, the Detroit, Mich., inspector of steam boilers reported his total receipts for the month of October as \$886.

About five hundred boilermakers of Detroit recently struck for an increase of twenty-seven cents additional pay per diem. The Union No. 3, of the United States, which includes the Detroit boilermakers, addressed a circular to their employers two or three months ago, and lately they sent a letter to every employer, notifying them that they would not accept anything less than the increase demanded. It is also understood that none of the manufacturers will reply to the document. It is a fact that with very few exceptions all the boilermakers in the city have already quit.

It appears from a late number of *L'Ingenieur-Consell* that the Belgian Association for the Surveillance of Steam Boilers has made a report showing that they have two thousand boilers under inspection, and that during the existence of the association it has had but two accidents. A clause has been lately added to its rules to the effect that its responsibility will cease on notification of the discovery of a dangerous defect in any member's steam boiler till such time as the defect shall be repaired in accordance with its directions.

By the force of the explosion at the Alvarado Sugar Mill, Cal., on September 27, the second boiler was rendered useless; the roof of the boiler house was blown to pieces and scattered in every direction, and the main mill was ignited by the flames.

RESIGNATION OF THE COMMISSIONER OF PATENTS.

In the resignation of the Commissioner of Patents, Mr. Edgar M. Marble, the service loses an officer that can ill be spared.

Under his administration the business of the office has been conducted with commendable promptness and impartiality, and much has been done to increase the efficiency of the service and its value to inventors and patentees.

It is a pity that the government will not deal more liberally, not to say justly, with the Patent Office, and through it with inventors and the public at large. While the office is much more than self-sustaining, indeed is annually turning over a large sum to the treasury, it cannot for any length of time command, for it is not allowed to adequately pay for, the service of men who, like Mr. Marble, have exhibited unusual executive ability.

As a consequence the office now loses a chief whose temper and capacity and exceptional knowledge of patent law, not less than his hearty sympathy with the spirit and purpose of the patent system, have proved him to be the proper man for the place.

It is not easy to find men so well fitted for the severe, complicated, and, at the same time, delicate duties of the Commission of Patents. For such service, more especially in an office with large surplus revenue, the government ought to be willing to pay as liberally as business corporations can, and give as ample a guarantee of permanence in the employment. We understand that Mr. Marble has accepted more lucrative employment as Land Commissioner for the Northern Pacific Railroad Company.

Steamboat Inspection

The annual report of the Supervising Inspector-General shows that the tax collected from licensed officers of steam vessels amounts to about \$7.50 *per capita*, which appears to be largely in excess of the needs of the inspection bureau. This year alone the surplus is nearly \$89,000, while the accumulated surplus now lying idle in the Treasury amounts to a total of about \$650,000, which Gen. Dumont thinks would suffice for the expenses of his department for a term of fifteen years, if the tax should be reduced about 50 cents for each license per annum. He therefore recommends that Section 4,458 of the Revised Statutes be so amended as to require from each master, engineer, pilot, and mate, the sum of 50 cents for every certificate granted.

His report shows that during the five years ending with 1881, 22,132 steamers were inspected, 932,500,000 passengers were carried, and that 1,053 lives were lost by steamboat disasters, which is an improvement over the preceding five years, when less work was done at a greater cost, and a less number of passengers were carried with a greater loss of life from disasters.

Ball Holes in Glass.

Reviewing the evidence in the second trial of Jesse Billings, Jr., Dr. Lewis Balch, of Albany, N. Y., sets it down as established that a ball fired through glass may make a hole enough smaller than the full size of the ball before firing to prevent an unfired ball of like caliber passing. In an experiment with a baseball it was found that the hole made was too small by one-third to let the ball be passed through.