

Prevention and restriction of small-pox.

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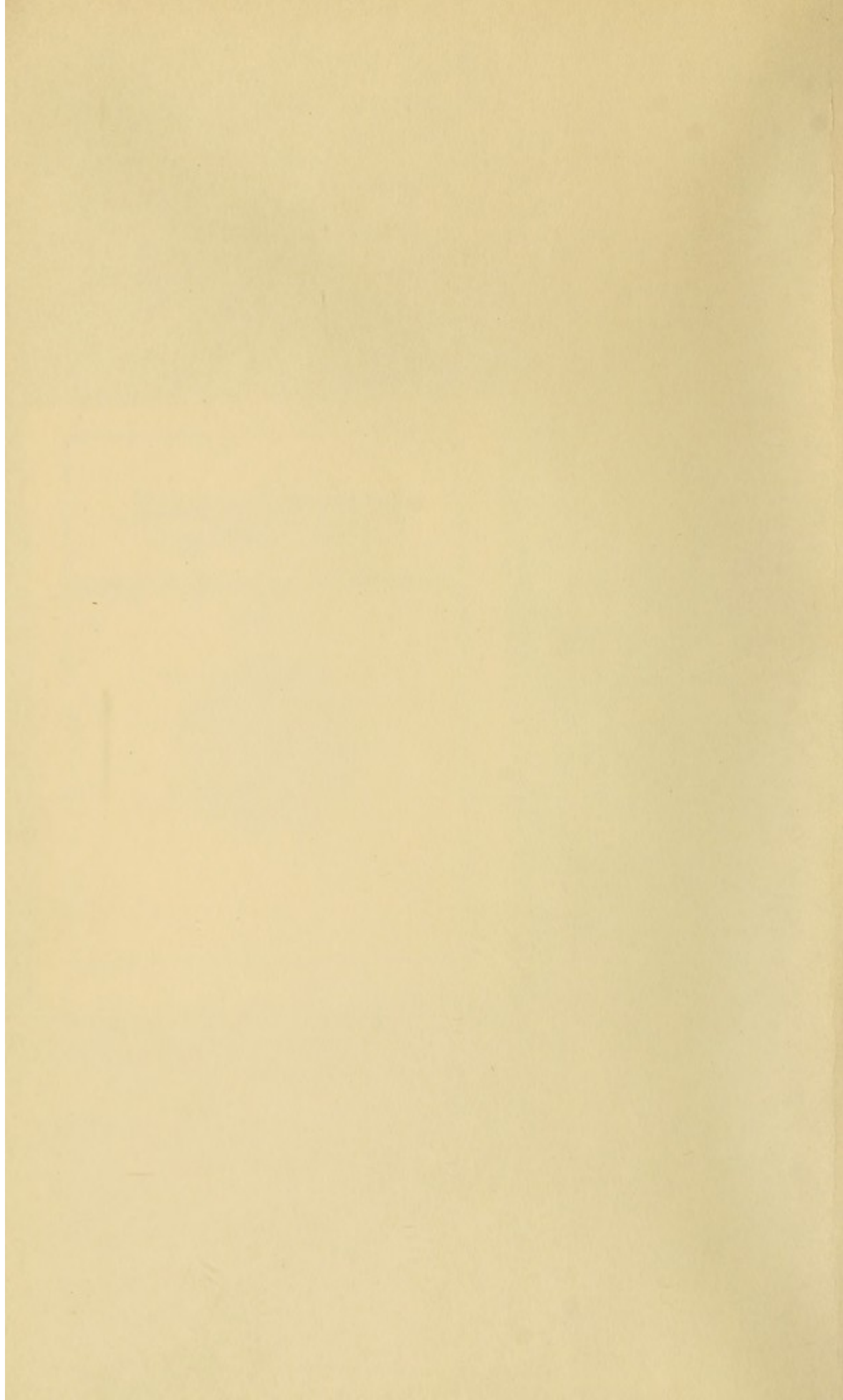
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PREVENTION AND RESTRICTION OF SMALL-POX.

[54.]

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PREVENTION OF SMALL-POX.

1. **Small-pox a preventable disease.**—It has long been known that small-pox can be prevented or modified by vaccination. It is now believed that a wide-spread epidemic of the disease can be attributed only to an equally wide-spread ignorance or willfulness concerning small-pox and its prevention by vaccination. No intelligent person need have small-pox.

2. **Why vaccinate.**—Because unmodified small-pox is so deadly a disease, and so often disfigures and enfeebles those who recover,* and because by traveling or by travelers, by articles received in the mail or from stores or shops, or in various other ways any one at any time may without knowing it be exposed to small-pox, it becomes important so far as possible without injury to health to render every person incapable of taking the disease. This may be done so perfectly by vaccination and revaccination with genuine bovine vaccine virus that no question of ordinary expense or trouble should be allowed for a day to prevent the careful vaccination of every man, woman, and child in Michigan, and the revaccination of every one who has not been vaccinated within five years. It is well established that those who have been properly vaccinated are far less likely to take small-pox if exposed to it, and that the very few who have been properly vaccinated and have small-pox have it in a much milder form and are much less disfigured by it than those who have not been thus vaccinated. The value of vaccination is illustrated by the following facts:—

On March 13, 1859, Dr. E. M. Snow, of Providence, R. I., found, in a cluster of seven houses, twenty-five families, and in these families ten cases of small-pox, all apparently at about the same stage of the disease. In the same families there were twenty-one children who had never been vaccinated. The ten cases and the remaining members of the families including the twenty-one children were quarantined at home, and the children were all vaccinated and compelled to remain with the sick. Several other cases of small-pox occurred in persons previously exposed, but not one of the twenty-one children referred to had the slightest touch of the disease.

* "Among those who outlive it, many either totally or partially lose their sight or hearing; many are left consumptive, weakly, sickly, or maimed; many are disfigured for life by horrid scars, and become shocking objects to those who approach them. Immense numbers lose their eyesight by it."—*La Condamine*.

In Sweden the average number of deaths in each year from small-pox per one million inhabitants was,—

Before the introduction of vaccination (1774–1801), 1,973.

During the period of optional vaccination (1802–1816), 479;

And during the period of obligatory vaccination (1817–1877), 189.

Vaccination was introduced in England near the beginning of the present century, and since 1853 compulsory vaccination has been attempted. In England the number of deaths in each year from small-pox per one million inhabitants was,—

At the close of the last century, 3,000;

From 1841 to 1853 (average), 304;

From 1854 to 1863 (average), 171.

In the Bavarian army revaccination has been compulsory since 1843. From that date till 1857, not even a single case of unmodified small-pox occurred, nor a single death from small-pox.

During 42 years of duty, Dr. Marson, physician of the London small-pox hospital, has never observed a single case of small-pox in the officers and employees of the hospital, who are revaccinated when they enter the service, and who are constantly exposed to the infection.

“Out of more than 10,000 children vaccinated at Brussels with animal lymph, from 1865 to 1870, and who went through the terrible epidemic of small-pox which in 1870 and 1871 frightened the world, not a single one was, to my knowledge, reported as being attacked by the disease. The same immunity was shared by those—a much larger number—whom I had revaccinated, and who at the same time were living in epidemic centers.”—Dr. Warlemont, of Brussels.—[North Carolina Medical Journal, January, 1880. Vol. v., p. 2.]

3. Who should be vaccinated.—Everybody, old and young, for his own interest and that he may not become a breeding-place for the distribution of small-pox to others, should seek that protection from small-pox which is afforded by vaccination alone. It is believed that all persons except those mentioned in the following paragraph may, if the operation is properly performed, at the proper time, and with pure bovine virus, be vaccinated with perfect safety to themselves. Even those who have had small-pox should be vaccinated, for otherwise they may take the disease; and it seems to be proved that a larger proportion of those who have small-pox a second time die than of those who have the disease after vaccination.

4. Who should not be vaccinated.—Unless exposure to small-pox is believed to have taken place, or likely to take place, teething children, pregnant women, persons suffering with measles, scarlet fever, erysipelas, or susceptible to and recently exposed to one of these diseases, persons suffering with skin disease or eruption, and in general feeble persons not in good health, should not be vaccinated. In all cases in which there is any doubt as to the propriety of vaccinating or postponing vaccination, the judgment of a good physician should be taken. The restriction as to vaccinating teething children makes it important that children should be vaccinated before the teething process has begun, because small-pox is very much more dangerous than vaccination. Small-pox is exceedingly dangerous to pregnant women.

5. When should a person be vaccinated.—The sooner the better, as a rule, and especially whenever there is much liability of exposure to small-pox. Children should be vaccinated before they are four months old; those who have never been vaccinated, should, with the exceptions previously made, in paragraph 4,

be vaccinated at once. Because the vaccination often loses its protective power after a time, those who have been vaccinated but once or twice should, in order to test and to increase the protective power of the former vaccination, be vaccinated again and as often as the vaccination can be made to work. For the first three or four scars the protection afforded is believed to be somewhat in proportion to the number of good scars, conditioned always that the scars be the result of a proper vaccination with genuine vaccine virus. In general, to insure full protection from small-pox one should be vaccinated as often as every five years. It has been found that of those who have small-pox, the proportion of deaths is very much less among those who have three or four good vaccination scars than among those who have but one scar.

Vaccination as late as the second day after known exposure to small-pox, has prevented the small-pox; vaccination the third day after exposure has been known to render the disease much milder than usual, and, in a recent case in Iowa, vaccination on the seventh or eighth day after exposure to small-pox ran a partial course and was believed to have modified the attack of small-pox, which however, it did not wholly prevent.


6. **With what should one be vaccinated.**—Virus taken from the arm of one vaccinated a second time is worthless because unreliable. Virus dissolved and carried about between glass slips in the pocket of the vaccinator is liable to contamination and fermentation; bovine virus dried on ivory or quill points is preferable. It should be remembered that a vaccination which does not produce a vaccine vesicle, while it affords but little or no lasting protection against small-pox, may prevent subsequent vaccinations from working well and becoming protective. For this reason it is important to use only virus from reliable sources and free from contamination or decomposition. In a majority of cases, if the virus be taken at the proper time (eighth day after vaccination) from the arm of a healthy child having no taint of a hereditary or communicable disease, such as scrofula, consumption, syphilis, erysipelas, scarlet fever, etc., and undergoing the action of its first vaccination, and if a properly cleaned lancet be used, no harm will result to the person vaccinated, and a good vaccination may be secured. This method involves rupturing the vesicle on the arm of the child from whom the virus is obtained, and this is objectionable because it may interfere with the complete development of its vaccination. But because harm has sometimes resulted from the use of virus taken from another person, because it is often impossible to tell whether a child has pure blood and is free from every disease, because it is so easy to obtain pure and fresh bovine virus, and because such bovine virus is efficient, it is better in all cases to use only the pure and fresh bovine virus.

Reasons for preferring bovine virus to humanized virus may be given as follows:—(1.) By the use of the bovine virus there is secured a more perfect or typical development of the vaccine disease; and hence it may fairly be inferred a greater protection against small-pox. (2.) With the bovine virus and with a clean lancet, and with clean surroundings, there is no danger of communicating syphilis. (3.) The bovine virus is far more effective than the humanized virus in revaccination; and where the humanized virus fails and the bovine virus works it is probable that there was susceptibility to small-pox which the humanized virus did not remove but which has been removed by the bovine virus. (4.) Greater care can be taken in the propagation of bovine virus, a greater supply can be always at command, and always, but especially in times of urgent danger from small-pox people can have a better guarantee that they are vaccinated with genuine and pure vaccine virus.

7. **By whom should one be vaccinated.**—The operation of vaccination should be performed always by a competent and responsible physician, or by some one whom he has instructed and recommends to perform the operation. To try to vaccinate one's self or one's family is poor economy, for it often results not only in a waste of money and of time but in a false and dangerous feeling of security. To trust to vaccination by nurses and midwives is equally foolish. A well-educated and experienced physician has the skill, and the special knowledge necessary to the best judgment on all of the questions involved, without which the operation may be a failure or worse than a failure. In work of this kind the best is the cheapest, whatever it costs.

8. **Where to obtain fresh and pure bovine virus.**—Dr. E. L. Griffin, of Fond du Lac, Wis., by a series of inoculations of young heifers propagates virus of the Belgian stock of cow-pox, obtained from Dr. Warlomont, director of the government vaccine establishment of Brussels. This virus, so far as known, never has passed through the human subject. It is stored on ivory points, each of which holds enough virus to vaccinate one person, and should be used only for one person. Ten points are sent by mail for one dollar; and if used according to the directions of Griffin's circular within ten days of the receipt of the package their efficiency is guaranteed by him. Dr. Henry A. Martin, of 27 Dudley St., Boston, Mass., who claims the honor of being the first propagator of bovine virus in the United States, propagates virus of the Beaugency stock. Both Dr. Griffin and Dr. Martin are believed to be reliable propagators of bovine vaccine virus. By request of the Michigan State Board of Health, Dr. George E. Ranney, of Lansing, Mich., supplies to persons in Michigan ordering through him, the virus propagated by Dr. Griffin, at Dr. Griffin's prices, the money to accompany the order.

9. **Where should vaccination be performed.**—In a room or place free from persons suffering from disease, and from dust or vapors which may convey to the scratched surface germs of any communicable disease; certainly not in or near a room where there is erysipelas, nor in the presence of one who has just come from a person sick with erysipelas, diphtheria, or scarlet fever.

10. **How to vaccinate.**—In remote places it is sometimes necessary to vaccinate persons who are practically beyond the reach of a competent physician. For the benefit of such, and not as an encouragement to others to dispense with the services of a skillful physician, the following suggestions are made as to the best method of vaccinating. As a rule the most convenient place for vaccination is found to be on the outer surface of the left arm, about one-half or two-thirds the way up from the elbow to the shoulder. An infant which its mother carries on her right arm should be vaccinated on its right arm in order to avoid rupturing the vesicle by pressure against its mother. With a sharp-pointed and perfectly clean instrument (lancet) make six parallel scratches, barely sufficient to make a show of blood, but not to cause bleeding. Directly across these scratches make four or five similar scratches, so that the scarified place shall be as large as a split pea, and something like this illustration:  If blood flows, wait, and wipe it off before applying the lymph. The virus is at and near the pointed end of the ivory carrier. Moisten the lymph upon the ivory point with half a drop of pure cool water smeared over it with the lancet. Then *rub the point over the scarified surface briskly for a minute so as to lodge the granules in the abraded surface.* The lymph which may be deposited on the sound skin should be scraped upon the scarified place and allowed to dry there. When the arm is dry return its ordinary clothing,

between which and the arm a loose, soft cloth may be fastened. Do not put on a tight bandage or any plaster. Let no saliva touch the scratched place, neither to affix a plaster nor in any way. When an ivory point has been used throw it in the fire. Except there is urgent necessity, do not use the same point on two persons, and not then if there is danger of communicating disease. Vaccination sometimes fails because the arm is not well scarified and the virus is not thoroughly rubbed into the scarified surface. A skillful vaccinator can generally use sufficient care to insure success in a susceptible person. Never cut entirely through the skin. Virus should not be inserted under the skin. Except with young children, and with feeble persons, for whom only one place is recommended, two or more places an inch or more apart may be scarified and vaccinated.

11. **After vaccination.**—Let the vaccinated place alone. Do not scratch it or otherwise transfer the virus where it is not wanted.

12. **Common appearances after vaccination.**—For a day or two nothing unusual should appear. A few days after that, if it succeeds regularly, the skin will become red, then a pimple will form, and on the pimple a little vesicle or blister which may be plainly seen on the fifth or sixth day. On the eighth day the blister (vesicle) is, or should be, plump, round, translucent, pearly white, with a clearly marked edge, and a depression in the center; the skin around it for about half an inch is red and swollen. This vesicle and the red inflamed circle about it (called the areola) are the two points which prove the vaccination to be successful. A rash, and even a vesicular eruption, sometimes comes on the child's body about the eighth day, and lasts about a week; he may be feverish, or may remain quite well. The arm may be red and swollen down as far as the elbow, and in an adult there will usually be a tender or swollen gland in the armpit, and some disturbance of sleep for several nights. The vesicle dries up in a few days more, and a crust forms which becomes of a brownish mahogany color, and falls off from the twentieth to the twenty-fifth day. In some cases the several appearances described above may be delayed a day or two. The crust or scab will leave a well-marked, permanent scar.

13. **Signs of successful revaccination.**—When a person who has been once successfully vaccinated is afterwards revaccinated there sometimes results a vesicle which, as regards its course and that of the attendant areola, cannot be distinguished from the perfect results of a primary vaccination, and this is more likely to occur if bovine virus is used. But often the result is modified by the influence of the previous vaccination, no true vesicle forms, but merely a papular elevation surrounded by an areola; and this result having attained its maximum on or before the fifth day, afterwards quickly declines. Or, if a vesicle forms, its shape is apt to vary from that of the regular vesicle, and its course to be more rapid, so that its maturity is reached on or before the sixth day, its areola declines on or before the eighth day, and the scabbing begins correspondingly early. In either case the areola tends to diffuse itself more widely and less regularly, and with more affection of the areolar tissue than in primary vaccination, while the itching and feverishness may be present much the same as in primary vaccination. When the results of a revaccination are not well-marked, protection should not be presumed unless the same virus is proved to be efficient in a primary vaccination.

14. **What to do during and after vaccination.**—Do nothing to irritate the eruption, do not pull the scab off, when it drops off throw it in the fire. When the eruption is at its height show it to the doctor who performed the

vaccination. If it is satisfactory, ask him for a certificate stating when and by whom you were vaccinated, whether with bovine or humanized lymph, in how many places and with what result at each place. When the arm is healed, if the vaccination did not work *well, be vaccinated again and as soon as possible*, and in the best manner possible. This will be a test of the protection secured by the former vaccination, and will itself afford increased protection. Do not be satisfied with less than four genuine vaccine scars, or with four if it is possible to secure more than four. This vaccination a second or third time in close succession is believed to be hardly less important than vaccination the first time, and hardly less valuable as a protection against small-pox. Without doubt many persons are living in a false sense of security from small-pox because at sometime in their lives they have had a little sore on their arms caused by a supposed or a real vaccination, or because an imperfect vaccination failed to "work," or because they were successfully vaccinated, or had the varioloid, or the unmodified small-pox many years ago. Until small-pox is stamped out throughout the world so that exposure to the disease shall be practically impossible, the only personal safety is in such perfect and frequent vaccination that one need not fear an exposure to small-pox through the recklessness of the foolish. Statistics abundantly prove that among the unvaccinated, small-pox has lost none of the deadly power which made it such a terror to former generations.

15. Make a record of your vaccination.—Do not fail to procure and preserve the certificate mentioned in the preceding paragraph, and also to make a personal record of the facts with regard to any vaccination of yourself or in your family. From it you may sometime learn that it is ten years since you or some member of your family was vaccinated, when you thought it only five.

16. Vaccination before admission to the schools.—In some places, and with good results, the board of education has made the possession of a certificate signed by some competent physician, stating that the child has been successfully vaccinated within a given number of years or months, a condition to admission to the public schools. Such a regulation seems to be one of the most efficient means of securing a general vaccination of the young people.

17. Corporations and large business firms may well prevent interruption of their business by small-pox by requiring employees to exhibit certificates of successful vaccination, and of revaccination.

18. Do not Delay to be vaccinated.—By setting about it at once there will be time to secure pure and fresh vaccine virus, and neither sickness nor haste need prevent a successful vaccination. But if one puts it off, he may suddenly be called away on an unexpected journey in which he may incur greater risk of exposure to small-pox, or small-pox may appear in his vicinity and for want of time to procure reliable vaccine virus he may be compelled to accept vaccination with virus neither fresh and active nor of known purity; and vaccination with inferior virus, while it affords but little protection against small-pox, may be a hindrance to successful vaccination with the best virus; or by his delay he may contract small-pox itself, with all its dangers and with an expense many times larger than the cost of thorough vaccination.

19. Small-pox occurs at all seasons of the year, but as a rule is most prevalent in cold weather. It has been suggested that this may be in part due to a lack of ventilation in winter, by which the poison becomes more concentrated, and to the greater irritation and rawness of the throat and air-passages caused

by the cold, dry air and by the more abundant ozone in winter, the sore throat supplying a place where small-pox may easily be inoculated; it is known also that in a warm, moist air vaccine virus decomposes more readily than in a cold, dry air, and the same is probably true of small-pox virus. This greater liability to small-pox in winter makes it important that one should not wait till winter and its dangers have come before being vaccinated, and also that he should not suffer the winter to pass without being vaccinated.

20. **Small-pox not spontaneously generated.**—It is believed that neither small-pox nor any other strictly contagious disease is originated in Michigan, and that small-pox may in great part be kept out of the State if proper measures are taken, such as the systematic inspection of immigrants and travelers and the isolation and disinfection of all infected material.

21. **Premises.**—Privies, cesspools, waterclosets, drains, gutters, and all other such places liable to receive the contagium of a disease should be frequently and liberally treated with the copperas solution mentioned in paragraph 9, page 9.

22. **Rags.**—No person should handle old clothing or rags without taking precautions to prevent the spread of communicable diseases. Children should not be allowed to go near a rag-gatherer's collection, nor into the rag-rooms in paper-mills or store-houses.

RESTRICTION OF SMALL-POX.

When small-pox appears in a place it is generally possible to restrict it to the first case or set of cases. Five things should immediately be done, and several other things should without fail be done in their proper order, somewhat as follows:—

1. **Notice to the local board of health.**—The house-holder within whose family a case of small-pox occurs, and the physician called to treat a case of small-pox should at once give notice thereof to the health officer (or to the local board of health), as required in townships by sections 1734 and 1735 of the compiled laws of 1871, and in cities and villages by section 1740 of the compiled laws of 1871, as amended in 1879. Sections 1734 and 1735 (sections 43 and 44 of chapter 46), compiled laws of Michigan, 1871, are as follows:—

(1734.) SEC. 43. Whenever any householder shall know that any person within his family is taken sick with the small-pox, or any other disease dangerous to the public health, he shall immediately give notice thereof to the Board of Health, or to the Health Officer of the township [city, or village*] in which he resides; and if he shall refuse or neglect to give such notice, he shall forfeit a sum not exceeding one hundred dollars.

Householders to give notice of disease; penalty for neglect.

(1735.) SEC. 44. Whenever any physician shall know that any person whom he is called to visit is infected with the small-pox, or any other disease dangerous to the public health, such physician shall immediately give notice thereof to the Board of Health, or Health Officer of the township [city, or village*] in which such diseased person may be; and every physician who shall refuse or neglect to give such notice, shall forfeit, for each offense, a sum not less than fifty nor more than one hundred dollars.

Penalty on physician neglecting to give notice.

Section 1740, as amended by Act No. 145, laws of 1879, is as follows:—

(1740.) SEC. 49. The mayor and aldermen of each incorporated city, and the president and council, or trustees of each incorporated village in this State, in which no board of health is organized under its charter, shall have and exercise all the powers and perform all the duties of a board of health as provided in this chapter, within the limits of the cities or villages, respectively, of which they are such officers. The provisions of this chapter, and the amendments thereto, shall, as far

Board of Health in cities and villages, who to constitute.

* See section (1740) Sec. 49, as amended by Act No. 145, Laws of 1879, on this and following page.

Duties of officers and inhabitants of cities and villages. as applicable, apply to all cities and villages in this State, and all duties which are, by the provisions of this chapter, to be performed by the board of health of townships, or by the officers and inhabitants thereof, shall in like manner be performed by the board of health and the officers and inhabitants of such cities and villages, with a like penalty for the non-performance of such duties, excepting in cases where the charters of such cities and villages contain provisions inconsistent herewith.

2. Vaccination of attendants and all exposed.—The attendants on the sick with small-pox and all other persons who it is feared have been exposed to small-pox or varioloid, should immediately be vaccinated. If properly vaccinated within a day or two after exposure to small-pox, a person has a good chance to escape small-pox entirely, and if he should come down with varioloid or modified small-pox he will probably have the disease in a much milder form than if not recently vaccinated. (See page 3, paragraph 5,—Prevention of Small-pox.) Unless the eruption has already appeared, vaccinate.

3. Restriction of the Infection.—As the contagium of small-pox harbors in carpets, bedding, clothing, etc., it is best to prepare the room in which one sick with small-pox is to be cared for, removing the carpets, pictures, sofas, etc., the bedding and clothing not required for actual use in the room, and any other articles capable of harboring the infection and which it would be difficult to disinfect or not desirable to burn. Such removals of carpets, bedding, etc., should not be attempted after they have been exposed to infection, unless properly disinfected under the direction of the health officer. (See paragraphs 12 and 15, page 10, of this document.)

4. Isolation.—Those sick with small-pox or suspected small-pox should at once be separated from all other persons except the necessary attendants on the sick.

5. Care of those exposed to small-pox.—All persons known to have been exposed to small-pox should at once be vaccinated, and should be, so far as possible, isolated from others until it is known whether they have contracted small-pox. This "period of incubation" is usually about twelve or fifteen days.

6. Notice of infected place.—Placard on house.—A signboard or large card as a signal of danger, with the words, SMALL-POX printed on it in large plain letters should at once be displayed before a house, and a large card with the words SMALL-POX in large, plain letters should be fastened on the door of a house, in which is a case of small-pox; and without permission of the health officer no person should be allowed to come to the house or go from it.

7. Who may attend small-pox patients.—Any person who has recently been successfully vaccinated or revaccinated, or has *recently* had small-pox or varioloid, may attend on small-pox patients with comparative safety to himself, and in most cases with absolute safety so far as relates to danger from small-pox. No person who has been vaccinated or has had varioloid or small-pox more than ten years previously should rely upon such experience for security from small-pox, if exposed by attendance on a person sick with small-pox or varioloid. Such a person should immediately be revaccinated.

"It is now fully established that a typical vaccine scar is not proof of the immunity of the individual from small-pox. We have admitted to the hospital * * * 711 cases of small-pox exhibiting typical cicatrices; of which number 73 proved fatal."—W. M. Welch, M. D., in Philadelphia Health Report, 1872.

There is good statistical support for the common theory that the protective influence of vaccination, varioloid, and small-pox dies out in seven years.

This is now known to be absolutely true for many persons, but there is no one period applicable to all persons, the fact being that while vaccination affords at first almost absolute protection, its influence is gradually worn out. Its protective influence is lost much sooner in some persons than in others, but experience has shown (as in Philadelphia in 1871-2) that many children vaccinated in infancy have varioloid before they are seven years of age, while in some instances one vaccination or one attack of small-pox protects the individual through life. Inasmuch as many persons are known to be susceptible to small-pox or vaccination as often as once in ten years, and as some are susceptible yet more frequently, this State Board of Health has advised revaccination every five years, as the most judicious measure for the prevention of small-pox.

DISINFECTION.*

8. **Disposal of infected material.**—All discharges from a small-pox patient should be received into vessels containing a strong solution of copperas (sulphate of iron), or the zinc-solution mentioned in paragraph 10. In cities where sewers are in use the disinfected discharges may be thrown into the water-closet; in other places they should at once be buried at least 100 feet distant from any well; they should not by any means be thrown into a running stream nor into a cesspool. All cloths, rags, etc., used about the patient should at once be burned, or where that is impracticable should be thrown into a strong zinc-solution. If necessary, discharges from the patient may be received on old cloths which should at once be burned or disinfected and buried. All vessels should be kept clean and disinfected.

Bedding, clothing, etc., should so soon as removed from the patient be burned. If it is too valuable to be destroyed, it should at once be disinfected by boiling in the zinc-solution, by heating in a specially prepared disinfecting-chamber to a temperature of 250° Fahr., or by long exposure in a close room or box to the fumes of burning sulphur, as stated in paragraph 12, page 10.

Cotton, linen, flannels, blankets, etc., should be treated with the boiling hot zinc-solution, introducing them piece by piece, securing thorough wetting, and boiling for at least half an hour.

Heavy woolen clothing, silks, furs, stuffed bed-covers, beds, and other articles which cannot be treated with the zinc-solution, should be hung in the room during fumigation, pockets being turned inside out and the whole garment thoroughly exposed. Afterward they should be hung in the open air, beaten and shaken. Pillows, beds, stuffed mattresses, upholstered furniture, etc., should be cut open, the contents spread out and thoroughly fumigated. Carpets are best fumigated on the floor, but should afterward be removed to the open air and thoroughly beaten, after which they may well be again exposed to fumes of burning sulphur.

9. **The copperas-solution** may be prepared by dissolving sulphate of iron (copperas) in water in the proportion of one and a half pounds of copperas to a gallon of water. When much is wanted it may be prepared by hanging a basket containing about sixty pounds of copperas in a barrel of water.

10. **The zinc-solution** may be prepared by dissolving sulphate of zinc and common salt in water in the proportion of four ounces of zinc-sulphate and two ounces of salt to a gallon of water.

11. **Care of rooms, etc., during sickness.**—So far as consistent with the welfare of the patient, the room throughout the sickness should be constantly ventilated and frequently aired. To confine the poison in a close room is to retain its power of infecting others. It is well to provide for disinfecting the foul air withdrawn from the room, as by an open fire-place where this is practicable,

* These methods of disinfection are applicable in other contagious diseases, such as scarlet fever, diphtheria, etc. For the statement of some of the methods herein described the State Board of Health is indebted to a circular on disinfection (No. 8) issued by the National Board of Health.

or by flues leading into furnaces, or kept constantly fumigated in some manner. It is well to keep in the sick-room a vessel containing the zinc-solution (mentioned in a preceding paragraph) for the reception of towels, sheets, and other articles of clothing which are not to be burned or disinfected in a specially prepared oven.

12. Disinfection after death, recovery, or removal.—After death, recovery, or removal there should take place, under the supervision of the health officer, the most thorough and complete disinfection of the house and the contents of the house in which there has been a case of small-pox. It is far better for the community and cheaper for the board of health to pay a competent man to see that this is properly done than to take the risk of its not being done well. This disinfection should be done with fumes of burning sulphur. For this purpose the room to be disinfected must be vacated. Heavy clothing, blankets, bedding, and other articles which cannot be treated with zinc-solution, should be opened and spread out so as to be freely exposed during fumigation. Close the doors and all large openings to the room as tight as possible, but do not use paste, or in any such way cover surfaces which need to be disinfected, nor prevent free entrance of the fumes to all cracks into which the contagium may have entered. Place the sulphur in iron pans supported upon bricks, set it on fire by hot coals or with the aid of a spoonful of alcohol and a lighted match, and allow the rooms to remain closed for several hours. For a room about ten feet square, two pounds of sulphur should be burned; for a larger room a proportionally larger quantity should be used, that is at the rate of one and a half to two pounds of sulphur to each one thousand cubic feet of air-space.

13. Carefully avoid breathing the fumes of the burning sulphur.—After fumigation for several hours, the room should be thoroughly opened and aired, before it is again occupied.

14. Care of the corpse.—The corpse should be wrapped in a sheet wet with a zinc-solution of double the strength specified in paragraph 10, page 9, and buried at once. Metallic, metal-lined, or air-tight coffins should be used when possible, certainly when the body is to be transported for any considerable distance. In no case should the body be exposed to view except in a perfectly air-tight coffin, and through glass; the coffin after its final closure having been exposed to fumes of burning sulphur.

15. Disinfection of rooms, clothing, etc., incidentally exposed to infection.—Hotel-rooms, stores,* cars, boats, hacks or other enclosures which may have been exposed to infection should be carefully disinfected by fumes of burning sulphur, as specified in paragraph 12.

16. Funerals.—No public funeral should be held at the house, and no one should go to a public funeral from the house where one has died from small-pox, or the inmates have been exposed to the disease. Should any one from an infected or exposed house ride to a funeral or a grave in a public hack the robes, cushions, etc., and the interior of the hack should immediately afterwards be thoroughly disinfected by exposure for several hours to the fumes of burning sulphur, as described in paragraph 12.

* Prof. Richardson, of Philadelphia, says:—(Germ Theory of Disease, *Trans. Phila. Social Science Association, Penn Monthly, Nov., 1878.*) Some years ago cases of small-pox occurred in the house of a dealer in ready-made clothing near New York. The whole stock of coats, pantaloons, etc., numbering many hundreds, had an opportunity to become infected and should have been carefully disinfected. They were, however, sold at retail, and may have given rise to many cases of "idiopathic" small-pox which no one could trace to any source of contagium.

17. Care of convalescents.—After recovery the patient should not be allowed to go abroad or to receive visitors until his clothing, etc., has been carefully disinfected under the supervision of the health officer, and until he has received from the health officer or from some competent physician a properly authenticated statement which is approved by the health officer that there is no longer any danger of his communicating the disease.

18. Hospitals for persons sick with diseases dangerous to the public health.—As a means of preventing the spread of disease, the law authorizes the inhabitants of townships, cities, and villages to be constantly provided with hospitals for the reception of persons having small-pox, or any other disease dangerous to the public health; and directs local boards of health on the outbreak of any such disease to provide such hospitals or places of reception for the sick and infected as they shall judge best for their accommodation and the safety of the inhabitants, and to cause such sick or infected persons, if their condition will admit, to be removed to such hospitals or places of reception,—said hospitals, and (in case the sick cannot be removed to the hospital without danger to life or health) the houses where the sick may remain, and all persons connected with said hospitals or abodes of the sick to be subject to the regulations of the board of health, or of a committee appointed by the board of health for that purpose. Sections 1726-1733 of the Compiled Laws of 1871, relating to this subject, and by amended section 1740 (being Secs. 35-42, and 49 of chapter XLVI.) made equally applicable to cities, villages, and townships, are as follows:

(1726.) SEC. 35. The inhabitants of any township may establish within their town-ship and be constantly provided with one or more hospitals for the reception of persons having the small-pox, or other disease which may be dangerous to the public health. Hospitals for reception of persons having small-pox, etc.

(1727.) SEC. 36. All such hospitals shall be subject to the orders and regulations of the board of health, or a committee appointed by such board for that purpose; but no such hospital shall be established within one hundred rods of any inhabited dwelling-house situated in an adjoining township, without the consent of such adjoining township. By whom hospitals to be regulated, etc.

(1728.) SEC. 37. If any person shall inoculate any other person, or inoculate himself, or suffer himself to be inoculated, with the small-pox, unless at some hospital licensed and authorized by law, he shall, for each offense, forfeit a sum not exceeding two hundred dollars. Penalty for inoculating with small-pox, except at hospitals.

(1729.) SEC. 38. When any hospital shall be so established, the physician attending the same, the persons inoculated or sick therein, the nurses, attendants, and all persons who shall approach or come within the limits of the same, and all such furniture and other articles as shall be used or brought there shall be subject to such regulations as shall be made by the board of health, or of the committee appointed for that purpose. Physicians, etc., to be subject to regulations of board, etc.

(1730.) SEC. 39. When the small-pox or any other disease dangerous to the public health shall break out in any township, the board of health shall immediately provide such hospital, or place of reception for the sick and infected, as they shall judge best for their accommodation and the safety of the inhabitants; and such hospitals and places of reception shall be subject to the regulations of the board of health, in the same manner as hereinbefore provided for established hospitals. When board of health to provide hospital.

(1733.) SEC. 42. If any physician or other person in any of the hospitals or places of reception before mentioned, or who shall attend, approach, or be concerned with the same, shall violate any of the regulations lawfully made in relation thereto, either with respect to himself, or his or any other person's property, the person so offending shall, for each offense, forfeit a sum not less than ten nor more than one hundred dollars. Penalty for violating regulations of hospitals.

19. Hospital construction, ventilation, warming, etc.—In the construction and management of hospitals great care should be had for the comfort, safety, and health of those confined in or connected with them, as well as for the safety of the public.

The proper size and plan for such a hospital may vary somewhat for different localities; but a few general principles which should be considered may be mentioned here. Particular attention should be paid to ventilation. The foul air should be drawn off through an opening or openings in the floor or in the wall at the floor-level, into a *heated* flue open at the top. In cold weather the fresh air should be warmed before it enters, or as it enters the room. This may be done by a furnace or by steam coils in fresh air ducts. If stoves are used, this can be done by jacketing the stove and providing an inlet pipe for fresh air from out door to the back of the stove within the sheet-iron jacket, as described on pages 55-62 of the Report of the State Board of Health for 1879, and on pages 263-6 of the Report for 1880.

20. Removal of sick or infected persons.—The law provides that the board of health “shall make effectual provision in the manner in which they shall judge best for the safety of the inhabitants,” sections 1706, 1731, and 1707, compiled laws of 1871, being as follows:—

Board to make provision to prevent spread of small-pox, etc. (1706.) SEC. 15. When any person coming from abroad or residing in any township within this State, shall be infected, or shall lately before have been infected, with the small-pox, or other sickness dangerous to the public health, the board of health of the township where such person may be shall make effectual provision in the manner in which they shall judge best for the safety of the inhabitants, by removing such sick or infected person to a separate house, if it can be done without danger to his health, and by providing nurses and other assistance and necessities, which shall be at the charge of the person himself, his parents, or other person who may be liable for his support, if able; otherwise, at the charge of the county to which he belongs.

When infected persons to be removed to hospital, etc. (1731.) SEC. 40. The board of health shall cause such sick or infected persons to be removed to such hospitals or places of reception, unless the condition of the sick person be such as not to admit of removal without danger to life; in which case the house or place where the sick shall remain shall be considered as a hospital to every purpose before mentioned, and all persons residing in or in any way concerned with the same, shall be subject to the regulations of the board of health, as before provided.

Provision in case infected persons cannot be removed. (1707.) SEC. 16. If any such infected person cannot be removed without danger to his health, the board of health shall make provision for him as directed in the preceding section, in the house in which he may be, and in such case they may cause the persons in the neighborhood to be removed, and may take such other measures as they may deem necessary for the safety of the inhabitants.

21. Nurses and necessary supplies.—Persons thus restrained at hospital or at home should be permitted to provide themselves, or the local board of health should provide them, with the best nursing and medical care. The duty of the board of health is not primarily to assume the care and medical treatment of the person sick with small-pox or other disease dangerous to the public health, but to place that care and treatment under such regulations as will protect the community from the spread of the disease; but persons thus restrained for the public good are generally prevented from earning their own support, and the public in thus enforcing unusual conditions is bound to provide proper care and medical treatment, food, etc., for those not able to provide for themselves. The board of health is authorized and required to “provide nurses and other assistance and necessities,” at the charge of the person sick, or of those liable for his support, if able (in which case the sick person will choose his own medical attendants), otherwise at the charge of the county to which he belongs. This is provided for by sections 1706 and 1707, compiled laws of 1871, printed above. See also Third Michigan Report, page 475, in which the supreme court in 1855 granted a writ of mandamus to compel the board of supervisors of Macomb county to pay a claim for care of an indigent person sick with small-pox, which claim had been audited by, and was for services ordered by,

the board of health of the village of Mt. Clemens, under section 1706, being section 15 of chapter XLVI. of the revised statutes of 1846.

22. Houses, supplies, nurses, etc., paid by the county in certain cases.—Nurses and attendants employed by the sheriff or other officer in accordance with section 1709, owners of houses, stores, lodgings, or other necessities taken possession of by either of said officers in accordance with sections 1709–1712, and other persons properly employed by said officers to assist in the duties enjoined by said sections, are entitled to just compensation, to be paid by the county. This is provided by section 1714, as follows:

(1714.) SEC. 23. Whenever the sheriff or other officer shall take possession of any houses, stores, lodgings, or other necessities, or shall employ any nurse or attendant, as provided in this chapter, the several parties interested shall be entitled to a just compensation therefor, to be paid by the county in which such person or property shall have been so employed or taken possession of.

23. Duties of the local board of health.—In view of known means of preventing and restricting small-pox, it would seem to be the duty of the local board of health:—

(I.) Frequently to offer free vaccination at any time to all persons who have not been successfully vaccinated within the preceding five years; and constantly to place before the people the importance of vaccination. This the board of health is authorized to do by Act No. 146 of the laws of 1879, which reads as follows:—

SECTION 1. *The People of the State of Michigan enact*, That the board of health in each city, village, and township may, at any time, direct its health officer or health physician to offer vaccination with bovine vaccine virus to every child not previously vaccinated, and to all other persons who have not been vaccinated within the preceding five years, without cost to the persons [person] vaccinated, but at the expense of such city, village, or township, as the case may be.

(II.) To enforce the law (sections 1734 and 1735, compiled laws of 1871, page 7 of this document), requiring householders and physicians to give immediate notice of cases of small-pox and other diseases dangerous to the public health. What it is the duty of the board of health to require the people to do for their own safety *it is the duty of the people* to do without compulsion. The board of health should have as prompt notice of the outbreak of a contagious disease as the fire department has of the outbreak of fire, and as hearty coöperation of citizens for the suppression of the disease as is given the fire department for the suppression of fire. And when the board is informed it should act as promptly, and continue to act as faithfully, as is done for the extinguishing of a fire.

(III.) To secure complete isolation of those sick or infected with small-pox.

(IV.) To give the public prompt and full notice of infected places (section 1732, compiled laws 1871, printed below.)

(V.) In general, and in compliance with the following section of law, to do all that may be done by prompt and intelligent action to prevent the introduction of disease.

(1732.) SEC. 41. When the small-pox, or any other disease dangerous to the public health, is found to exist in any township [city or village*] the board of health shall use all possible care to prevent the spreading of the infection, and to give public notice of infected places to travelers, by such means as in their judgment shall be most effectual for the common safety.

(VI.) To secure and superintend the immediate and thorough disinfection of infected houses, material, etc., as directed in paragraphs 8–15, pages 9–10 of this document.

* See Sec. 1740, compiled laws of 1871, as amended by act No. 145, laws of 1879, printed on pages 7–8 of this document.

(VII.) Promptly to notify, by its clerk or health officer, the State Board of Health upon the first outbreak of small-pox, or any other disease dangerous to the public health, in accordance with published requirements of the State Board of Health under section 8 of Act No. 81, laws of 1873.

24. Board of health should instruct its health officer.—In order that no time may be lost, it is the duty of every board of health to make provision for prompt action by its health officer, authorizing and directing him to be prepared at all times, as executive officer of the board, to take certain action without waiting for a meeting of the board, whenever a case of small-pox or other disease dangerous to the public health occurs within its jurisdiction. Some of these duties which the health officer should be directed to perform may be briefly suggested as follows:—

He should—

- a. Promptly verify the reports of cases of small-pox, and investigate suspected cases which are not reported, so that he may act intelligently.
- b. Secure the isolation of those sick with or exposed to small-pox.
- c. See that no person suffers for lack of nurses, etc., because of isolation for the public good.
- d. In case of an outbreak of small-pox, secure a prompt vaccination of all persons who have been or may be exposed to the disease.
- e. Give public notice of infected places. (See paragraph 6, page 8, also Sec. 1732, compiled laws 1871, page 13.)
- f. Regulate funerals of persons dead from small-pox, etc.
- g. Disinfect rooms, clothing, and premises.
- h. Give certificates of recovery and of freedom from liability to communicate the disease.
- i. Keep his own board of health, and the State Board of Health, constantly informed respecting every outbreak of a disease dangerous to the public health. (See paragraph (vii.) above.)

25. Notices of regulations of local boards of health.—Though a more general notice than is *required* by law should always be given of regulations made by local boards of health, the notice required by section 1698, compiled laws of 1871, should never be omitted, as on the giving of this notice might depend the success of legal proceedings begun by the board to enforce obedience to its regulations:

Notice of regulations, how published.

(1698.) SEC. 7. Notice shall be given by the board of health of all regulations made by them, by publishing the same in some newspaper of the township, if there be one published therein, and if not, then by posting them up in five public places in such township; and such notice of said regulations shall be deemed legal notice to all persons.

Section 1698 applies also to boards of health in cities and villages; and in general it should be remembered that by the amended section 1740 the provisions of all sections in chapter 46 of the compiled laws of 1871, including sections 1692–1744 and the amendments thereto, apply so as far applicable with equal obligation to the inhabitants and the boards of health in cities and villages, unless charter provisions conflict. (See Sec. 1740 in paragraph 1, page 7–8 of this document.)

26. Inspection of travelers, restraint of infected persons.—Boards of health of townships, cities, and villages near to or bordering upon neighboring States are by section 1708 (made applicable to cities and villages by Act 145, laws of 1879) authorized to inspect travelers, and to restrain from travel within their jurisdiction, except by license from the board of health, persons coming from infected places in other States. Section 1708 is as follows:

(1708.) SEC. 17. The board of health of any township near to or bordering upon either of the neighboring States, may appoint, by writing under their hands, suitable persons to attend any places by which travelers may pass from infected places in other States; and the persons so appointed may examine such passengers as they may suspect of bringing with them any infection which may be dangerous to the public health, and, if need be, may restrain them from traveling until licensed thereto by the board of health of the township to which such persons may come; and any person coming from such infected place, who shall, without license as aforesaid, travel within this State, unless it be to travel by the most direct way to the State from whence he came, after he shall be cautioned to depart by the persons appointed as aforesaid, shall forfeit a sum not exceeding one hundred dollars.

Board may restrain travelers coming from infected districts.

27. Permits for removal of an infected article or sick person may be granted by the board of health in its discretion.

(1705.) SEC. 14. The board of health may grant permits for the removal of any nuisance, infected article, or sick person within the limits of their township, when they shall think it safe and proper so to do.

Board may permit removal of infected articles, etc.

28. Restraint and removal of infected persons.—In case of travelers and other persons *infected* with any disease dangerous to the public health, the law (section 1706 compiled laws of 1871, in paragraph 20, page 12, of this document) requires the local board of health to make effectual provision for the safety of the inhabitants,—including removal of the sick person to another house when this is best and can be done without danger to the health of the person sick, otherwise at the house where he may be.

In removing and caring for any person infected with contagious sickness the board of health may make use of the sheriff or any constable of the county, by procuring a warrant signed by any two justices of the peace. Section 1709 permits this, and is as follows:

(1709.) Sec. 18. Any two justices of the peace may, if need be, may make out a warrant under their hands, directed to the sheriff or any constable of the county, requiring him, under the direction of the board of health to remove any person infected with contagious sickness, or to take possession of convenient houses and lodgings, and to provide nurses, attendants, and other necessities for the accommodation, safety, and relief of the sick.

Removal of persons infected.

29. Control of infected baggage, clothing, goods, etc.—By sections 1710–1713 the board of health is authorized to procure the detention, examination, and purification at the owner's expense of any baggage, clothing, or goods of any kind, found within the township, city, or village, which there is just cause to suspect to be infected with any disease dangerous to the public health. These sections are as follows:

(1710.) SEC. 19. Whenever on application of the board of health, it shall be made to appear to any justice of the peace that there is just cause to suspect that any baggage, clothing, or goods of any kind found within the township are infected with any disease which may be dangerous to the public health, such justice of the peace shall, by warrant under his hand, directed to the sheriff or any constable of the county, require him to take with him as many men as the said justice shall deem necessary to secure such baggage, clothing, or other goods, and to post said men as a guard over the house or place where such baggage, clothing, or other goods shall be lodged, which guard shall take effectual care to prevent any person removing or coming near to such baggage, clothing or other goods, until due inquiry be made into the circumstances thereof.

Infected baggage, clothing, and goods, how secured.

(1711.) SEC. 20. The said justice may also, by the same warrant, if it shall appear to him necessary, require the said officer, under the direction of the board of health, to impress and take up convenient houses or stores for the safe keeping of such baggage, clothing, or other goods; and the board of health may cause them to be removed to such houses or stores, or to be otherwise detained, until they shall, in the opinion of said board of health, be freed from infection.

Impressing houses, etc., for keeping infected goods.

(1712.) SEC. 21. Such officer in the execution of such warrant, shall, if need be, break open any house, shop, or any other place mentioned in said warrant, where such baggage, clothing, or other goods shall be; and he may require such aid as

Power of officer executing warrant.

shall be necessary to effect the execution of the warrant; and all persons shall, at the command of any such officer, under a penalty not exceeding ten dollars, assist in the execution of the warrant, if able to do so.

Charges to be paid by owner.

(1713.) SEC. 22. The charges of securing such baggage, clothing, or other goods, and of transporting and purifying the same, shall be paid by the owners thereof, at such rates and prices as shall be determined by the board of health.

30. Small-pox in a jail.—The board of health may by written order secure the removal from a common jail to a hospital or other place of safety of a prisoner attacked with a disease dangerous to the safety and health of the other prisoners or of the inhabitants of the township, city, or village. Sections 1715 and 1716 authorizing and prescribing the manner of such removal are as follows:

When prisoners attacked with dangerous disease may be removed.

(1715.) SEC. 24. Whenever any person confined in any common jail shall be attacked with any disease, which, in the opinion of the physician of the board of health, or of such other physicians as they may consult, shall be considered dangerous to the safety and health of the other prisoners, or of the inhabitants of the township, the board of health shall, by their order in writing, direct the removal of such person to some hospital or other place of safety, there to be provided for and securely kept, so as to prevent his escape, until their further orders; and if such prisoner shall recover from the disease, he shall be returned to such jail.

Prisoners removed, to be returned, and not to be considered as having escaped.

(1716.) SEC. 25. If the person so removed shall have been committed by order of any court, or under any judicial process, the order for his removal, or a copy thereof, attested by the presiding member of said board of health, shall be returned by him, with the doings thereon, into the office of the clerk of the circuit court for the county; and no prisoner, removed as aforesaid, shall be considered as thereby having committed an escape.

31. Small-pox in a poorhouse.—On the outbreak in a county poorhouse or in the vicinity thereof of any pestilence or contagious disease likely to endanger the health of persons supported at the poorhouse, the superintendents are by section 1717 required to remove to some other suitable place any or all of the persons there supported until they can safely be returned or otherwise be discharged. Section 1717 is as follows:

When superintendents of poor may remove paupers from poorhouses.

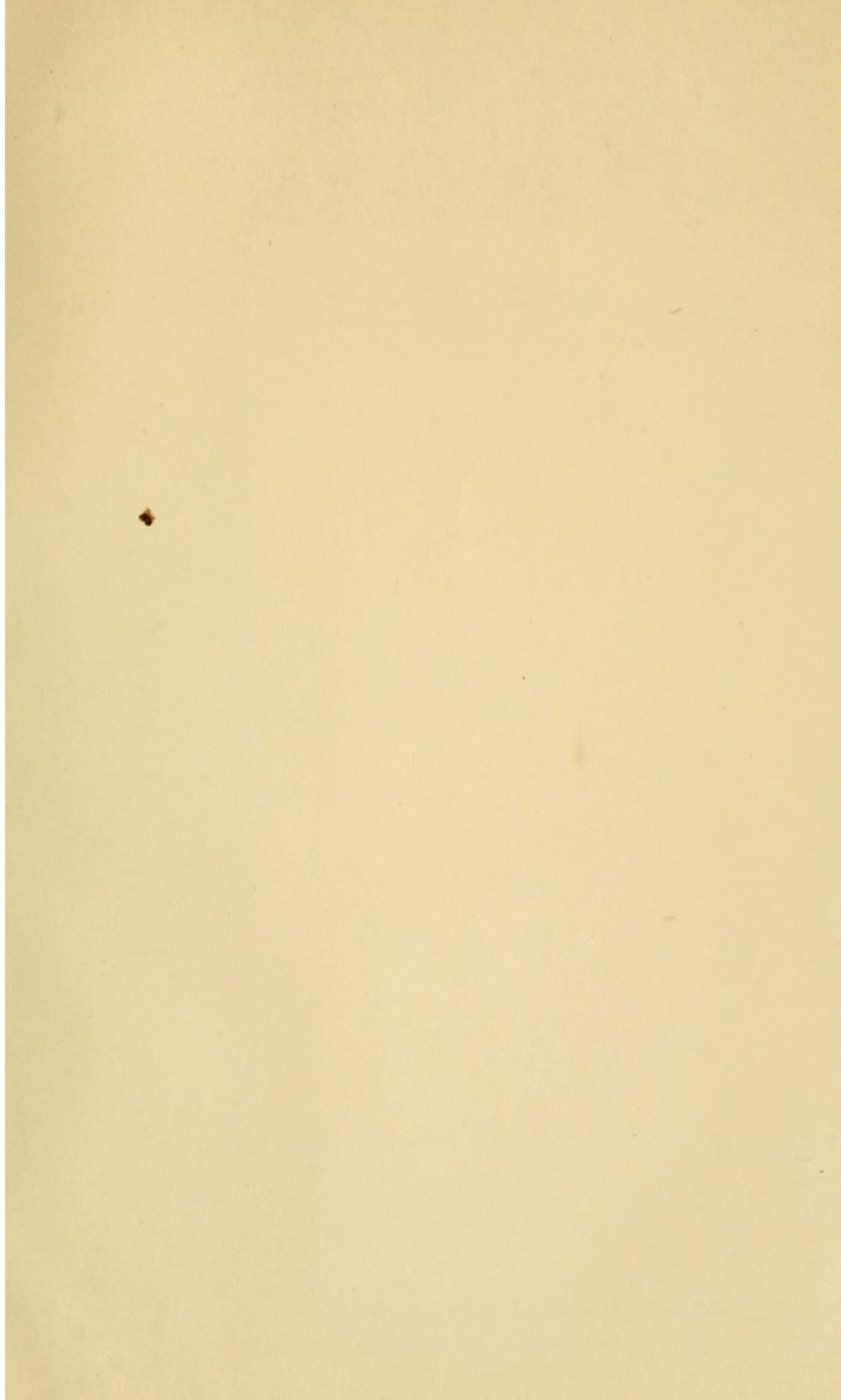
(1717.) SEC. 26. Whenever any pestilence or contagious disease shall break out in any county poorhouse in this State, or in the vicinity thereof, and the physician to such county poorhouse, or such other physician as the superintendents may consult, shall certify that such pestilence or disease is likely to endanger the health of the persons supported at such poorhouse, the superintendents of such county poorhouse shall cause the persons there supported, or any of them, to be removed to some other suitable place in the same county, there to be maintained and provided for at the expense of the county, with all necessary medical attendance and care, until they can safely be returned to such poorhouse, or otherwise discharged.

In July, 1877, the Michigan State Board of Health passed a resolution advising and requesting all boards of health to offer every year free vaccination with bovine virus to every child not previously vaccinated and to all other persons not vaccinated within five years. The resolution was then, and has since been widely distributed throughout the State. This tract more fully sets forth the importance of vaccination, and other means for the prevention and restriction of small-pox.

It is hoped that local boards of health, newspapers, and all public-spirited persons will aid in spreading the information herein contained. It is recommended that every local board of health secure copies of this tract, and place one copy in every household within its jurisdiction. Although large numbers are distributed by the State Board of Health, its distribution will not reach every household, but to facilitate this the State Board has secured electrotype plates of this tract; in English, from which copies can cheaply be reprinted. Copies of this tract may be had of W. S. George & Co., Lansing, Michigan, at the following terms, cash to accompany order:

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