

APPENDIX.

Poisons and their Antidotes.

ACCIDENTS from poisoning are of such frequent occurrence, that every one should be able to administer the more common antidotes, until the services of a physician can be obtained. As many poisons bear a close resemblance to articles in common use, no dangerous substance should be brought into the household without having the word *poison* plainly written or printed on the label; and any package, box, or vial, without a label, if the contents are not positively known, should be at once destroyed.

When a healthy person is taken severely and *suddenly ill soon after some substance has been swallowed*, we may suspect that he has been poisoned. In all cases where poison has been taken into the stomach, it should be quickly and thoroughly expelled by some active emetic, which can be speedily obtained. This may be accomplished by drinking a tumblerful of warm water, containing either a tablespoonful of powdered mustard or of common salt, or two teaspoonfuls of powdered alum in two tablespoonfuls of syrup. When vomiting has already taken place, it should be maintained by copious draughts of warm water or mucilaginous drinks, such as gum-water or flaxseed tea, and tickling the throat with the finger until there is reason to believe that all the poisonous substance has been driven from the stomach.

The following list embraces only the more common poisons, together with such antidotes as are usually at hand, to be used until the physician arrives.

Acids.—*Hydrochloric acid*; *muratic acid* (spirits of salt); *nitric acid* (aqua fortis); *sulphuric acid* (oil of vitriol).

ANTIDOTE.—An antidote should be given at once to neutralize the acid. Strong soap-suds is an efficient remedy, and can always be obtained. It should be followed by copious draughts of warm water or flaxseed tea. Chalk, magnesia, soda or saleratus (with water) or lime-water, are the best remedies. When sulphuric acid has been taken, water should be

given sparingly, because, when water unites with this acid, intense heat is produced.

Oxalic acid.

ANTIDOTE.—Oxalic acid resembles Epsom salts in appearance, and may easily be mistaken for it. The antidotes are magnesia, or chalk mixed with water.

Prussic Acid; *oil of bitter almonds; laurel water; cyanide of potassium* (used in electrotyping).

ANTIDOTE.—Cold douche to the spine. Chlorine water, or water of ammonia largely diluted, should be given, and the vapor arising from them inhaled.

Alkalies and their Salts.—AMMONIA (*hartshorn*), *liquor of water of ammonia*. POTASSA:—*caustic potash, strong lye, carbonate of potassa* (pearlash), *nitrate of potassa* (saltpetre).

ANTIDOTE.—Give the vegetable acids diluted, as weak vinegar, acetic, citric, or tartaric acids dissolved in water. Castor oil, linseed oil, and sweet oil may also be used; they form soaps when mixed with the free alkalies, which they thus render harmless. The poisonous effects of saltpetre must be counteracted by taking mucilaginous drinks freely, so as to produce vomiting.

Alcohol.—*Brandy, wine; all spirituous liquors.*

ANTIDOTE.—Give as an emetic ground mustard or tartar emetic. If the patient cannot swallow, introduce a stomach pump; pour cold water on the head.

Gases.—*Chlorine, carbonic acid gas, carbonic oxide, fumes of burning charcoal, sulphuretted hydrogen, illuminating or coal-gas.*

ANTIDOTE.—For poisoning by chlorine, inhale, cautiously, ammonia (*hartshorn*). For the other gases, cold water should be poured upon the head, and stimulants cautiously administered; artificial respiration. (See *Marshall Hall's Ready Method*, page 180.)

Metals.—*Antimony, tartar emetic, wine of antimony, etc.*

ANTIDOTE.—If vomiting has not occurred, it should be produced by tickling the throat with the finger or a feather, and the abundant use of warm water. Astringent infusions, such as common tea, oak bark, and solution of tannin, act as antidotes.

Arsenic.—*White arsenic, Fowler's solution, fly-powder, cobalt, Paris green, etc.*

ANTIDOTE.—Produce vomiting at once with a tablespoonful or two of powdered mustard in a glass of warm water, or with ipecac. The antidote is hydrated peroxide of iron. If Fowler's solution has been taken, lime-water must be given.

Copper.—*Acetate of copper* (verdigris), *sulphate of copper* (blue

vitriol), food cooked in dirty *copper vessels*, or pickles made green by *copper*.

ANTIDOTE.—Milk or white of eggs, with mucilaginous drinks (flaxseed tea, etc.), should be freely given.

Iron.—*Sulphate of iron* (copperas), etc.

ANTIDOTE.—Carbonate of soda in some mucilaginous drink, or in water, is an excellent antidote.

Lead.—*Acetate of lead* (sugar of lead), *carbonate of lead* (white lead), water kept in *leaden pipes* or *vessels*, food cooked in *vessels* glazed with *lead*.

ANTIDOTE.—Induce vomiting with ground mustard or common salt in warm water. The antidote for soluble preparations of lead is Epsom salts; for the insoluble forms, sulphuric acid largely diluted.

Mercury.—*Bichloride of mercury* (corrosive sublimate), *ammoniated mercury* (white precipitate), *red oxide of mercury* (red precipitate), *red sulphuret of mercury* (vermillion).

ANTIDOTE.—The white of eggs, or wheat flour beaten up with water and milk, are the best antidotes.

Silver.—*Nitrate of silver* (lunar caustic).

ANTIDOTE.—Give a teaspoonful of common salt in a tumbler of water. It decomposes the salts of silver and destroys their activity.

Zinc.—*Sulphate of zinc*, etc. (white vitriol).

ANTIDOTE.—The vomiting may be relieved by copious draughts of warm water. The antidote is carbonate of soda administered in water.

Narcotic Poisons.—*Opium* (laudanum, paregoric, salts of morphia, Godfrey's cordial, Dalby's carminative, soothing syrup, cholera mixtures), *aconite, belladonna, hemlock, stramonium, digitalis, tobacco, hyosciamus, nux vomica, strychnine*.

ANTIDOTE.—Empty the stomach by the most active emetics, as mustard, alum, or sulphate of zinc. The patient should be kept in motion, and cold water dashed on the head and shoulders. Strong coffee must be given. The physician will use the stomach pump and electricity. In poisoning by *nux vomica* or *strychnine*, etc., chloroform or ether should be inhaled to quiet the spasms.

Irritant Vegetable Poisons.—*Croton oil, oil of savine, poke, oil of tansy, etc.*

ANTIDOTE.—If vomiting has taken place, it may be rendered easier by copious draughts of warm water. But if symptoms of insensibility have come on without vomiting, it ought to be immediately excited by ground mustard mixed with warm water, or some other active emetic, and after its operation an active purgative should be given. After expelling as much of

the poison as possible, strong coffee or vinegar and water may be given with advantage.

Poisonous Fish.—*Conger eel, mussels, crabs, etc.*

ANTIDOTE.—Evacuate, as soon as possible, the contents of the stomach and bowels by emetics (ground mustard mixed with warm water or powdered alum), and castor oil, drinking freely at the same time of vinegar and water. Ether, with a few drops of laudanum mixed with sugar and water, may afterward be taken freely.

Poisonous Serpents.—**ANTIDOTE.**—A ligature or handkerchief should be applied moderately tight above the bite, and a cupping-glass over the wound. The patient should drink freely of alcoholic stimulants containing a small quantity of ammonia. The physician may inject ammonia into the veins.

Poisonous Insects.—*Stings of scorpion, hornet, wasp, bee, etc.*

ANTIDOTE.—A piece of rag moistened with a solution of carbolic acid may be kept on the affected part until the pain is relieved; and a few drops of carbolic acid may be given frequently in a little water. The sting may be removed by making strong pressure around it with the barrel of a small watch-key.

Drowning.

MARSHALL HALL'S "READY METHOD" of treatment in asphyxia from drowning, chloroform, coal-gas, etc.

1st. Treat the patient *instantly on the spot, in the open air, freely exposing the face, neck, and chest to the breeze, except in severe weather.*

2d. In order to *clear the throat*, place the patient gently on the face, with one wrist under the forehead, that all fluid, and the tongue itself, may fall forward, and leave the entrance into the windpipe free.

3d. To *excite respiration*, turn the patient slightly on his side, and apply some irritating or stimulating agent to the nostrils, as *veratrine, dilute ammonia, etc.*

4th. Make the face warm by brisk friction; then dash cold water upon it.

5th. If not successful, lose no time; but, to *imitate respiration*, place the patient on his face, and turn the body gently, but completely, *on the side, and a little beyond*; then again on the face, and so on, alternately. Repeat these movements deliberately and perseveringly, *fifteen times only in a minute.* (When the patient lies on the thorax, this cavity is *compressed* by the weight of the body, and *expiration* takes place. When he is turned on the side, this pressure is removed, and *inspiration* occurs.)

6th. When the prone position is resumed, make a uniform and efficient

pressure *along the spine*, removing the pressure immediately, before rotation on the side. (The pressure augments the *expiration*; the rotation commences *inspiration.*) Continue these measures.

7th. Rub the limbs *upward*, with *firm pressure* and with *energy.* (The object being to aid the return of venous blood to the heart.)

8th. Substitute for the patient's wet clothing, if possible, such other covering as can be instantly procured, each bystander supplying a coat or cloak, etc. Meantime, and from time to time, to *excite inspiration*, let the surface of the body be *slapped* briskly with the hand.

9th. Rub the body briskly till it is dry and warm, then dash *cold* water upon it, and repeat the rubbing.

Avoid the immediate removal of the patient, as it involves a *dangerous loss of time*—also, the use of bellows, or any *forcing instrument*; also, the *warm bath*, and *all rough treatment.*

The Care of the Sick-room.

The sick-room should be bright and airy, and "Sweetness and light" its motto. Other things being equal, it is best on one of the upper floors:—in the case of some "catching" disease on the top floor. Let it be on the sunny side of the house. If for any reason the light of the sun is temporarily to be avoided—as when the eyes are sensitive or have been operated upon—let the light be shut out by a proper arrangement of blinds or curtains. The air-supply to be breathed by the sick person should be pure. Those who, in health, find themselves in an impure air can quit it; they are not compelled to suffer from it; but a sick person may be incapable of recognizing the bad quality of the air, as well as helpless to free himself from it.

To keep the air pure, the windows should be opened as often as three times a day, care being taken to protect the patient from being chilled, while the room is being aired.

Unless the physician shall direct differently, one window—that most remote from the bed—should be open an inch or more both day and night, and in all seasons. The extent to which the sash shall be lowered must be governed largely by the weather and the direction of the wind.

A fire, in an open fireplace, except in summer weather, will be a great help towards keeping the air pure. The upward current through a chimney flue, if unobstructed, is equal to or not far below 20,000 cubic feet per hour: an outlet sufficient for a room occupied by ten persons.

The inlet of air, however, must not be forgotten, otherwise the air of the

room tends to become both impure and rare. As our houses are generally constructed, the inlet of air is best secured by a window-sash being lowered from the top.

Take special care that no stationary wash-basin or other sewer-connected convenience is improperly plumbed, and that sewer gas cannot by any possibility escape into the sick-room.

The swinging of doors to create a current is not an efficient means of ventilation, as it agitates the air of the room without purifying it, and often disturbs the patient.

A draught of air is to be avoided; it will seldom occur that the air of the room requires to be so speedily changed that the patient need be exposed to a draught; never, when care has been taken to provide continuous and gradual ventilation.

It should be borne in mind that cold air is not necessarily pure air, and that ventilation is not less needed in winter than in warm weather.

Sleep is a great necessity to the sick. If a well person slumbers in the day-time, it will interfere with his sound repose at night, but with the sick this is generally not the case. The more they sleep the more favorable are the chances for their recovery: so that it will be readily seen how important it is to avoid noise and jar in the sick-room, especially if the disease is acute.

Bear in mind that even slight noises, as the rustling of garments, the creaking of doors, whispering or noisy footfalls, may be sufficient to disturb a brain that is rendered sensitive by pain or wakefulness.

The clothing next the skin should be changed more frequently in sickness than in health. These changes must be quickly and deftly made, and with as little disturbance as possible.

Under some conditions of disease, the best welfare of the patient is accomplished by having two beds in the room instead of one.

The temperature of the room must be watched. To that end a thermometer should always be present, and easily approached. It is better not to have it directly in the view of the patient. The temperature should not be allowed to vary much from 65° F., unless the doctor otherwise directs.

Let the furniture be as plain and as free from upholstery as possible: not many pieces are required. Movable carpets or rugs are better than those that are permanently laid. Curtains about the windows are out of place in a sick-room: so are flowering plants and birds, as a general rule. Florence Nightingale, however, makes an exception in the case of chronic invalids, and consents to the comforting influence of a pet bird or two.

In regard to the admission of visitors and conversation, much will depend upon the strength of the patient and the kind of sickness: at

many times these are to be forbidden, as having a disquieting influence. When contagious disease is in the house, the sick-room must be avoided by all except those who have the care of the patient, and those having this care should avoid coming in contact with the other members of the household, especially the children.

Bear in mind that everything brought in contact with the sick is liable to endanger the health of the well.

No articles in use by the invalid should be removed or used by others until thoroughly disinfected: the dishes and spoons should be put in boiling water before being taken from the room. The room itself should be fumigated with sulphur when the person is removed from it.

Old pieces of muslin, etc., may be used instead of handkerchiefs to receive the poisonous discharges from the nose, mouth, and throat. These can be destroyed by fire, and thus prevent the danger of conveying the disease to others.

"Taking the breath" and kissing should be avoided by those in attendance upon the case.

The bottles of medicine and other reminders of illness should, as far as convenient, be withdrawn from the view of the sick.

Such as are to be kept always at hand, should be arranged in an orderly way upon a tidily-covered bed-side table. The sight of a siphon-bottle of aerated water is agreeable to most patients: that may be kept in the room, but the vessels containing milk, drinking-water, etc., should be kept elsewhere.

Disinfection.

Filth fosters or produces certain diseases; it should therefore be removed as soon as possible. When it is difficult to remove it, disinfectants come into play, as they have the power to rob it of some of its disease-making force. But let it be remembered that disinfection is not cure: it is not a substitute for cleanliness and pure air. The true cure is the removal of filth: and when our homes are concerned in some question of drainage where the filth is out of our sight, it may be necessary to consult and employ the plumber or some other artisan.

In times gone by, it was the custom to mask bad smells by burning pastiles, coffee, cascarilla, and the like. These are not now much used, for most persons have come to understand that the fumes thus created do not remove but simply overpower the evil odors.

Chemistry has advanced to such a point that various pungent chemical substances, formerly not well known, can be furnished at small cost, and these substances have the power in varying degrees, to check vile odors.

Carbolic acid, chloride of lime, and Labarraque's solution are among the best known of these, but there are also certain of the salts of iron and zinc and the permanganate of potash that may be used. Sulphur is much used for the fumigation of rooms that have been infected.

Another cheap disinfectant is a solution of chloride of lead. It is inodorous, effective, and the cost is small. Take half a drachm of the nitrate and dissolve it in a pint or more of boiling water. Dissolve two drachms of common salt in a pail or bucket of water: pour the two solutions together and allow the sediment to sink. A cloth dipped in this solution and hung up in a room will correct a bad odor promptly, or if the solution be thrown down a drain or upon foul-smelling refuse, it will have the same effect.

The room to be purified with sulphur should be made as tight as possible, so that no fumes can escape, either by window, door or chimney. Put three pounds of sulphur in an iron pot, which should not stand upon woodwork or carpet, lest they be burned, but in a large pan of ashes, or upon a layer of bricks; on this sulphur pour a table-spoonful of alcohol. This is then set on fire, and everybody immediately withdraws from the room. The room should remain closed ten hours, after which it should be thoroughly aired before it is occupied, for the fumes of the sulphur are irritating to the lungs.

The chemicals above mentioned should be known and labeled as poisons. Many persons have been injured, if not killed, by incautiously or ignorantly drinking those that are of a liquid form.

Heat is one of the best, if not the best disinfecting agent. Articles of bedding and furniture that cannot well be treated otherwise can be purified by a long exposure to a temperature of 240° F. In some cities, especially in England, furnaces are made for the reception of bulky articles that have become infected.

Fresh pure air is another powerful agent. If woven fabrics, clothing and the like are for a long time aired out of doors, they cease to be infective; probably by the enormous dilution, if not destruction, of the elements of danger.

Certain diseases are "catching"; they have the power of spreading from one person to another, chiefly by the particles that pass off from the body of the patient. Among these diseases are small-pox, measles, scarlet fever, and diphtheria. The articles that are worn or used by the patient become "infected," and they should be disinfected before they are used by others. As a rule, of course, a doctor will be called in to attend to these diseases. When that is so, follow his directions as to disinfection as well as every other part of the treatment of the case. For substances that are not injured by being washed, a good and cheap disinfectant is

sulphate of zinc ("white vitriol") and common salt dissolved in water, boiling-hot if possible: using eight table-spoonfuls of the zinc and four of salt to the gallon of water. This is useful for clothing, bed-linen, towels, handkerchiefs, etc. After these articles have lain for an hour or two in this solution, they should be allowed to stand in boiling water before being washed. Infected articles that are of little value should, of course, be destroyed by fire.

The United States Treasury Department has published the following formula for the disinfection of the rags coming from Egypt: "1. Boiling in water for two hours under a pressure of fifty pounds per square inch; 2. Boiling in water for four hours without pressure; or, 3. Subjection to the action of sulphur fumes for six hours, burning one and one-half to two pounds of roll brimstone in each 1,000 cubic feet of space, with the rags well scattered upon racks." Either of these three methods is accepted as sufficiently thorough to prevent the spreading of cholera by means of rags.

Emergencies.

"The readiness is all."—HAMLET.

The life of many a child has been saved by the fire-drill in schools, and great good has been done on shipboard by a drilling of the crews.

If in a building filled with smoke, get down on hands and knees and crawl to door or window.

In a cellar, well, or vat where carbonic acid can collect, the true posture is to stand erect. If a candle, on being lowered into a suspected place, is put out, you may know that there is danger to human life.

Burns and Scalds.—The secret of the best treatment of these injuries is to exclude the air from the wounded surfaces. When they are slight, and the skin is not destroyed but merely blistered, prevent the displacement of the skin as much as possible. Let the blisters be punctured, if necessary, to let out the liquid, and then keep the skin in place by cotton cloth or lint, wet with a solution of one teaspoonful of carbolic acid in a quart of water, or a strong solution of baking soda. The cloth should be kept wet constantly, but do not irritate the wound by taking off the dressing too often.

Extensive burns are much worse than deep burns. In the former case, the outlook is grave and the patient will probably require the best aid, both medical and surgical, of some physician.

Scars after Burns.—If a burn be on the face, neck, or near a

joint, it is not well to hasten the healing process, on account of the contraction that always takes place as the scar is formed.

“Fire is a source of danger, and is very destructive to life at times. Spontaneous combustion of the human body when saturated with alcohol is a myth, though perhaps the alcoholized body does burn more readily than one free from inflammable fluid. When a lady is on fire, she should not, and ought not to be permitted to run; that fans the flames amazingly. She must be laid down, and rolled up in the nearest woollen article,—rug, coat, or blanket. Such wrapping up in a non-inflammable article is a most effective method of extinguishing the flames. Immersion in water is, unfortunately, rarely practicable.”—*Fothergill*.

Illuminating Gas is dangerous in two ways. If it escapes into a tightly closed room in sufficient quantities, it causes the death of the inmates by suffocation, unless some one from without discovers the perilous situation. If not too late, remove the patient into fresh air, undo the clothing, dash cold water on the face and neck, and employ artificial respiration, as in drowning (see p. 180). Again: If it escapes freely into an apartment, it forms an explosive compound by mixing with the air. If then a light is unguardedly taken into the place, an explosion that may be destructive to life will result. Always thoroughly air any room that has the odor of escaping gas before a light is taken in.

Kerosene is the cause of even more “accidents” than gas. Too much care cannot be taken in its use. Buy only that which has been tested, but remember that not all that are marked as “safe” are truly so. If a responsible oil-man certifies that the oil will not “flash” under 140°, it may be regarded as safe if properly used. Lamps should be filled only in the daytime. Never attempt to fill a lamp that is lighted, and never put kerosene in the stove for the purpose of kindling a fire. Very small lamps are dangerous, as also is a lamp that has burned a long time, and has but very little oil in it.

Frost-bites.—Keep away from the fire and in a cool room. Rub the nose or other part that has been “bitten” with snow or ice-water until the blood is again warmed and circulating in the part. Chilblains should not be brought to the fire; if the skin is unbroken, it should be hardened by brushing it over with alcohol having tannin in it.

Cuts.—These, if severe, should be promptly attended by a physician, but every one should know how to treat small wounds. Learn the difference between the two kinds of bleeding, called “arterial” and “venous.” Arterial is bright red and comes in jets (or with throbs corresponding to the pulse); venous is dark colored and flows continuously. In the former, press on that side of the wound nearer to the heart; in the latter, on the further side. Or, pressure may be made over the wound itself with the

fingers—this may stop the loss of blood from small arteries as well as from veins. Loss of blood from arteries is apt to be more rapid and dangerous than that from veins, and when the cut vessel is a large one, the skill of the surgeon will ordinarily be required in order to close the bleeding artery permanently and securely.

It is well, in every household, to have, in some handy and well-known place, some strips of old muslin and some lint, or oakum, a bandage or two and some adhesive plaster, a soft sponge, and needles and thread in a basket or box by themselves. In this way, valuable time may be saved in the staunching of blood, flowing in consequence of some accidental cut or other injury.

Fits or Convulsions.—These may be trivial or grave. If it is a young woman, the attack is probably hysterical and, as a rule, not dangerous, and a sprinkle of cold water will bring relief. If the patient struggles with regularity of movement, and there is bloody froth on the lips, it is a case of epilepsy, and requires a physician’s attendance. Meanwhile, protect the head from injury by putting a pillow or some soft article beneath it; a cork introduced between the teeth will prevent the biting of the tongue. Prevent the person from falling or injuring himself, but do not attempt to forcibly hold him quiet.

In children, apply cloths dipped in water to the head; disturb the child as little as possible; do not use a warm bath until directed by the doctor.

Fainting.—This occurs when the blood is deficient in the brain. The proper position, therefore, is upon the back. Let the window be opened to admit fresh air; fanning, and the sprinkling of water are useful. If the clothing about the chest is tight, let it be loosened. If the faint occurs at church or some public gathering, remove the person promptly to the outer air: for foul air is frequently the cause of the trouble.

Vertigo.—This is “a rush of blood to the brain.” The body should be placed in the sitting posture, with the head erect. If the blood escapes into the brain by reason of the rupture of a blood-vessel within it, the case is very grave, and the physician should be summoned at once. Meanwhile, let the position of the body be as above stated. Apoplexy is known, in very many cases, by the helpless condition of an arm or leg, or both.

Sunstroke is seldom produced in this climate in persons who have not labored too hard. Fatigue and sun-heat are commonly the joint causes of sudden prostration in summer; although “heat-stroke” may occur in an artificially-heated atmosphere, without exposure to the sun. In the tropics, the least possible exertion is by the natives put forth during the midday hours. On very hot days, therefore, avoid fatigue and labor in

the open air as much as possible. Keep the head cool. If any unusual, dizzy feeling comes on, apply cold water to the head and neck. If a person falls unconscious and the skin is decidedly hot and dry, he should be taken to a cool place. If the face and head are red and hot, apply ice-water on cloths. If pale, give stimulants gradually and use cold water sparingly.

Shock may be caused by a fall or a blow upon the head or the pit of the stomach. It is known by slowing of the pulse and respiration; the face is pale and the skin becomes cool. The head should be placed low, some ammonia in water be given and warmth applied to the surface of the body.

The Home and Health.

The location of the house should be airy, dry, and sunny.

A certain amount of elevation is necessary, in order to secure proper drainage. Too much shade must not fall upon the house, as sunlight is very necessary to a proper degree of animal vigor. Young children, as is well known, especially profit by the tonic influence of sunlight.

The cellar is an important part of the dwelling; therefore, unless care be taken for its ample ventilation, it will be the source from which is supplied much of the air breathed in the upper chambers of the house. If the cellar is damp the house is liable to become so, and if vegetables are stored in the cellar, an especial degree of care is needed to ventilate it thoroughly and constantly.

House Drainage.—An English writer has stated that “the most important part of the house is the drains.” This, no doubt, sounds strangely to the ears of many, who have been brought up to view the parlor or drawing-room as the true centre of the house, and yet it is no foolish saying, when we reflect that with a bad system of drainage to a house every dweller therein stands in peril of several forms of disease that, mild as the cases may be, are a source of anxiety, and when severe, too often have a fatal termination. Drain-diseases, such as typhoid fever, dysentery, diphtheria, and scarlet fever, often destroy entire families. These diseases do not always spring upon a home through defective drainage, but when they do, they frequently show themselves in a very violent form.

Drainage (as applied to dwellings) consists in conveying away from the house the liquid and solid impurities that would otherwise accumulate in or near the dwelling. Waste is a necessary accompaniment of all animal life, to the preparation and the taking of food, to the clothing of the body, to bathing and other simple acts of daily life. The waste material of houses tends to decay and to become offensive. It must, therefore, not

only be put out of sight and smell, but must be removed so far away that it cannot return in the form of dangerous, invisible gases of decomposition.

The best house-drains are made of iron or glazed earthenware, carefully selected and well laid. The joints of the pipes should be gas-tight. The soil-pipe should be carried up to and through the roof. All the waste-pipes from basins, etc., in the rooms should be joined in a gas-tight manner to the soil-pipe, and each and every basin and other fixture should have a separate trap. What is a trap? It is a device that is designed to retain a certain portion of the water running through it—called the “water-seal”—so that the ascent of air or gas, from the drain back into the room, is prevented. It “traps” the sewer gas away from us. Whenever a fixture has been used and there is not, beyond all doubt, a sufficiency of water to fill the trap, additional water should be poured in. Traps are of various sizes, and of an infinite variety of patterns and patents, and must vary greatly according to their situation, but one thing should be made sure of in their use, namely, that they hold not less than two inches of water as a “seal.”

There is at almost all seasons of the year an upward, because warmer, current of air through the main pipes. It is therefore better to have a fresh-air inlet pipe near the point where the drain leaves the house-wall. This helps to prevent the unsealing of traps. It also brings about a purer condition of the air in the interior of the system of pipes: so useful is this air-current through the soil-pipe that if applied there is little danger of the escape of sewer gas into the living rooms.

What is sewer gas or sewer air? It varies greatly in different places and at different times. It is not a definite gas, like oxygen, nitrogen, etc., but varies in composition, and what is still more worthy of note, it varies in its dangerous qualities. It is not always offensive, although it is generally so; its odor has been described as being “sweetish and sickish.” Its dangerous qualities have not yet been determined by chemistry or the microscope, but one practical point may be borne in mind, namely, that when a case or cases of contagious disease occur in any house along any given line of sewer pipes, it is best to use disinfectants in the drainage of the other dwellings along the same line of sewer. Children should avoid playing over or around the sewer gratings in the streets at all times, and especially when scarlet fever and like contagious diseases are known to be in the neighborhood, for the exit of sewer air at these points is always very free, unless it be directly after a rainfall.

One other point must be remembered, that the best laid system of house plumbing is not indestructible. In the course of time, defects will

arise, breaks will occur; for this reason it would be well for every householder to have an examination made at intervals of every joint and along the whole line of the house connection with the sewer or drain.

It is thought by many that sewer gas is not found in the country because there are no sewers: they have been misled by the word. If the words "drain air" or "filth gas" had been adopted, the universal production of this injurious substance, in close connection with every abode of man, wherever located, might have been better understood. In country houses there are, perhaps, fewer dangers of contamination of the air we breathe by waste products, because there are fewer water-closets, wash-basins, sinks, etc., and the rooms are less exposed to impure air.

But in the country danger is apt to come by or through the pollution of the water supply. The well, which furnishes that cool and refreshing draught, is the point to be watched. It is convenient to have the well near the house, because when snow is on the ground and the weather is cold, the distance to the well from the house is a matter of no small moment. Near the house must be the stable and pens for animals: the waste from the house goes upon the ground, and not very far away from the house: the chamber slops and the more offensive matters go into a pit, which must not be too distant. The result of all these conditions is a pollution of the soil at all these points—a pollution which spreads with every rainfall, and which, sooner or later, reaches the well; yet the water may appear as pure as ever. It only remains to have the suitable disease-germ lodged in this polluted territory to bring down the whole household with a fever. This is the kind of soil-pollution which is hard to cure, and which, in long-settled countries, causes laws to be enacted requiring all vaults for the reception of house and human waste to be made water-tight, so as to save the soil from its poisoning influence.

This is the kind of poisoning which, in the Dark Ages, caused so much unrighteous persecution of the innocent. In those days, no care whatever was taken in the towns, high-walled, crowded, and unsewered, to protect the water supply from pollution: as a result, some terrible epidemic of fever would arise. Then the angry populace would, in their ignorance, cry out: "The Jews have poisoned the wells." The wells were poisoned, no doubt, but the Jew was no more worthy of blame than were his accusers. Nevertheless, the Jews were not spared: they were robbed, imprisoned, executed.

Drainage in the city is a comparatively easy problem when the city's sewers are laid in the streets. In the country it is more difficult, and on this account the fewer fixtures or "modern improvements" there are in the house the better it will be. There should be no less care within the country house, where waste-pipes are put in, than in the city house.

The material should be well selected, tightly joined, and properly ventilated. The water-closet should be remote from the house. Earth-closets are better than the ordinary vaults—house-waste from kitchen and laundry should be taken to a considerable distance from the house, and far away from the well, and either deposited in a water-tight cesspool or conveyed away, by a system of subsoil drainage tiles, arranged so as to fertilize some unoccupied plot of ground.

On Going into the Country.

To spend the summer in the country would be the choice of all city-dwellers, whenever their purses will permit of it. And there are not a few advantages in such a course; the change of scene is good, the mountains and the seaside give a purer and cooler air: an air that invigorates and aids in restful sleep at night, so different from the midsummer atmosphere in hot cities. There are fewer excitements in the country; we do not "live so fast," and there is full scope for healthful life and activity in the open air, with the green and blue of nature all about us, instead of the monotonous walls of towering houses.

But this course, pleasant and helpful to so many, is not without its danger. Many who "go away" on vacation are brought home sick on account of fever or other sickness caused by defects and faults of drainage existing in these temporary summer homes. Scarcely a year goes by that one or more summer resorts have not gained the ill name of being the hotbeds of typhoid fever, dysentery, and the like.

In view of this, how important it becomes that we exercise judgment and seek skilled advice in the selection of our summering places.

Again, there is another danger that must not be overlooked. Let us suppose that the summer vacation has passed by without accident; that we return invigorated by the experience; and that the home in the city has been empty and closed during our absence; what has happened that the air in the rooms newly reopened should be foul and stifling? This has taken place; the water that stands in the traps of house pipes, and shuts off gases from the sewer, when the rooms are in use and water is daily entering the different wash-basins, etc., has during our absence been evaporated. For weeks, perhaps, there has been no "water-seal" in the traps, and the ascent of sewer air has been going on continuously, so that not only is the air utterly unfit to live in, but all the curtain, carpets, and other absorbing materials have become saturated with the pollution thus allowed to enter. Let it be remembered that when a sink, etc., is not in use, it is gradually losing the trap-water by the evaporation.

What is the remedy, you will ask, for the condition of things caused by closing up the house, as above stated? To this the reply is, that the house should from time to time be opened and aired, and water should be poured down each and every sanitary fixture, in sufficient quantity to renew the supply of water in the trap of each.

GLOSSARY.

- AB-DO'MEN (Latin *abdo*, to conceal). The largest cavity of the body, containing the liver, stomach, intestines, etc.; the belly.
- AB-SOR'BENTS (L. *ab* and *sorbeo*, to suck up). The vessels which take part in the process of absorption.
- AB-SORP'TION. The process of sucking up fluids by means of an animal membrane.
- AC-COM-MO-DA'TION of the Eye. The alteration in the shape of the crystalline lens, which accommodates or adjusts the eye for near and remote vision.
- AC'ID, LACTIC (L. *lac*, milk). The acid ingredient of sour milk; the gastric juice also contains it.
- AL-BU'MEN, or Albumin (L. *albus*, white). An animal substance resembling white of egg.
- AL-BU'MI-NOSE (from *albumen*). A soluble animal substance produced in the stomach by the digestion of the albuminoid substances.
- AL-BU'MIN-OID substances. A class of proximate principles resembling albumen; they may be derived from either the animal or vegetable kingdoms.
- AL'I-MENT (L. *alo*, to nourish). That which affords nourishment; food.
- AL-I-MENT'A-RY CA-NAL (from *aliment*). A long tube in which the food is digested, or prepared for reception into the system.
- AN-ÆS-THET'ICS (Greek, *an*, without, *αἰσθησία*, *aisthesia*, feeling). Those medicinal agents which prevent the feeling of pain, such as chloroform, laughing-gas, etc.
- AN-I-MAL'CuLE (L. *animal'culum*, a small animal). Applied to animals which can only be seen with the aid of the microscope. Animalculum (plural, animalcula) is used with the same meaning.
- A-OR'TA (Gr. *ἀορτή*, *aorteomai*, to be lifted up). The largest artery of the body, and main trunk of all the arteries. It arises from the left ventricle of the heart. The name was first applied to the two large branches of the trachea, which appear to be lifted up by the heart.
- A'QUE-ous HUMOR (L. *aqua*, water). A few drops of watery colorless fluid occupying the space between the cornea and crystalline lens.