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DIPHTHERIA

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ITS

Prevention, Restriction and Suppression

ISSUED BY

The West Virginia State Board of Health

1907.

PLEASE PRESERVE FOR FUTURE USE.

Should a case of Diphtheria occur near you, you can do yourself and your community a great good by seeing that the family has one of these pamphlets.

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DIPHTHERIA.

Its Prevention, Restriction and Suppression.

Issued by the West Virginia State Board of Health, 1907.

ITS SANITARY FEATURES.

Diphtheria is a highly contagious disease, rapidly communicated from person to person.

The infection of diphtheria is contained in particles or shreds of the diphtheritic membrane or in the expired air. These are communicated by direct contact with the patient, by inhaling the air surrounding him, and by coming in contact with articles used in the sick room, such as carpets, bed clothes, clothing, books and toys. The infection clings tenaciously to these articles. The virus may remain dormant in dwellings for a long period, and unless destroyed by disinfection, may give rise to a new outbreak.

Filth plays a very important part in the spread of diphtheria, for unsanitary conditions tend to lower vitality, and, in consequence, to increase the susceptibility of the the disease. There is no doubt, also, that sewage gas may be a carrier of diphtheritic poison and that many outbreaks hold a close relationship with defective drainage, sewers and cesspools.

Over-crowding, faulty ventilation and filthy conditions of habitation favor the spread of the disease, as do also soil moisture, damp cellars, and general dampness of houses.

It is possible that diphtheria may be communicated by dogs, fowls, pigeons and the like. It is known that cats are susceptible to human diphtheria and are capable of communicating the disease to other cats and also to human beings.

Children under fifteen are usually most susceptible to diphtheria, although adults may be attacked with fatal results. The disease is most fatal between the second and fifth years. A healthy child is not as susceptible to diphtheria as one whose vitality has been weakened by unsanitary conditions.

A person may have diphtheria more than once.

Whenever diphtheria exists in malignant form there will generally be found some obvious cause, such as accumulation of filth, un-

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clean cellars, foul gutters or cesspools or overflowing privy vaults.

Every case of diphtheria is dangerous to life. A physician should be called early whenever, on examining the throat of a sick child, it is found swollen and red, and if there is evidence of the appearance of white, gray or yellow membrane. A delay may be fatal to the patient. The treatment of diphtheria is most effective if commenced within twenty-four hours after the appearance of the membrane.

MEMBRANOUS CROUP.—The majority, if not all cases of so-called membranous croup, are laryngeal diphtheria, the membrane being usually limited to the upper part of the windpipe. In these cases an inspection of the throat may or may not show the presence of the membrane. Without a bacterial examination, the facilities for which are seldom available except in cities, it is impossible at the onset to differentiate diphtheria from benign croup. As the majority of cases of membranous croup, however, have been found to be genuine diphtheria, all cases of membranous croup should, in the interests of the lives and health of the children of the state, be considered diphtheria, so far as isolation, quarantine and disinfection are concerned.

PREVENTION, RESTRICTION, AND SUPPRESSION.

Diphtheria is a preventable disease. A rigid observance of the rules of the State Board of Health will often prevent the introduction of the disease, and is always followed by a limitation of the disease to the first case or cases. If diphtheria spreads from one house to another some one is to blame. The parents who permit their children to enter a house in which they know, or suspect, there is a case of diphtheria, or to play or mingle with children from that house, need not attribute the sickness and subsequent death of one of their loved ones to the mysterious dispensation of Divine Providence. The parents who fail to make known the existence of diphtheria in their houses, who allow the children of their families to go to school and mingle otherwise with other children, and who, during the period of sickness, disregard all health laws and sanitary precautions, are morally responsible for whatever sickness and death may occur through their negligence.

The local health authorities, who, after being advised of the presence of diphtheria in a family, fail to quarantine the premises, and to insist on the isolation of the patient and compliance with all precautions necessary to prevent the spread of the disease, are guilty of culpable negligence.

During the existence of diphtheria or scarlet fever in a community, all cases of sore throat with fever are to be looked upon with suspicion until their innocent character is established.

Whenever a child has sore throat and fever, he or she should be at once separated from other members of the family until a physician has passed an opinion on the nature of the ailment. This precaution should never be neglected, especially if the child vomits, or has a chill, or is sluggish and languid, and looks heavy-eyed. By "separated" is meant placed in a room apart as far as possible from other rooms in the house. From this room all other children must be kept.

A child is attacked with diphtheria usually within two to four days after exposure. The disease may come on within 12 hours after the child has come in contact with the poison, and, again, no symptoms may develop until the seventh day. If a child does not show signs of illness by the tenth day it can be safely concluded that the disease has not been contracted. A child known to have been exposed should be carefully watched for a week or ten days, and on the slightest sign of illness, be separated from all others.

Keep away from the sources of contagion. Do not go where the disease is if you can avoid it, and do not let your children go near an infected dwelling or mingle with children or others coming from the premises. If you know that children from infected houses are permitted to attend school, withdraw your children from that school, should they be in attendance, and notify the State Board of Health. Permit no one to enter your house who has been exposed to diphtheria. During the prevalence of diphtheria, in epidemic form especially, avoid all public gatherings and keep your children away from such.

At all times, and especially during the prevalence of disease, keep your premises and its surroundings,—your yard, outhouses, cellars,—in a sanitary condition. Allow no filth to accumulate. Draw off all pools of stagnant water. Burn all rubbish. Use disinfectants freely they are cheap, sickness is costly. Bear in mind continually that while filth may not cause diphtheria it is nevertheless a fact beyond controversy that the spread of diphtheria is influenced largely by unsanitary conditions, which induce an unhealthy condition of the throat and provide a suitable soil or breeding ground for the germ of the disease. A healthy child, though exposed to diphtheria, may not contract the disease, one whose vitality is weak-

ened through the influence of unsanitary surroundings is very susceptible to the virus.

When diphtheria prevails in the neighborhood,—and at all times,—warn your children not to use, while in school, the pencils, books, etc., of other children, and especially not to put in their mouths pencils, toys, harmonicas, jewsharps, and the like, which may have been handled by other children. Warn them also to thoroughly rinse the school room drinking cup before using.

A “sore throat” in an adult may mean diphtheria in a child. Be careful not to allow children to use dishes and other utensils which have been used by adults having “sore throats.” Under no circumstances should such adults kiss children.

It is better, when diphtheria exists in your family, to send the children, who are not affected, elsewhere. Do not, however, run the risk of communicating the disease to other children. In this, and in all other matters relative to disease in your household, consult your physician.

Engage the services of a competent physician early in all contagious diseases. Do not wait until it is too late, when regrets are useless. You may not feel able to incur the necessary expense incident to sickness, you likewise may not feel able to pay those always attendant upon a death.

Remember that diphtheria is a preventable disease. Remember, also, that the period of sickness can be much shortened and the possible bad effects of the disease entirely prevented if competent medical attendance is obtained early.

Avoid, as you would the presence of evil, those individuals, “old women” of both sexes, who “know more than the doctor”; who insist that your child suffers from “putrid sore throat,” and that the ailment is not contagious. Countless graves are filled with the bodies of innocent children, in whose little throats the deadly germ of diphtheria was allowed to prey unmolested, while these oracles in health and hygiene, often persons not knowing even the rudiments of anatomy and physiology, taught in the common schools, gravely diagnosed the ailment as “putrid sore throat.”

ISOLATION AND DISINFECTION.

Diphtheria is a most highly contagious disease, readily communicated from person to person. As it is difficult often at the onset of a “sore throat” to determine whether the ailment is diphtheria or not, to be on the safe side, the sufferer should be isolated until medical advice can be obtained. “An ounce of prevention,”

here as elsewhere, "is worth a pound of cure." By "isolated" is meant kept away from other persons as much as possible. For this purpose a room on the upper floor, away from the direct line of passage should be selected.

The room of a person sick with diphtheria should be large and easily aired. It must be kept well ventilated. There should be taken out of the room all ornaments, carpets, table covers, draperies, plush chairs, and other things that are not needed in it. Dogs, cats, birds, and fowls should be kept out of the room, and even out of the house. The patient must have plenty of fresh air, night and day. In winter the room should be heated with an open fire. If there is a fireplace have a fire in it, even if you must use other heat. A stove makes the worst kind of heat for a sick room. If a stove must be used, a pan or kettle of water should be put on it. The bed should be placed near the center of the room, without letting the air blow directly on the patient.

A sheet kept wet with a solution of carbolic acid (2½ ounces of acid to one gallon of water) or with Standard Disinfectant No. 3, recommended on last page of this circular, ought to be hung over the door or doors communicating with the sick room. This will prevent, in a great measure, the virus from attaching itself to clothing, bedding, furniture, etc., in other rooms, and will obviate the necessity of a thorough disinfection of the rest of the house after the recovery or death of the patient. Hang this sheet on the opposite side from which the door opens.

If you can do so employ a professional nurse for the patient.

No other person beside the nurse and necessary attendants should be permitted in the room, and they should take special precautions not to carry the infection. Their communication with the rest of the family should be as restricted as possible. Do not make the sick room a place of family gathering.

Neither the nurse nor any other person should eat or drink any thing in the sick room, or any thing which has been there. Food which the patient has left should be burned or disinfected. The dishes which the patient uses should not be used by others, or washed with other dishes. They should be washed by themselves in boiling water.

While the liberal use of carbolic acid and other disinfectants in the room is recommended, there should not be any attempt to disinfect the room, when occupied, by the use of volatile chemical agents, such as carbolic acid, chlorine, etc. It cannot be done, and you but waste your time and annoy the patient. Neutralizing

odors by creating others does not constitute disinfection. Fresh air and absolute cleanliness are all that is necessary. Your physician may recommend the distillation of carbolic acid in the room by means of boiling water, to prevent the passage of diphtheritic virus in the air. This may be beneficial and can do no harm unless the odor worries the patient. In this, as all other matters, follow your physician's advice. He desires that his patient shall recover, and recover speedily.

All discharges from the bowels should be received in vessels containing a quart of *Standard Disinfectant No.1 (acid), or Standard Disinfectant No. 2. Vomited matter and discharges from the lungs and throat should be received in vessels containing the same solution. Have this disinfectant continually on hand ready for use.

Standard Disinfectant No. 1 (acid) or Standard Disinfectant No. 2 should be always at hand for washing the floor or bed whenever soiled by discharges.

The discharges from the throat, mouth, and nose, are especially dangerous and must be cared for at once. It is well to prepare a number of squares of old soft cloth (old sheets or pillow cases) to receive these discharges. The cloth should be burned as soon as soiled. If there is no fire in the sick room, it is convenient to have a small tub, containing the disinfecting solution, to receive these cloths until they can be carried from the room and burned.

All knives, forks, spoons, glasses, cups, and plates used by the patient must be disinfected at once by being put in a carbolic acid solution, and later boiled.

A wooden pail or tub containing Standard Disinfectant No. 3 should be kept in a room, and all blankets, sheets, towels, pillow slips, and other articles used about the patient's room should be put into this as soon as they are used and before they are taken from the room. They should be allowed to soak for two hours, then they must be taken out and boiled at once. Use old blankets on the bed and burn them afterwards.

Dirt and dust must be removed by cloths dampened with Standard Disinfectant No. 3, as sweeping and dusting are objectionable. These cloths should be at once thrown into the solution or into the fire.

Books, toys and articles used to amuse the patient when convalescent are best disposed of by burning them in the room. Under no

*See pages 22 and 23 for method of making and using the STANDARD DISINFECTANTS.

circumstances should toys be borrowed and returned to be used by the well. **NEVER RETURN A BOOK TAKEN FROM A PUBLIC LIBRARY. IT MUST BE BURNED.**

No person from a house where diphtheria is should go into public assemblies, such as schools, churches, or concerts, or anywhere into the presence of children. No person in said house should leave the premises without first thoroughly washing the hands, face and hair, and brushing his clothing with a whisk broom wet with Standard Disinfectant No. 3. Children who have had diphtheria should not be allowed to go to school or to mingle in any other way with the public while they remain infectious. The period of infection varies from two weeks in a very mild case to six or more weeks in a severe case.

A person who has had an attack of diphtheria may spread the disease for six weeks from the beginning of the sickness. Such person should not associate with others nor go to school or church, or go to any public meeting, until the throat is entirely well, and the sores on the lips and nose are healed. Before going to school or to any meeting, the person should have a certificate from the physician or health officer, setting forth that proper precautions have been taken during the sickness, and that the person is believed to be free from danger of conveying the disease to others.

All persons recovering from diphtheria are dangerous. Dangerous also, and but in a slightly less degree, are all individuals, nurses, attendants, parents, brothers, sisters, other relatives, friends, acquaintances, neighbors, who have come in contact with the patient, or who have been in the infected rooms prior to disinfection of the same, unless their clothing and persons have been disinfected.

In the event of death, the body must be wrapped in a sheet thoroughly soaked in Standard Disinfectant No. 2 and then placed in an air-tight coffin. Public funerals and wakes over such a body are forbidden. **THE COFFIN MUST NOT BE OPENED NOR THE REMAINS AGAIN EXPOSED UNDER ANY PRETEXT WHATSOEVER.** The body cannot be transported by rail unless prepared in accordance with the rules of this Board and placed in an air-tight metallic casket. Newspaper notices of such deaths should distinctly state that the deceased died of diphtheria.

DISINFECTATION AFTER RECOVERY OR DEATH.

*When an Apartment Which Has Been Occupied by a Person Sick
With an Infectious Disease is Vacated, it Should be
Disinfected.*

The object of disinfection in the sick room is the destruction of infectious material attached to surfaces, or deposited as dust upon window ledges, in crevices, etc. If the room has been properly cleansed and ventilated while still occupied by the sick person and especially if it was stripped of carpets and unnecessary furniture at the outset of his attack, the difficulties of disinfection will be greatly reduced.

The work of disinfection should begin with the beginning of the treatment of cases, and should continue during the whole course of the disease. All articles of bed clothing and of body clothing should be disinfected as soon as they are removed from the bed or from the patient.

During the entire illness the privy should be thoroughly disinfected with Standard Disinfectant No. 1, four or five gallons of which should be thrown into the vault every day. Instead of the solution, chloride of lime in powder can be used. All wood work in the vault should be soaked with the solution or covered with powdered lime. Water closets and sinks should be disinfected daily by pouring a quart or more of the solution of chloride of lime or carbolic acid into the pipes. The pipes should be freely flushed in order to avoid injury.

After the patient has been removed from the room, it should be thoroughly fumigated, with all its contents, by burning sulphur or evaporating formaldehyde, and by a thorough cleansing with a disinfectant solution.

The following mode of *procedure will be found easy of application, economical and effective:

(a) Have all windows and doors (except doors of egress) tightly closed. Securely paste strips of paper over keyholes, over cracks, above, beneath and at sides of windows and doors, over the stove holes and all openings in walls, ceilings and floor. If opening be large, paste several thicknesses of paper over opening. Carefully stop up the fireplace if there be one. There must be no opening through which gas can escape.

*See pages 19 and 20 for method of disinfection with formaldehyde.

(b) All articles in the room which cannot be washed must be spread out on chairs or racks. Clothing, bed covers, etc., should be hung on lines stretched across the room. Mattresses should be opened and set on edge, window shades and curtains spread out at full length. If there is a trunk or chest in the room, open it, but let nothing stay in it. Open the pillows so that the sulphur fumes can reach the feathers. Do not pile articles together.

(c) Use three pounds of powdered sulphur for every 1,000 cubic feet in the room. A room ten feet long, ten feet wide and ten feet high has 1,000 cubic feet. For a closet, use two pounds of sulphur.

(d) Burn the sulphur in an iron pot or deep pan. Let the pot or pan stand in a large vessel containing water, which vessel should be placed on a table, not on the floor. For example, take a common washtub, lay in it three or four bricks, pour in water to the level of top of bricks, put the pot or pan containing the required amount of sulphur on the bricks, place the washtub and contents on a table. The disinfecting "apparatus" is then in working order.

Moisten the sulphur with alcohol and ignite. When the sulphur begins to burn, leave the room, close the door of egress, and carefully paste strips of paper over the keyhole and all openings above, beneath and at side of door. Keep the room closed for ten hours at least.

Sulphur candles can be used instead of crude sulphur, but care must be taken to use sufficient candles. The average candle on the market contains one pound of sulphur. Three of these will be required in the disinfection of a small room, 10x10x10. Do not use a less number, no matter what directions may accompany the candle. The water-jacketed candle is preferable. Partly fill tin around candle with water and place candle in pan on the table, not on the floor. Let one-half pint of water be vaporized with each candle. In the absence of moisture, the fumes of sulphur have no disinfecting power.

(e) After the apartments are opened, take out all the articles and place them in the sunshine. Carpets should be well beaten and exposed to the sun.

(f) All surfaces in the room should then be thoroughly washed with Standard Disinfectant No. 3. Walls and ceilings, if plastered, should subsequently be washed with lime. Wash well all out-of-the-way places, window ledges, mouldings etc. Floors, particularly

should receive careful treatment, and the solution should wet the dust and dirt in the cracks.

(g) After washing, ventilate the rooms, if possible, for several hours.

(h) It is safer to burn mattresses and pillows.

(i) It is likewise safer to burn all books, toys, and articles of small value which have been handled by the patient. Burn what you cannot boil. Books which have not been handled by the patient can be saved. Lay them on edge on a table with leaves open, in a room while the sulphur is burning.

Unless all precautions recommended have been taken in the sick room, the entire house must be disinfected in the manner directed for the sick room; otherwise a thorough "cleaning house" exposure of all articles to air and sunshine, the beating of carpets, etc., will be all that is necessary. In case the entire house is disinfected, take out before exposure to SULPHUR, any pianos, sewing machines, lace curtains, fine paintings or draperies, and expose them to the sun. Sulphur fumes injure the articles. Formaldehyde does not.

The infection must not remain in the house. It is a menace to the lives and health of the patient, the children, if any, of the family, and your neighbor's children.

There is one serious objection to the use of sulphur, and this must be fully understood. The fumes of sulphur have a destructive action on fabrics of wool, silk, cotton and linen, on tapestries and draperies, and exercise an injurious influence on brass, copper, steel and gilt work. Colored fabrics are frequently changed in appearance and the strength impaired. Curtains and all articles of cotton or linen can be effectually disinfected by boiling or soaking them in Standard Disinfectant No. 3 for several hours, and portable articles of brass, copper, steel and gilt work by washing with a strong solution of carbolic acid (Standard Disinfectant No. 1).

Formaldehyde (the 40 per cent solution) may be used instead of sulphur if desired.

PUBLIC HEALTH LAWS OF WEST VIRGINIA.

EXTRACTS FROM THE REVISED STATUTES.

POWERS AND AUTHORITY OF THE STATE AND LOCAL BOARDS OF HEALTH.

(Extract.)

The board of health shall take cognizance of the interests of the life and health of the inhabitants of the State, and shall make and cause to be made sanitary investigation and inquiries respecting the causes of diseases, especially of endemics, epidemics, and the means of prevention, the sources of mortality and the effects of localities, employments, habits, and circumstances of life on the public health. Said board may make and adopt all necessary rules, regulations and by-laws not inconsistent with the constitution and laws of this State or of the United States, to enable it to perform its duties and transact its business under the provisions of this chapter. They shall also examine into and devise as to the water supply, drainage and sewerage of cities, towns and villages; the ventilation and warming of public halls, churches, school houses, workshops and prisons; the ventilation of coal mines, and how to treat promptly, accidents resulting from poisonous gases. When they believe that there is a probability that any infectious or contagious disease will invade this State from any other State, it shall be their duty to take such action, and to adopt and enforce such rules as they may, in the exercise of their discretion, deem efficient in preventing the introduction and spread of such disease or diseases. To better accomplish such objects, the board are empowered to establish and strictly maintain quarantine at such places as they may deem proper, and may adopt rules and regulations to obstruct and prevent the introduction or spread of contagious or infectious diseases to, or within the State. They may enforce inspection of persons and articles of baggage, or other goods of whatever character, as well as the purification of the same; and companies or individuals, operating or controlling railroads, passenger coaches, public conveyances, and steamers plying the Ohio river or its tributaries in this State, shall obey

the rules and regulations when made and published by the board in some newspaper printed at or near the place where the danger is; and any owner or person having charge of such railway trains, passenger coach or steamboat, or public or private conveyance, who shall refuse to obey such rules and regulations, when so made and published, shall be guilty of a misdemeanor, and for each offence shall be fined not less than fifty nor more than five hundred dollars, and be confined in the county jail not less than fifteen days nor more than two months, at the discretion of the court. The provisions of this section shall apply to the establishing and enforcing quarantine against the introduction into the State from another state, or the transporting from one county to another county in the State, of any cattle, hogs, horses or sheep suffering with an infectious disease. It shall be the duty of the local board, upon request, to inspect any cattle, hogs or sheep about to be slaughtered for domestic consumption or for shipment.

DUTIES OF LOCAL BOARD AS TO QUARANTINE, ETC.

The local board of health of any county may declare quarantine therein, or in any particular district or place therein against the introduction of any contagious or infectious disease, prevailing in any other State, county or place, and of any and all persons and things likely to spread such contagion or infection. As soon as such quarantine is established, such local board shall, in writing, inform the members of the state board of health residing in their congressional districts, thereof, whose duty it shall be to ascertain, as soon as practicable, the necessity therefor, if any exists, and if they find that no such necessity exists, they shall declare the same raised. The said local board shall have power and authority to enforce such quarantine until the same is raised as aforesaid, or by themselves, and may confine any such infected person, or any person liable to spread such contagion or infection, to the house or premises in which he resides, or if he have no residence in the county, at a place to be provided by them for the purpose; and if it shall become necessary to do so, they shall summon a sufficient guard for the enforcement of their orders in the premises. Every person who shall fail or refuse to comply with any order made by such board under this section, and every person summoned as such guard who shall, without a lawful excuse, fail or refuse to obey the orders and directions of such board in enforcing said quarantine, shall be guilty of a misdemeanor, and for each offence be fined not less than twenty-five nor more than one hundred dollars. In cases of emergency or of act-

ual necessity, and when the court or corporate authorities are from any cause unable to meet or to provide for the emergency or the necessity of the case, all actual expenditures necessary for local and county sanitation, as provided for in this section, shall be certified by the local board of health to the county court, and the whole or as much thereof, as the said court may deem right and proper, shall be paid out of the county treasury. The board of health of any city, town or village, shall have the same powers and perform the same duties therein conferred upon and required of the local board of health in their county. The state board of health may also, under the provisions of this section, declare quarantine in any part of the State, and all the provisions of this section shall be applicable to the quarantine so declared.

RULES AND REGULATIONS FOR PHYSICIANS AND HEALTH AUTHORITIES.

RECOMMENDATIONS TO PHYSICIANS.

Use Antitoxin. Use Antitoxin Early.

On being satisfied that diphtheria exists in a family, the attending physicians should direct the observance of all precautions necessary to prevent the further spread of the disease, and should AT ONCE REPORT the case or cases to the County or City Health Officer (See Act of 1907.) Penalty for non-compliance \$10.00.

The physician should avoid carrying infection. A very leading manner of the conveyance of the bacillus is by FOMITES. The contagion adheres tenaciously to a great variety of objects, and has been transferred in clothing over great distances, giving rise to the disease long after. The physician should thoroughly disinfect all instruments used on a patient and should, especially after close contact with the patient, wash his hair and all exposed cutaneous surfaces with a germicidal solution and thoroughly brush his clothing with a whisk broom wet with the solution.

On the recovery of the patient the attending physician should notify the local health authorities, in order that the quarantine restrictions can be removed. The physician should also impress upon the local health authorities the absolute necessity for a thorough disinfection of the infected room or rooms, if he has reason to believe that this important feature of preventive medicine will be overlooked.

*DUTIES OF LOCAL HEALTH AUTHORITIES.**Isolate, Quarantine, Disinfect.*

Whenever a case of diphtheria or membranous croup is reported, the local health officer, if there be one, or a physician appointed by the city, village or town authorities, should visit the premises and secure prompt compliance with the precautions herein enjoined. Every infected house should be properly placarded, and all children therein confined to the immediate premises during the prevalence of the disease, and steps should be taken to prevent all unauthorized persons, especially children, from visiting the premises. Adults from the infected house should be prohibited from mingling unnecessarily with other people, above all with children, and should be required to disinfect their clothing before going out of the house.

Prompt reports of the existence of diphtheria in a family should be furnished to all public libraries, and care should be taken that no book from the infected premises be returned to the libraries.

It is not considered necessary to close the schools during the prevalence of diphtheria in a community unless it prevails in epidemic form, but all schools in the neighborhood should be notified of the existence of the disease, and should any children affected with diphtheria have attended school, the school should be promptly closed until disinfected.

It is imperative that similar notice be sent also to the superintendents of all Sunday Schools, or to the pastors of the churches, for there is no question but that the liability of the dissemination of contagious diseases is greater in Sunday Schools, which are used but once a week than in public schools, which are cleaned and ventilated daily. As a further precautionary measure the local health authorities should see that rooms used for Sunday school purposes be kept in a sanitary condition and freely ventilated at intervals during the week.

When should the patient be released from quarantine? The time is variable, depending entirely upon the character of the disease, and the presence or absence of complications.

Health officers will ordinarily be justified in raising the quarantine whenever the attending physician certifies that the patient has entirely recovered from diphtheria; and there is no danger of spread of the infection from the patient. As a rule however, the minimum length of quarantine should be two weeks. In very mild cases, and particularly when antitoxin has been administered, the quarantine may be raised within ten days, provided the physician furn-

ishes the certificate required, and especially if a bacteriological examination of the throat shows no evidence of the presence of the bacilli of diphtheria.

The quarantine should not be raised, however, until the infected room, and if necessary the entire house, has been properly disinfected.

On receiving a certificate from the attending physician that the patient has entirely recovered, and that no further quarantine is necessary, the local health officer should see that the infected room and premises, if thought necessary, with contents, be **DISINFECTED** as directed herein. To be effective, the disinfection must be thorough. "There can be no partial disinfection of infectious material; either its infectious power is destroyed or it is not. In the latter case there is a failure to disinfect." Deodorants merely remove offensive odors, and may not have any disinfecting power whatever. A failure to properly disinfect apartments often leads to the recurrence of the disease.

The bacilli of diphtheria will live on infected substances for weeks. They have been known to live for several months on children's playthings which have been put away.

In the disinfection of school rooms the burning of sulphur is usually advisable. This fumigation should always be followed by thorough airing for several hours. The floors and all furniture should be washed with a germicidal solution, preferably Standard Dinsinfectant No. 3.

Local Boards of Health and health officers should guard against the introduction or spread of contagious disease by the exercise of proper and vigilant inspection and control of all persons and things coming within their jurisdiction. They should require prompt reports of all infectious and contagious diseases and the isolation of all persons and things infected with or exposed to infectious or contagious diseases, and should placard and disinfect infected premises, close schools and assume charge of funerals, if necessary. They should also cause the arrest and imprisonment of all persons violating their orders. The authorities may, in general, take any measure of precaution, however stringent, which they may deem necessary or prudent in the interest of the health of the inhabitants.

DISINFECTION.

The thorough disinfection of infected apartments or dwellings is as important as the maintenance of an efficient quarantine during the prevalence of the disease. Hence, no agent should be employed

in the effort to destroy the germs of disease, upon the efficiency of which, under all circumstances, there rests any doubt or uncertainty. The use of a worthless disinfectant or the misuse of a valuable one not only involves a waste of time and material, but jeopardizes the health of the community.

Disinfection of an infected apartment can be successfully performed by thoroughly wetting the floors, ceilings, walls and all exposed surfaces with an efficient germicidal solution. This method, however, is not applicable to the contents of the apartment. For these, fire is the most reliable disinfectant, yet, as other reliable disinfectants are available, there is little justification for the burning of any article of value, except, for instance, books or mattresses or pillows, which cannot be successfully disinfected except by steam.

All infected apartments, with contents, should be disinfected by an efficient aerial germicide, and this fumigation should be followed by a thorough washing of the walls, ceilings, floors and exposed surfaces of the room with a reliable disinfecting solution.

Fumigating by burning sulphur has for many years been a favorite method of aerial disinfection.

Sulphur will be found a thoroughly reliable gaseous disinfectant of considerable penetrating power if it is intelligently employed. To obtain satisfactory results, the following essentials of successful disinfection, established by repeated experiments, must be observed: (a) The infected room, or rooms, must be thoroughly closed, every crack and crevice sealed. (b) Sufficient sulphur must be used. (c) There must be ample moisture in the room. (d) The time of exposure must be sufficient, ten hours the minimum.

In the disinfection of stores, halls, school houses and apartments or dwellings in which there are no articles to be injuriously affected by the gas, sulphur is an ideal disinfectant. Its mode of application is simple (the simpler the mode of application, the better); it is cheap; the material is accessible everywhere, and, finally, the most important of all, the action will be invariably found effective when the sulphur is properly used.

During recent years, formaldehyde gas has, to a very considerable extent, taken the place of sulphur dioxide as a gaseous disinfectant. Various methods for the use of formaldehyde have been devised—all requiring apparatus more or less expensive and complicated—all exploited with extravagant claims of merit and infallibility. None of these, however, has proven worthy of the claims made for it, while many have been entirely worthless. The fact that the vast majority of devices, at one time exploited and enjoy-

ing wide popularity, and widely purchased by confiding health officers, have been eventually relegated to the junk heap, indicates clearly the failure of former methods of formaldehyde disinfection to meet the requirements upon them.

The method now unreservedly recommended by the Board consists merely in pouring formaldehyde solution over crystals of potassium permanganate. This method primarily offers the advantage of absolute simplicity in operation, requiring no special apparatus and no fire. In addition to this, exhaustive experimental work has demonstrated that, in practical disinfection, the method is unusually efficient, regardless of the conditions of humidity, temperatures and other factors which materially affect other methods of the use of formaldehyde.

The only apparatus required is a large open vessel, protected by some non-conductive material to prevent the loss of heat from within. An ordinary milk-pail, set into a pulp or wooden bucket, will answer every purpose, altogether a special container, devised for physicians and health officers, will be found of considerable advantage. This container or generator consists of a simply constructed tin can with broad, flaring top. Its full height is $15\frac{1}{2}$ inches, the height from the bottom to the flaring top being about 8 inches. The lower or round section is 10 inches in diameter, while the flaring top is $17\frac{1}{2}$ inches in diameter at its top. The container is made of good quality of bright tin, is supplied with a double bottom with $\frac{1}{4}$ inch air space between the two layers, and is entirely covered on sides and bottom with asbestos paper. The asbestos paper and double bottom serve effectively to retain the heat which is generated by the vigorous chemical reaction occurring within, and which is essential to the complete production and liberation of the gas. This special container can be made by any tinner of ordinary intelligence and costs but a few dollars.

With the room sealed as described on (page 10,) and, as is essential to any form of aerial disinfection, the crystals of potassium permanganate ($6\frac{3}{4}$ ounces to each 1,000 cubic feet of room space, or ten ounces when the temperature is below 60° F.) are placed in the container. Over this salt is poured "formalin," or the 40 per cent aqueous solution of formaldehyde (16 ounces to every 1,000 cubic feet of room space, or 24 ounces when the temperature is below 60° F.) The formaldehyde gas is promptly liberated by the vigorous chemical reaction of the formalin and potassic salt and rises from the generator in immense volume in the form of

an inverted cone. It is consequently necessary that all preparations be made in advance, and that the operator leave the room at once on the combination of the two chemicals.

The door or window of exit will be promptly closed and sealed, and the room left closed for at least four hours.

As in all methods of disinfection, success largely depends upon the care which is exercised and the attention which is given to every detail. Simple as the method is, neglect of any of the following points may result in complete failure:

1. The room should be sealed and prepared as described on (page 10.)

2. The potassium permanganate ($6\frac{3}{4}$ ounces to every 1,000 cubic feet of room space, or ten ounces at temperature below 60° F.) should be placed in the apparatus or generator. **THE PERMANGANATE MUST BE PUT IN BEFORE THE FORMALDEHYDE SOLUTION.**

3. The 40 per cent formaldehyde solution (16 ounces to the 1,000 cubic feet of room space, or 24 ounces at the temperature below 60° F.) should then be poured over the permanganate.

4. As the gas is given off in immense volume immediately after the mixture of the formaldehyde and permanganate, the operator must leave the room at once. All preparations must have been finished in advance.

5. The door or window of the exit must be promptly closed and sealed, so that there will be no escape of gas, and the room should be left closed for four hours.

6. The room should be thoroughly cleaned after disinfection. All out-of-the-way places, window ledges, mouldings, etc., should be washed with Standard Disinfectant No. 3 (see page 11). The floors should receive careful attention and the solution should thoroughly wet the dust and dirt in the cracks.

Care must be taken not to place too much formaldehyde in a single container. The reaction is violent and there is great effervescence and bubbling. If the room is too large to be disinfected with one generator, use as many more as are required and place in each only a reasonable amount.

Larger quantities than these should not be used.

If good results are to be attained, care must be exercised to secure the best quality of formaldehyde solution. Secure the highest grade 40 per cent. aqueous solution on the market. Good formal-

dehyde is not expensive. Inferior formaldehyde is dear at any price. Its use may bring about most unfortunate results.

The fine, needle-shaped crystals of potassium permanganate are better than the rhomboid crystals. See that you get crystals of potassium permanganate. Do not accept the dust, which often contains impurities.

Prepare the room and its contents as described on (pages 10 and 11,) but remember that books cannot be disinfected with formaldehyde gas.

DON'T USE "FORMALDEHYDE CANDLES." Entire dependence should not be placed upon an aerial disinfectant, even though its penetrating power be great. There should be a thorough "house cleaning" after the exposure to the gas, and the liberal application of a solution of corrosive sublimate to all exposed surfaces in the room and a thorough outdoor airing of its contents.

STANDARD DISINFECTANTS.

The following are simple, cheap and reliable disinfectants.

STANDARD DISINFECTANT NO. 1.

Dissolve Chloride of Lime of the Best Quality in Water, in the Proportion of Six Ounces to the Gallon.

Use one quart of this solution for each discharge from a patient suffering from a contagious or infectious disease. Discharges from the mouth and throat should be received in a cup half full of the solution, and those from the nostrils upon soft cotton or linen rags, which should be immediately burned.

THE CHLORIDE OF LIME MUST BE OF THE BEST QUALITY. POOR CHLORIDE OF LIME IS WORTHLESS. THE SOLUTION SHOULD BE MADE WHEN REQUIRED.

Instead of chloride of lime, carbolic acid may be used in the strength of six and one-half ounces to the gallon of water.

STANDARD DISINFECTANT NO. 2

Dissolve Corrosive Sublimate and Muriate of Ammonia in Water in the Proportion of Two Drachms (120 Grains— $\frac{1}{4}$ Ounce) of Each to the Gallon. Dissolve in a WOODEN Tub, Barrel or Pail, or an EARTHEN CROCK.

Use for the same purposes and in the same way as No. 1. Equally effective, but slower in action. This solution is odorless, while the chloride of lime solution is often objectionable in the sick room on account of its smell.

STANDARD DISINFECTANT NO. 3.

Dissolve One Drachm (60 Grains— $\frac{1}{8}$ Ounce) of Corrosive Sublimate and Muriate of Ammonia in One Gallon of Water. Dissolve in a WOODEN Tub, Barrel or Pail, or an EARTHEN CROCK.

Use for the disinfection of soiled underclothing, bed linen, etc. Mix solution and immerse articles for two hours. Then wring them out and boil them.

Mixed with an equal quantity of water the solution is useful for washing the hands and general surfaces of the bodies of attendants and convalescents. The latter only by direction of the physician.

Good chloride of lime should contain at least 25 per cent of available chlorine. It may be purchased by the quantity at $3\frac{1}{2}$ cents per pound. The cost of the standard solution recommended is therefore about 1 cent a gallon. A clear solution may be obtained by filtration or by decantation, but the insoluble sediment does no harm, and this is an unnecessary refinement.

Chloride of lime, carbolic acid and corrosive sublimate are *DEADLY POISONS*.

Solutions of corrosive sublimate must not be made or kept in a metal vessel. Use a *wooden* tub, barrel or pail or an *earthen* crock.

Solutions of chloride of lime, carbolic acid and corrosive sublimate will injure lead pipes if passed through them in large quantities without free flushing.

STANDARD DISINFECTANT NO. 4.

Milk of Lime (Quick Lime).

Slack a quart of freshly burnt lime (in small pieces) with three-fourths of a quart of water—or, to be exact, 60 parts of water by weight with 100 of lime. A dry product of slack lime (hydrate of lime) results. Make milk of lime not long before it is to be used by mixing one part of this dry hydrate of lime with eight parts (by weight) of water.

Air slackened lime is worthless. The dry hydrate may be preserved some time if it is enclosed in an air tight container. Milk of lime should be freshly prepared, but may be kept a few days if it is closely stoppered.

Quick lime is one of the cheapest of disinfectants. The solution can take the place of chloride of lime, if desired. It should be used freely, in quantity equal in amount to the material to be disinfected. It can be used to white wash exposed surfaces, to disinfect excreta in the sick room, or on the surface of the ground, in sinks, drains, stagnant pools, etc.

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