MEDICAL HANDBOOK

UNITED STATES LIGHTHOUSE SERVICE

1915

DEPARTMENT OF COMMERCE
LIGHTHOUSE SERVICE

PREVENTION OF DISEASE AND CARE OF THE SICK AND INJURED

MEDICAL HANDBOOK FOR THE USE OF LIGHTHOUSE VESSELS AND STATIONS

1915

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WITH A SUPPLEMENT ON

FIRST AID TO THE INJURED

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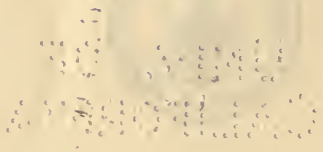

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MEDICAL HANDBOOK FOR THE USE OF LIGHTHOUSE VESSELS AND STATIONS.

DEPARTMENT OF COMMERCE,
BUREAU OF LIGHTHOUSES,
Washington, D. C., June 11, 1915.

This handbook has been prepared for the benefit of officers and employees of the Lighthouse Service, whose duty on vessels and at remote stations may render it difficult at times for them to obtain necessary medical assistance or advice. In all cases of serious sickness or injury, however, medical attendance should be obtained as soon as practicable. Written directions must very imperfectly supply the place of the physician and surgeon. With a medicine chest and handbook it is not possible to provide for and explain to persons who have not had a medical education the treatment of more than a few of the commoner diseases.

Medicine chests, equipped with the list of articles given herein, will be supplied to the vessels and remote stations, as approved. Such chests must be kept accessible, frequently inspected, and fully equipped. The dates when obtained must appear on all medicines and packages, and they must be renewed when no longer serviceable, according to the length of time stated in the list of medicines and articles.

Sick or disabled persons employed on vessels of the Lighthouse Service will be admitted without charge to relief stations of the United States Public Health Service upon application of their respective commanding officers.

This handbook is a revision for the use of the Lighthouse Service of the Medical Handbook, 1912, revised by W. J. Pettus, Assistant Surgeon General, from the Handbook for the Ship's Medicine Chest, prepared by George W. Stoner, surgeon, United States Public Health Service, by direction of the Surgeon General of that service.

G. R. PUTNAM,
Commissioner of Lighthouses.

LIST OF MEDICAL AND SURGICAL SUPPLIES.

Medical supplies.

[Supplies for Lighthouse Service medicine chests are marked with an asterisk, thus: (*).]

For vessels.	For stations.	Item.
*1 pound	*1 pound	Absorbent cotton.
1 pint	½ pint	Alcohol.
½ pound	4 ounces	Alum.
*½ pint	*4 ounces	Aromatic spirit of ammonia.
*100	*100	Aspirin, 5-grain tablets.
*1 yard	*1 yard	Belladonna plaster (1 year).
*4 ounces	*4 ounces	Bicarbonate of soda (baking soda).
*100	*100	(**Poison**) Bichloride of mercury, antiseptic tablets of 7.3 grains each. One tablet to a pint of water makes solution 1 part of bichloride to 1,000 of water.
*100	*100	Bismuth subnitrate, 5-grain tablets.
½ pound	4 ounces	Borax.
*1 pound	*½ pound	Boric acid (boracic acid), powdered.
*100	*100	Bromide of potash, 5-grain tablets.
*100	*100	Brown Mixture lozenges.
*100	*100	Calomel, $\frac{1}{10}$-grain tablets, amber-colored bottle (1 year).
*100	*100	(**Poison**) Camphor and opium pills.
½ pint	4 ounces	Camphorated oil.
*1 pint	*½ pint	(**Poison**) Carbolic acid, liquid, pure.
*1 pint	*½ pint	Castor oil.
½ pound	4 ounces	Charcoal.
*100	*100	Chlorate of potash, 5-grain tablets.
100	100	Compound Cathartic Pills, vegetable.
*100	*100	Copaiba, 5-minim capsules.
*1 ounce	*½ ounce	(**Poison**) Creosote, Beechwood.
1 pint	½ pint	Dobell's Solution.
1 ounce	1 ounce	Ear drops, formula: Carbolic acid, 1 fluid drachm; glycerin, 7 fluid drachms; well mixed.
*2 pounds	*1 pound	Epsom salts.
½ pint	4 ounces	Essence Jamaica ginger.
4 ounces	2 ounces	Essence of peppermint.
½ pint	4 ounces	Essence of pepsin.
1 pound	½ pound	Flaxseed meal (linseed meal).
1 pint	1 pint	(**Poison**) Formalin (1 year).
*1 pint	*½ pint	Glycerin.
*100	*100	Iodide of potash, 5-grain tablets.
*4 ounces	*2 ounces	(**Poison**) Laudanum (1 year).
1 pint	½ pint	(**Poison**) Lead and opium wash. Shake well before using.
½ pound	4 ounces	Magnesia, calcined, heavy.
*½ pound	*4 ounces	Mustard.
1 ounce	½ ounce	(**Poison**) Oil cloves.
*1 pint	*1 pint	Olive oil (sweet oil).
*½ pint	*4 ounces	(**Poison**) Paregoric.
100	100	Permanganate of potash, 5-grain tablets.
1 pint	1 pint	Peroxide of hydrogen solution (1 year).
1 pint	½ pint	(**Poison**) Picric acid, ½ per cent solution.
*100	*100	Quinine sulphate, 5-grain tablets.
*100	*100	Salicylate of soda, 5-grain tablets.
100	100	Salol, 5-grain tablets.
½ pint	4 ounces	Sirup of ipecac.
*1 quart	*1 pint	Soap liniment.
*100	*100	(**Poison**) Strychnine sulphate, $\frac{1}{60}$-grain tablets.
*100	*100	(**Poison**) Sun Cholera Mixture, 15-minim tablets.

LIST OF MEDICAL AND SURGICAL SUPPLIES—Continued.

Medical supplies—Continued.

For vessels.	For stations.	Item.
½ pint	4 ounces	Sweet spirit of niter, dark-colored bottle (1 year).
½ pound	4 ounces	Tannic acid.
1 pint	½ pint	Tincture of green soap.
*½ pint	*4 ounces	(**Poison**) Tincture of iodine (1 year).
½ pint	4 ounces	Tincture of iron.
*½ pint	*4 ounces	Tincture of myrrh.
1 pint	½ pint	Turpentine.
1 pound	½ pound	Unguentine (for burns, scalds, etc.).
*1 pound	*½ pound	Vaseline.
6 powders	6 powders	(**Poison**) Zinc sulphate (white vitriol), 15-grain powders. (One powder in water to produce vomiting.)

These medicines will remain serviceable until used if kept in glass-stoppered bottles, with the exception of those marked "1 year," which should be renewed after that interval. The containers of all articles marked "1 year" should be plainly marked with the date on which such articles are received.

For bulky articles not over a pint of each need be kept in the medicine chest.

Special bottles with a rough surface must be used for poisonous medicines. These bottles must be plainly marked **Poison.**

Doses for children.—Add 12 to the age of the child and divide the age of the child by this sum. This fraction will represent the size of dose compared with that for an adult. Example: For a child 2 years old $\frac{2}{2+12}=\frac{2}{14}$ or $\frac{1}{7}$; the dose is one-seventh of that for an adult.

Surgical supplies, etc.

[Supplies for Lighthouse Service medicine chests are marked with an asterisk, thus: (*).]

For vessels.	For stations.	Item.
*2	*1	Adhesive plaster, 10-yard reel, 1 inch wide.
2 dozen	1 dozen	Applicators, small, wooden.
1	1	Atomizer. De Vilbiss.
		Bandages:
*1 dozen	*1 dozen	2-inch by 3-yard (one-half dozen gauze and one-half dozen muslin).
1 dozen	1 dozen	3-inch by 5-yard (one-half dozen gauze and one-half dozen muslin).
1 dozen	1 dozen	4-inch by 5-yard (muslin).
4	2	Bandages, plaster of Paris, 3-inch. Each contained in an air and moisture proof container.
6	6	Bandages, triangular (Esmarch's bandage), with figures printed on them showing the various ways they can be used.
6	3	Camel's-hair brushes.
*1	*1	Catheter, rubber, No. 20 F. (1 year).

LIST OF MEDICAL AND SURGICAL SUPPLIES—Continued.

Surgical supplies, etc.—Continued.

For vessels.	For stations.	Item.
1	1	Corkscrew.
1	1	Forceps, artery (hemostatic forceps). This can be used to grasp a bleeding vessel until it can be tied, or until the doctor arrives. A catch holds the grip of the forceps. Sterilize by boiling.
1	1	Forceps, dressing, or dissecting. Will be found convenient in cleaning up a wound and applying dressings; also in removing splinters, etc. Sterilize by boiling.
1	1	Fountain syringe, 2-quart (1 year).
10 yards	5 yards	Gauze, picric acid. Good dressing for wounds and scalds.
*10 yards	*5 yards	Gauze, plain, sterile.
1	1	Hot-water bottle, rubber, 2-quart (1 year). Metal bottle preferred.
6	6	Medicine droppers.
1	1	Medicine glass.
2	2	Nail brushes.
2 dozen	2 dozen	Safety pins, large.
1	1	Scissors, dressing, surgeon's, for cutting gauze and bandages. Sterilize by boiling.
1	1	Shears, for cutting cotton and muslin, etc.
6	3	Splints, wooden. Straight and angular splints made of thin board, as described in chapter on "Fractures."
*1	*1	Spool of silk ligature, medium size.
*2	*2	Surgical needles, in glass-stoppered bottles.
*1	*1	Thermometer, clinical, Fahrenheit.
1	1	Tooth forceps, incisor.
1	1	Tooth forceps, molar.
4 pieces	2 pieces	Wire gauze, made of heavy mesh malleable wire. When well padded can be wrapped around a fracture for temporary dressing.
4 sheets	2 sheets	Yucca palm (a thin fiber board). Can be wrapped around fracture for temporary dressing.

Gauze and bandages should be in paraffin-paper packages, sealed after sterilization.

Catheters and other rubber goods should be in sealed paraffin packages or envelopes, slightly dusted with sterile talcum on the inside of the package.

Scissors and instruments, if not in cases, may be coated with paraffin, which will come off when dipped in hot water.

Articles marked "1 year" should be discarded after that interval and new ones obtained. The containers of all articles marked "1 year" should be plainly marked with the date on which such articles are received.

SANITATION.

On vessels.—The master of a vessel should observe the following measures on board his vessel, and the same rules should be applied at light stations, so far as useful:

The water-closets, forecastle, bilges, and similar portions of the vessel liable to harbor infection should be frequently cleansed.

Free ventilation and rigorous cleanliness should be maintained in all portions of the ship during the voyage and measures taken to destroy rats, mice, fleas, flies, roaches, mosquitoes, and other vermin.

Everyone on board a vessel or on duty at a light station should be provided with a separate towel, soap, and drinking cup for his individual use in order to prevent conveyance of disease from one person to another. Water butts should have spigots and tight-fitting tops secured by lock and key to prevent seamen from dipping their cups into the water.

A patient sick of a communicable disease should be isolated and one member of the crew detailed for his care and comfort, who, if practicable, should be immune to the disease.

Communication between the patient or his nurse and other persons on board should be reduced to a minimum.

Used clothing, body linen, and bedding of the patient and nurse should be immersed in boiling water or in a 3 per cent solution of carbolic acid before removal from room, and should be kept so immersed for 1 hour.

Eating and drinking utensils, after being used by the patient, should be washed in boiling water. They should not be used by others until they have been sterilized by boiling.

The compartment from which the patient was removed should be disinfected and thoroughly cleansed.

Any person suffering from malarial fever should be kept under mosquito bars and the apartment in which he is confined closely screened with mosquito netting. All mosquitoes on board should be destroyed by burning Pyrethrum powder (Persian insect powder) or sulphur, in pots, 2 pounds to 1,000 cubic feet air space, the room or compartment to be closed for 2 hours. The pots should be placed upon metal or in utensils containing water in order to guard against fire. If Pyrethrum powder is used the stupified mosquitoes should be swept up and burned after the fumigation, as otherwise they may again become active. Mosquito larvæ (wigglers or wiggle tails) should be destroyed in water barrels, casks, and other collections of water about the vessel by placing a thin layer of petroleum (kerosene) on top the water. Where this is not practicable, use mosquito netting to prevent the exit of mosquitoes from such breeding places.

Formulas for disinfecting solutions recommended for use.

Bichloride of mercury [1] (1:1,000):	
Bichloride of mercury	1
Sea water	1,000
Carbolic acid [1] (3 per cent):	
Carbolic acid, pure	30
Hot fresh water	1,000

Flies as carriers of disease.—It is a well-known fact that flies carry the germs of such well-known diseases as tuberculosis, typhoid fever, and probably smallpox; hence the importance of preventing their breeding near a dwelling or securing access to a house. They breed in such things as stable manure, garbage, etc., in from 8 to 10 days after the eggs are deposited. The fly deposits its eggs, which in a few days hatch into a white worm, popularly called the maggot, then turning into the fly. If there is a stable near the lighthouse, the manure should be removed and buried every 5 days or it should be protected from the access of flies by screening or some similar method. All garbage not immediately buried or burned should be placed in cans, protected by tops, so that the flies can not get in. All openings to the house should be protected by wire netting, preferably bronze wire, 16 mesh to the inch; if mosquitoes are present the mesh should be 18 to the inch.

Mosquitoes.—Mosquitoes are known to convey such diseases as malarial and yellow fever by biting a person sick with this disease and afterwards inoculating other persons by biting them. They breed usually in stagnant water. The eggs are deposited on the surface of the water and are hatched out first in the form of what is known as wiggle tails or wigglers. At the end of about 10 days these wigglers go through certain changes and become full-fledged mosquitoes. It is important that no water be allowed to stand in containers about the dwelling for a period as long as eight days. If there are such containers, they should be emptied every five or six days or protected by a netting, so that the mosquitoes can not obtain access to lay their eggs. Empty cans and bottles should not be allowed to lie around the yard. The screens mentioned above properly applied to all openings of the house will prevent the entrance of mosquitoes. A few will get in when doors are opened, so the dwelling should be searched each day and all mosquitoes found destroyed. All persons in malarial regions should sleep under mosquito bars. Ponds are the principal breeding ground of mosquitoes and, if possible, they should be drained or oiled when near a dwelling. The malarial mosquito usually bites about sundown or during the night.

[1] Poisonous solutions should be colored blue with a little laundry bluing in order to distinguish them from nonpoisonous solutions.

Diet.—In all acute diseases, especially those attended with fever, the question of diet is a very important one, and the main reliance may be placed on such food as eggs and milk. Thin soups may be used, but they contain very little nutrition and can not be depended upon to maintain the strength of the sick.

The proper mastication or chewing of the food is necessary to good digestion and the maintenance of a healthful condition. On this account the drinking of large quantities of fluid at mealtime is objectionable, as it has a tendency to wash down the solids before they are properly chewed. It is desirable to have the meals at regular hours.

Cleanliness of the person.—A cold bath every morning is probably the best plan for a person in vigorous health, but to take one with benefit there should be a pleasant glow of exhilaration afterwards, and it is necessary in cold weather for the average person to have a warm room in which to take this cold bath. A great many people do better with a bath in tepid water; but it is impossible to fix any hard and fast rule in these matters.

The presence of bedbugs in dwellings is indicative of want of care and cleanliness as to bed, bedclothes, etc., and means should be taken to exterminate them when they appear. A liberal application of kerosene oil to the places infested is probably the best means of killing them.

Care of the mouth and teeth.—It is important to take good care of the teeth. If they are allowed to decay, the food can not be masticated, indigestion results, and the body is not properly nourished. The bony processes of the jaws which hold the teeth in place are absorbed after the teeth fall out, allowing the cheeks to sink in, which makes the face look long and thin.

Dental decay is caused by fermentation of small particles of food which are permitted to remain in the crevices between the teeth. This fermentation is due to bacteria and results in the formation of acids which dissolve the lime salts of the teeth. The hard white outside coating of the teeth, known as enamel, is first attacked. This is destroyed at spots where the food is lodged and the softer interior substance of the tooth is exposed; this is rapidly eaten away, and a cavity is formed which increases in size until only a hollow shell of enamel remains. The nerves of the teeth are extremely sensitive, and severe pain or toothache is produced when dental decay extends into a tooth. An abscess or gumboil may form at the root of a tooth. This causes a throbbing pain, swelling, and fever. It usually breaks through the gum, discharging pus, with relief of the symptoms; sometimes, however, the inflammation extends to the bone, ending in its necrosis or death. Occasionally pus organisms are absorbed into the blood and blood poisoning ensues.

An unclean mouth makes an ideal home for small organisms known as endameba buccalis, which many believe are the cause of pyorrhœa dentalis or Rigg's disease. In this disease there is inflammation of the gums, which become soft, swollen, and bleed easily. The disease extends around the roots of the teeth, pus exudes from their sockets, they are loosened, and ultimately fall out. The process may take a number of years, but more than half of the permanent teeth are lost in this way.

An unclean condition of the mouth renders the person more liable to catch cold, to attacks of influenza, bronchitis, and pneumonia. Headaches and neuralgic pains are often due to bad teeth. Many cases of so-called rheumatism result from the absorption of poison from the mouth and disappear when the disease conditions in the mouth are remedied. The same poisons often lead to sore throat, inflammation of the tonsils, disease of the eye and ear, and disordered digestion.

Treatment.—The teeth should be cleaned with a toothbrush at least twice a day, and care should be taken that all particles of food are removed. Wooden and metal toothpicks should not be used, as the gums are liable to be injured, which may be followed by inflammation and absorption of septic products. Quill toothpicks are less objectionable, but should be employed with care. When brushing the teeth, a small quantity of tooth powder should be placed upon the brush. The formula of one of the best tooth powders is as follows:

Magnesium peroxide	60 parts
Sodium perborate	30 parts
Powdered castile soap and flavoring	10 parts

When a tooth powder is not available Castile soap can be used for cleansing the teeth.

Every person should visit the dentist at least twice a year to have his teeth examined, cleaned, and necessary repair work performed. A dentist should also be consulted whenever there is toothache or a gumboil. If it is impossible to obtain the services of one, temporary relief from toothache can be obtained by cleaning out the cavity and putting in two or three drops of oil of cloves on a small piece of cotton. For toothache without the presence of a decayed tooth to cause it, the application of heat to the seat of the pain will often give relief.

A gumboil should be opened by inserting a sharp-pointed knife along the side of the tooth down to the abscess cavity and cutting forward and outward. Before doing this operation the mouth should be rinsed out with a solution containing one part of hydrogen peroxide and three parts of water or some other antiseptic wash. The knife should be boiled before it is used, and the hands of the operator should

be carefully cleansed with soap and water before performing the operation.

The treatment for Rigg's disease requires that the tartar and yellowish matter which has accumulated along the edges of the teeth and between the teeth be removed by a dentist, who should be consulted as to further treatment.

USE OF CLINICAL THERMOMETER.

Place bulb of mercury in mouth under tongue for five minutes. If it registers over 101 degrees, send for physician. Stay in bed until he arrives. See that it registers less than 97 before using. This may be brought about by shaking it. Grasp the thermometer at the middle between the index finger and the thumb of the right hand, hold the bulb downward and hit the lower edge of the right hand against the upper edge of the left hand; the column of mercury will be lowered by the shock.

MALARIAL FEVER.

Malarial fever is an endemic infectious disease, caused by a parasite of the blood. The disease is transmitted to man (inoculated) by the bite of certain kinds of mosquitoes, of the genus *Anopheles*. It is never found except where mosquitoes of this genus are present. They breed only in fresh water. Mosquitoes that breed in salt or brackish water do not carry disease.

It is a disease of warm and temperate regions; very prevalent and of severe type in hot countries, especially along the seacoast and basins of rivers, but gradually declining in extent and virulence in proportion to the distance on either side from the Equator. In the Tropics the disease is constantly prevalent. In the cooler, or temperate regions, as, for example, along the coast of the Central Atlantic States, it is active only during summer and autumn. It is seldom developed at a lower temperature than 60° F. (15.5° C.), and even in the hot climates malaria is probably never contracted far away from land. The disease is said to be most frequently contracted during the night, just after sunset and just before sunrise being the most dangerous periods. It is, therefore, very important in infected localities not to permit the men to go ashore nor to allow them to sleep on deck if the vessel is lying near the land; or, if they must sleep on deck or other exposed places, to provide suitable protection by means of blankets and properly constructed mosquito bars.

There are different varieties and types of malarial intermittent fever: (1) Quotidian, when the paroxysm occurs every day; (2) tertian, when it occurs every other day; and (3) quartan, when it occurs every fourth day. The disease is popularly known as "fever and ague," "chills and fever," "the shakes," etc. It is characterized

by recurring paroxysms, consisting as a rule of three distinct stages: The cold, the hot, and the sweating stage. The attack may be sudden or it may be preceded by a feeling of uneasiness, a desire to stretch the limbs and yawn, headache, loss of appetite, and sometimes by vomiting. The chill may be of any degree of severity. Patients sometimes complain only of chilliness or of a creeping sensation of coldness over the back. More frequently the chill is well marked; the feeling of cold spreads all over the body, the teeth chatter, the patient shivers, and his whole body shakes. This **cold stage** may last from a few minutes to an hour, or longer.

The **hot stage** gradually comes on as the cold stage subsides, and soon there is a feeling of intense heat. The face becomes flushed, the pulse full or bounding, the headache continues, and the patient is in high fever. This stage may last from half an hour to 4 or 5 hours, when perspiration appears, first on the forehead and gradually over the entire body, and the **sweating stage** is fully established. With the appearance of perspiration the fever declines, the distressing symptoms gradually cease, the patient experiences a feeling of great relief, and soon falls into a refreshing sleep. The duration of the sweating stage varies from 1 to 3 hours. It may be very profuse or very slight. At the end of the sweating stage the patient may be greatly prostrated or may feel quite well, and able to be up and about until the beginning of the cold stage of the next fit, 24, 48, or 72 hours from the beginning of the first.

There are three varieties of malarial fever—intermittent, remittent, and a very severe type known as pernicious malarial fever.

In the **intermittent** the paroxysms may recur at irregular intervals, the cold stage may be absent, the fever may come on gradually and decline to normal in the same manner.

When the attacks are prolonged, and when instead of declining to normal there may be only a slight fall in the temperature and slight sweating, the fever is called **remittent fever.**

Pernicious malarial fever, as the name indicates, is a very fatal disease. It occurs chiefly in hot climates, but is occasionally met with in temperate regions. It may be preceded by an apparently mild attack of intermittent fever or the patient may be taken suddenly with intense headache, high fever, wild or perhaps muttering delirium, rapidly passing into unconsciousness, and death may occur within a few hours from the beginning of the attack.

In another form of the disease the attack begins with extreme coldness of the surface of the body, with vomiting, or with severe diarrhea or dysentery, and the patient may die from collapse.

There is also a hemorrhagic form in which bleeding may occur from the nose, mouth, or gums. The urine may be bloody or quite dark in color, in some cases almost black. In tropical Africa and

other hot countries where the disease prevails it is known as "black-water fever."

Hemorrhages, however, may occur in any severe or prolonged form of malarial infection, and bloody urine (malarial hematuria) is not infrequently met with.

Treatment.—Quinine is the remedy, and quinine also acts as a preventive. In going to a malarial region, treatment should be commenced several days before arriving at port. To each man on board should be given at least 10 grains (0.6 gm.) of quinine daily for a period of one week. The allowance may then be reduced to 5 grains (0.3 gm.) or even to 3 grains (0.2 gm.) a day. The bowels should be kept freely open.

The measures recommended for the prevention of the breeding of mosquitos on page 10 should be strictly carried out in malarial regions. Mosquitos, unless wind blown, do not travel over a few hundred yards from their breeding place. If malarial fever is present, it will be found in nearly all cases that they are breeding in some small body of stagnant water immediately around the house. Such breeding places should be looked for and, when discovered, abolished. In those collections of water which can not be eradicated, 1 ounce of kerosene added from time to time to every 15 square feet of water will prevent the growth of mosquitoes. These insects shun the sunlight, and during the day hide in grass and undergrowth. Their numbers may be greatly diminished by cutting away the bushes in the space around the dwelling and by keeping the grass cut short. It is important that the bed of a patient suffering from malarial fever should be protected by netting, for if mosquitoes are allowed to bite him, they may transmit the disease to other members of the household.

If a chill occur, the patient should at once be wrapped in blankets and given hot drinks. During the hot stage, cold drinks, lemonade, etc., may be given. As soon as the sweating stage begins, 10 or 15 grains (0.6 gm. to 1 gm.) of quinine should be given, and thereafter 5 grains (0.3 gm.) every six hours, for two or three days, and then continued in smaller doses, say 3 grains (0.2 gm.) three times daily, for the next two weeks.

If the chill is severe, or if the surface of the body is very cold, hot-water bottles or heated bricks or stones wrapped in cloth or in a separate piece of blanket should be placed to the feet. Mustard plasters may also be applied to the extremities and over the region of the heart, and hot, stimulating drinks should be given.

If vomiting occur, a mustard plaster may be placed over the region of the stomach, above the navel, and cracked ice may be given by the mouth. Headache may be relieved by cold applications or by 10 grains of aspirin taken with a cup of hot tea.

If the hot stage is severe, a tepid bath may be given in a tub or by means of a sponge. If the temperature is very high, 105° or 106° F. (40.5° or 41.1° C.), a cold bath should be given.

In remittent and other severe types of malarial fever the treatment should be more active. No time should be lost in giving the quinine; 10 or 15 or 20 grains (0.6 gm. to 1.3 gm.) should be given immediately, and along with this, if the bowels are not freely open, a calomel tablet, one-tenth grain each, should be given every half hour until 10 have been taken. After the bowels move the quinine should be continued in 5-grain (0.3 gm.) doses every four or five hours.

The symptoms and signs of typical malarial intermittent fever are so striking that they can hardly be mistaken for anything else. It must not be forgotten, however, that there are atypical and irregular forms of malarial fever, and that they may be mistaken for other diseases, such as tubercle (consumption) of the lungs, abscess of the lungs or of the liver or any part of the body, or the result of the passing of a catheter, all of which produce chills or chilliness and fever.

Some forms of remittent or continued remittent malarial fever may be difficult to distinguish from typhoid fever. The remittent type may be mistaken for yellow fever.

Quinine is the remedy for any form of malarial fever. If the fever does not yield to full doses of quinine, it is probably not malarial. At any rate this is the most practical method for determining the question as to whether the fever is malarial or not. In the hospital or laboratory the diagnosis is made by microscopical examination of the blood.

The diet in any form of acute fever should be light, liquid, and nourishing; and if there is much prostration, stimulants will be required. Solid food should not be allowed.

MEASLES.

Measles is an acute infectious disease, which most commonly attacks children but may occur in adults. It usually spreads from person to person by exposure to a patient with the disease, as going into the room where he is sick, riding in the same street car, or being in the same schoolroom. It generally makes its appearance from twelve to fourteen days after exposure. One attack is nearly always a protection against a second one.

It begins with the symptoms of an ordinary cold. There may be an initial chill; the patient's face looks flushed and sometimes slightly swollen about the nose and eyes, and the eyes are reddened. There may be a tendency to sneeze, and an examination of the throat will disclose a reddening of the mucous membrane. The rash often appears first in the throat. Some cough may be present

at the onset, with more or less headache. Fever is present with the onset of these symptoms. The eruption on the skin develops on the third or fourth day of the fever. It may be most marked on the forehead or about the ears, looking like fleabites, and gradually spreads over the entire body. The patient has considerable cough with expectoration. In children there is some liability to a form of pneumonia called broncho-pneumonia, which renders the disease much more dangerous. It may also have the complication of diarrhea and vomiting, due to implication of the bowels and stomach.

As soon as a case is discovered it should be put in bed and isolated in a room, from which children should be excluded and only those adults admitted who are directly concerned in the care of the case.

It is necessary to protect the patient from becoming chilled, and he should not be exposed to drafts, but fresh air should be admitted to the room. If the weather is cold, he should be provided with plenty of covering.

The treatment of an ordinary case of measles is practically nil, as little or no medication is required. If there is much irritation of the eyes, it is well to have the room darkened and to wash out the eyes with a saturated solution of boric acid in warm water. Take a glass of warm water and put into it all the boric acid it will dissolve and use it as a wash for the eyes, keeping it covered to prevent dust or other impurities getting into the solution. Everything applied to the eyes should be scrupulously clean.

If the skin is dusky and the eruption is not well marked, the patient may be enveloped in sheets or blankets wrung from hot water, but care must be exercised that he does not become too rapidly chilled afterwards. Only sufficient covering should be used to render the patient comfortable.

If the cough is very troublesome, a tablet of Brown Mixture may be given every two hours.

After the eruption has disappeared and the peeling of the skin has begun, the patient should bathe daily in order that the skin may be freed from the scales.

During the period of the disease the patient may be fed on broths, milk, soft-boiled eggs, etc.

Disinfection is not now considered necessary after measles, as it is believed the disease is transmitted only by contact with a sick person and experiments show there is little danger of contracting the disease after the eruption appears. If it is desired to disinfect the room after the patient recovers, the following procedure should be carried out:

The bedclothes should be boiled 20 minutes or soaked in a 3 per cent solution of carbolic acid for one hour. All the openings in the room

should be closed, and it should be fumigated with formaldehyde gas by placing formalin in a 10-quart pail and pouring permanganate of potash onto it. One pint of formalin and one-half pound of potash should be employed for every 1,000 cubic feet of air space. The time of exposure should be 4 hours, after which the doors and windows should be opened and the gas allowed to blow out. The room should then be thoroughly cleaned and aired for several days. Mattress, curtains, rugs, and carpet should be taken out of the room after fumigation, hung out in the sunshine, and be well beaten before being used again.

SMALLPOX.

Smallpox is an acute, contagious disease, characterized by an initial fever and successive stages of eruption. It spreads rapidly among persons unprotected by vaccination. It may be communicated by the breath, by exhalations from the skin, by clothing, or by anything that has been in contact with a person suffering from the disease. It is very contagious during the latter stage of eruption, and especially during the period of convalescence when the dried pus scales become detached from the skin and in the form of dry powder or dust settle on everything about the room or compartment, and may be conveyed not only to all parts of the ship or light station, but to any part of the world to which the ship is bound.

After a period of incubation of from 8 to 14 days, occasionally longer, the disease begins suddenly, usually with a chill, always with severe pain in the back and loins, intense headache, and high fever. Vomiting occurs in many cases. The bowels may or may not be constipated.

About the end of the third day or on the fourth day a papular eruption appears on the forehead, and frequently on the lips and the wrists, occasionally in the mouth and throat, and gradually extends to other parts of the body. The eruption begins as a bright red dot or spot slightly elevated above the surrounding skin, enlarging until the second day, when it forms a papule. The papule is hard to the touch, feels like shot under the skin. As soon as the eruption appears the temperature begins to fall, and the distressing symptoms subside. On the fifth or sixth day a small vesicle, with a depression of the center, appears on the top of the papule. The vesicles gradually become distended, the depressed centers rounded out, and about the eighth or ninth day the change is completed and the vesicles become pustules. They have a yellowish gray appearance and each pustule is surrounded by a red border. The skin between them is swollen, the eyes may be closed. During this change the temperature rises again, secondary fever sets in, the chief symptoms return, and a day or two later another change begins. The pustules break, matter oozes out, crusts form, first on the face and then over other parts of the

body, following the order of the appearance of the eruption. The secondary fever may be quite high in the beginning, but gradually declines as the pustules change into crusts, and in favorable cases seldom lasts more than two or three days. The crusts then rapidly dry and fall off, leaving red spots on the skin and here and there the characteristic pockmarks or pits. The healing of the pustules is usually attended by troublesome itching.

In some cases a diffuse redness of the skin or red spots appear on the abdomen, or on the side of the chest, or on the inner surface of the thighs as early as the second day, but the distinctive papular eruption makes its appearance, as stated, at the end of the third or on the fourth day and nearly always begins on the forehead.

In the confluent form of smallpox the eruption may appear a day earlier and all the symptoms are more severe. The pustules run together and form large brownish scabs, chiefly on the face and head, but also on the hands and feet. The face and neck are greatly swollen, the eyes are closed, the features are distorted. The patient complains of tension and burning of the skin; there is much thirst. The eruption may also appear in the mouth and throat. The secondary fever is high. Delirium may be quite marked. In fatal cases the pulse becomes rapid and feeble, and death occurs about the tenth or eleventh day or later.

In favorable cases, about the eleventh or twelfth day the pustules begin to break. The matter dries and forms crusts which slowly fall off, leaving the skin quite red and in many cases dreadfully scarred and pitted.

The crusts begin to drop off about the fourteenth day, but the process of desquamation may not be completed until the end of the third or fourth week, and the fever may persist during that preiod. There is a milder form of smallpox called **varioloid,** in which the symptoms are usually milder and of shorter duration. Varioloid occurs in persons who have been vaccinated. Sometimes the eruption begins on the feet. In some cases it is confined to the feet and hands. Occasionally the eruption is extensive and the symptoms are severe.

The most severe type of smallpox is the **hemorrhagic** (bloody). It occurs in two forms. In one the case goes on in the usual way until about the ninth or tenth day, when blood makes its appearance in the pock. This form is sometimes called **black** smallpox. In the other form the eruption may be blood-colored from the second day, and bleeding may take place from the nose or mouth or from the rectum. The face is greatly swollen and the eyes are deeply bloodshot. Death occurs during the first week, sometimes as early as the second day.

Before the characteristic eruption appears it is frequently very difficult to determine the existence of smallpox. It is easily confounded with other eruptive diseases. The important points to

remember are the intense pain in the back, the high fever, and bounding pulse, all of which precede the eruption, and that when the eruption appears the fever and all the severe symptoms subside. The temperature before the eruption may be up to 105° or 106° F. (40.5° or 41.1° C.). When the eruption appears it begins to decline and within 24 or 36 hours is down to about 100° F. (37.7° C.). When the secondary fever sets in the temperature rises again.

Treatment.—The patient should be placed in a cool, well-ventilated room, and strictly isolated; and every person at the light station or on board the ship should be immediately vaccinated. No one should be allowed to come in contact with him except the nurse or attendant, and the nurse or attendant should not be allowed to come in contact with other persons. While in immediate attendance on the sick he should wear overalls and jumper, and a head covering, to be removed when he leaves the room, and immediately put on again when he returns. Separate dishes and necessary utensils should be provided. The food should be placed at a convenient place near the door of the sick room where the nurse can come and get it. Nothing should be allowed in the room except the articles absolutely necessary. The soiled clothing should be wrapped in a clean sheet (or in a sheet that has been dipped in a 1 to 1,000 solution of bichloride of mercury) and the bundle placed in a kettle of water and thoroughly boiled. If there is a sufficient supply of bedclothing the soiled articles should be destroyed by fire (burned). The patient must be kept thoroughly clean. Good nursing is very important.

In the early stage, when the fever is high, place the patient in a cold bath, or give him a cold sponge bath, note the temperature of the body, and repeat the bath every three hours if the thermometer registers above 103° F. (39.4° C.). If the bowels are constipated, give small doses of Epsom salts, 2 teaspoonfuls, every two or three hours.

The food should be soft and nourishing and given at regular intervals. Cold drinks, lemonade, barley water, etc., may be freely given. Asperin, 10 grains may be given for the headache.

The pain and tension in the skin may be relieved by cold applications. A piece of lint, wet with a cold one-half of 1 per cent solution of carbolic acid, may be applied to the face and frequently renewed. Holes should be cut into the lint corresponding to the eyes, nose, and mouth. When the pustules begin to form it is a good plan to touch each one with tincture of iodine (a camel's-hair brush may be used for the purpose), and a day later to puncture them with the point of a needle. The needle should first be boiled, and the point should then be dipped in tincture of iodine before making the puncture. When crusts begin to form, olive oil or glycerin should be applied. If the hair is long

it should be cut short early in the disease before the pustular stage begins. The eyes must be carefully cleansed several times a day, else blindness may follow. A solution of boric acid, 5 grains to a fluid ounce of water, is a good eyewash. The mouth, throat, and nose also require attention. A saturated solution of boric acid may be used as a mouth wash and gargle.

When the crusts and scabs drop off they should be carefully gathered up and burned. The patient should then have a daily bath, with soap and water. When the case is ended the room and all exposed articles must be disinfected by burning sulphur (4 pounds to every 1,000 cubic feet of air space).

On shipboard, if near port when the disease breaks out, the ship should be taken direct to the quarantine station, where the patient may be taken care of and the ship disinfected.

Vaccination.—This procedure prevents smallpox. Every child should be vaccinated before it is 6 months old, and again when it reaches school age. If the vaccination does not take, the operation should be repeated until it is successful. A small papule should appear in 48 hours, which soon changes into a vesicle. This gradually enlarges, until at the end of one week it is the size of a finger nail. It is then of a whitish color and is surrounded by a reddish area. At this time the patient may have a slight fever, headache, or some disturbance of digestion. On the tenth or thirteenth day these symptoms have usually subsided, the vesicle begins to dry up, forming a scab, and the redness of the surrounding area diminishes and finally disappears. If the vaccination is kept clean by frequent washing with boiled water, and irritating substances, such as woolen shirts or coats, are not allowed to touch it, there is little danger of harmful germs gaining entrance through the wound. Some physicians advise the use of celluloid shields, but these exclude the air and are hot and uncomfortable. If care is taken not to break the vesicle, dressing is usually unnecessary; but if a dressing must be employed, the simpler the better. A little sterile vaseline or boracic-acid ointment, spread upon a piece of clean linen, generally suffices. This should extend beyond the inflamed area and be held in place by strips of narrow adhesive plaster.

If a person has not been vaccinated during childhood, he should have this operation performed immediately in order to protect himself from smallpox. No one can tell when he might come in contact with this disease, and if not protected by vaccination he is extremely liable to contract it. After an interval of about seven years a second vaccination should be performed, and this also should be repeated until successful. Smallpox has been practically eliminated from some countries by vaccination.

SCARLET FEVER.

Scarlet fever is a communicable disease characterized by fever, sore throat, and a red rash. When the disease is mild it is called scarlatina or scarlet rash. The incubation period is from two to four days. It begins with headache, vomiting, faintness, and occasionally convulsions in children. The mouth and throat are deeply congested. There is pain on swallowing or talking. The tongue has the color of a ripe strawberry. The inflammation may extend from the throat to the ears. The glands of the neck often become swollen. The rash appears on the second day of the disease, and in mild cases may be the first symptom noticed. It occurs as a diffuse redness, which, upon close observation, will be found to be due to fine red papules. After four or five days the skin commences to shed. Sometimes it is cast off in large flakes.

Complications.—Inflammation of many organs of the body may follow scarlet fever. There may be pneumonia, pleurisy, ulceration of the throat, abscesses in the neck, and inflammation of the lining membrane of the heart. Nephritis or inflammation of the kidneys frequently occurs from the second to the fourth week. In this complication there is diminution or suppression of urine, with puffiness under the eyes, swelling of the hands and ankles, or general dropsy. There may be convulsions and the case may quickly terminate fatally. In other cases the secretion of urine is reestablished and the person either entirely recovers or the disease persists in a chronic form. There may be pain, swelling, and redness of the joints. Careful watch should be kept for symptoms of inflammation of the middle ear. These are pain in the ear, tenderness over the bony prominence behind the ear, and drowsiness. The child may moan in its sleep and be hard to arouse. If the drum membrane breaks, the pent-up pus escapes from the ear opening, and if the inflammation is mild, the symptoms then abate; otherwise an abscess forms in the bony cells behind the ear which if not opened may break into the cranial cavity or spread downward along the deep tissues of the neck.

Varieties.—Mild cases may not be recognized until some unusual occurrence, such as a swelling in the neck, the shedding of skin, the onset of nephritis, or illness in another child who has been in company with the patient, calls attention to the fact that the child has had an attack of scarlet fever. The rash may be absent or present on only a portion of the body. The mild form may give rise to a severe attack in another person. In a malignant case there may be high fever, delirium, coma, gangrene of the throat with a foul discharge from the nose and mouth, the patient dying in one or two days.

Death is rare in cases that receive proper care and attention, although many persons succumb to the complications produced by scarlet fever, and it is often the starting point of chronic disease of the heart, ears, or kidneys which cause death in after life. It is more fatal to children less than 6 years old.

Treatment.—Isolate the patient. Keep the room warm, with a window partly open for ventilation. Put the patient in bed, but do not cover him up with too much bed clothing. If the child has convulsions, give him a hot bath; if the fever is high, sponge him off with cold water. If there is vomiting, apply a small mustard plaster over the upper part of the stomach, and give him a cup of hot water in which has been placed a teaspoonful of sodium bicarbonate. If there is severe headache, give 10 grains of aspirin if the patient is an adult; if a child, give 3 to 5 grains. Cold compresses should be applied to the neck. The mouth should be frequently rinsed with a saturated solution of boracic acid, and the throat kept clean by gargling with a solution composed of peroxide of hydrogen one part, water two parts. This solution may also be applied with a swab made by tying a small piece of cotton onto a small stick. If no peroxide of hydrogen is obtainable, a salt solution made by placing a teaspoonful of salt to a pint of water may be employed in its place. One tablet of calomel, each one-half of a grain, should be given every half hour until four are taken. This should be followed in four or five hours by a Seidlitz powder or a dose of salts. If there is earache, hot compresses should be applied to the side of the head and ear drops (acidi carbolici, 1 fluid drachm, glycerin 7 fluid drachms, mixed well together) should be placed in the ear. If possible, a physician should be immediately called; if the drum membrane is opened early, the hearing of the patient may often be preserved.

The patient should have a light diet with plenty of water to drink, especially if there is any sign of dropsy. If this develops, hot compresses should be applied to the back, and hot water (temperature from 110° to 120° F.) should be injected slowly into the bowels, several quarts at the time. If the excretion of urine is greatly diminished, it may be necessary to put the patient into a hot pack. This is done by wringing out a sheet in hot water and immediately wrapping the patient in it, and covering him with blankets. If there is electricity on the vessel or station, the patient may be made to sweat by placing several light bulbs, connected with lamp socket, between the blankets on the patient's bed and turning on the light. The patient should not be considered well until the skin has ceased pealing and all discharge of pus has ceased. He may then be allowed to mix with other persons. The room and its contents should be disinfected, as directed under "Measles."

DIPHTHERIA.

Diphtheria is a communicable disease, due to the action of the bacillus diphtheriæ. When conditions are favorable, this germ causes an inflammation of the lining membrane of the throat, upon which a grayish fibrinous exudate forms. The constitutional symptoms of the disease are the result of the absorption into the circulation of toxins or poisons produced at the site of the lesion. The grayish exudate is usually on the tonsils and palate, but it may extend up into the nose or down into the windpipe. A raw bleeding surface is left when a portion of this exudate or false membrane is detached. Efforts at swallowing cause strangulation or choking, and the patient may become asphyxiated by the exudate membrane blocking up the larynx. The voice is often husky, and there may be a rough cough to which the term "croupy" has been applied. In severe cases there is high fever and great prostration.

Sequelæ.—Paralysis may follow diphtheria. This may be slight, only affecting the palate, giving the voice a nasal character; or severe, nearly all the muscles of the body being involved. Weakness of the heart sometimes causes death as late as the sixth or seventh week. Nephritis may be one of the complications of the disease, but dropsy is less common than after scarlet fever.

Diagnosis.—Whenever a grayish exudate is seen on the throat, diphtheria should be suspected, especially if much inflammation is present and if bleeding occurs when a piece of the false membrane is detached. Diphtheria examination packages are now supplied free by most drug stores. These packages hold two glass tubes, one of which contains blood serum and the other a sterile swab. The tubes are closed by cotton plugs. These should be removed, the swab wiped over the throat, and then gently rubbed over the blood serum. The swab should then be replaced into its own tube, the cotton plugs of both tubes replaced, and the tubes mailed to the health officer of the city or district. A postal card will be mailed by him the next day to the sender stating whether or not the person from whom the specimen was taken has diphtheria.

Treatment.—As soon as it is suspected that a person has diphtheria a physician should be sent for, if possible, as it is important that diphtheria antitoxin should be at once administered to the patient. If this serum is given in sufficient quantities (5,000 to 10,000 units) early in the disease, the symptoms disappear like magic. The fever subsides, the inflammation in the throat abates, the exudate is cast off, and the tissues heal promptly. The dose of antitoxin should be repeated in a few hours if the fever continues. Some cases, where the disease has remained untreated for several days, require large quantities of antitoxin (80,000 to 90,000 units). Where antitoxin can not

be obtained, the patient should be given stimulants, cold compresses should be applied to the neck, and the throat should be frequently swabbed with the following solution: Carbolic acid, 3 parts; water sufficient to make 100 parts. Calomel grains, one-fourth, every two hours, is recommended by some physicians, but care has to be taken that the patient does not become salivated. The room should be warm, a window should be partly open for ventilation, and the air should be kept moist by placing a hood made with a sheet over the bed and allowing the steam from a kettle to pass under it. A liquid diet should be given, and if it is impossible for the patient to swallow he has to be fed by the rectum. If there is obstruction of the larynx and the patient is blue in the face, intubation or tracheotomy has to be performed. In the first operation a special hollow tube with a thread attached is inserted in the larynx, being guided in place by the finger. If no intubation tube is available, recourse has to be had to tracheotomy. The physician grasps the windpipe between the forefinger and thumb of the left hand, pushes the other tissues of the neck to each side, and opens the windpipe in the middle line. This operation requires some skill, and should not be performed except as a last resort. The patient should not be allowed to mingle with other persons until a culture has been taken, as described under "Diagnosis," and sent to the city or State department of health and found to be negative; that is, no germs of diphtheria present. The room and its contents should then be disinfected, as described under the heading "Measles."

SORE THROAT (TONSILLITIS, QUINSY).

Sore throat is a common disease. It is usually the result of exposure to wet and cold. Talking, laughing, or shouting in a damp, cold atmosphere is sometimes the cause of it. It frequently occurs in persons predisposed to rheumatism. It may accompany or be an extension from an ordinary "cold in the head." Sometimes the inflammation is limited to the mucous membrane of the pharynx and soft palate; it is then known as **pharyngitis** or **acute catarrhal sore throat.** More frequently the tonsils are affected, and the inflammation is then called **tonsillitis.** When the inflammation is more deeply seated behind the tonsil and tends to suppurate or form an abscess, the term **quinsy** is applied. An attack of sore throat may last from 2 to 10 days, or longer.

Symptoms of acute sore throat are chilliness and feverishness, pain or soreness on swallowing, dryness, or a tickling or scratching sensation in the throat.

There is apt to be a stiffness and some tenderness along the side of the neck. If one or both tonsils are involved, as they usually are

to a greater or less extent, the symptoms are more severe. In marked cases examination shows redness and swelling of the parts affected—swollen tonsils (tonsillitis) and white or cream-colored spots may be seen on the surface of one or both tonsils. (This form of the disease is frequently mistaken for diphtheria.) There may be high fever and great prostration.

In the severest form of tonsillitis (quinsy) the tonsil is hard and swollen to twice or three times its natural size, and the patient is unable to swallow or to open his mouth beyond a fraction of an inch. The saliva dribbles away; if suppuration occur the tonsil gradually softens until the abscess breaks. With the discharge of the pus the severe pain is relieved and the patient rapidly recovers. If the abscess is large, and if the pus is discharged in a backward direction, there is danger from suffocation, particularly if the abscess breaks during sleep. Fortunately, the abscess usually points toward the mouth, and the pus runs out.

Treatment.—Persons who are subject to attacks of sore throat should keep their feet dry and be very careful not to catch cold. If a case develop, give a gargle of salt water or potassium chlorate and water (saturated solution), or boric acid and water may be applied to the tonsil. Dry bicarbonate of soda (baking soda) is highly recommended as a local application, a small quantity to be applied every hour. Apply cold water or a light ice bag to the neck, or a thick piece of flannel saturated with ice water may be placed around the neck and covered with muslin. Small pieces of ice placed in the mouth are usually agreeable. The bowels should be kept open by means of Epsom salts.

If the cold applications to the neck do not give relief, or if they are not agreeable to the patient, apply hot water or poultices and give hot gargles, or let the patient gargle with hot tea. If the swelling is very great, he can not gargle. If practicable, send for a physician.

MUMPS.

Mumps is an acute infectious disease usually affecting children, but may occur in adults. It affects the parotid gland, which is situated just below the ear on each side. It is usually conveyed by contact from one patient to another. Hence, the patient should be isolated in a room, and children should not be exposed to the disease. Only the adults directly in charge of the case should be admitted to the room unless they have been protected by a previous attack. An attack usually comes on about 15 days after the exposure to the disease.

The chief symptoms are pain and swelling in the parotid region under the ear. Movements of the jaw, such as chewing and talking,

will be painful. Swelling may occur on one or both sides, but nearly always both are involved. It is worst about the third day, and may gradually disappear after that. It is usually a mild disease, but swelling of the testicle is a frequent complication in the male.

Treatment.—Light diet, such as broths, eggs, milk, rice puddings, etc., should be given. Sour food and acid drinks will be found to give considerable pain if taken in the mouth; hence they should be avoided. Hot applications may be placed over the swollen glands if there is very much pain. No internal medicines are indicated. If the bowels are constipated, a tablespoonful of Epsom salts may be administered with benefit.

COUGHS AND COLDS.

When a person has a cough that lasts more than two or three weeks, even though the symptoms are mild, the case is serious enough to require an examination by a physician, and one should be consulted on the first opportunity.

A case of bronchitis or bad cold usually begins with a cough, sometimes starting with an irritation in the throat, which gradually travels down into the lungs. Though the cough at first is dry, there will be some expectoration later on, especially marked in the morning on first arising. It may be at first white and tenacious, later on becoming yellowish. With this there will be some soreness over the upper and front part of the chest, and if the cough is violent there will be considerable soreness of the muscles between the ribs.

Treatment.—For the soreness over the chest a good rubbing with soap liniment may help to relieve the symptom. A tablet of Brown Mixture given every two hours is serviceable. The bowels should be kept open by a tablespoonful of Epsom salts, when necessary.

Patients with coughs and colds should not be kept in a hot, dry room without ventilation. Plenty of fresh air should be allowed to come into the room, with the precaution, however, that the patient be not exposed to a draft and that he be properly clothed so as not to become chilled when the weather is cold.

A cold in the head may often be aborted if the patient when he feels the cold coming on will take a hot bath or a hot mustard foot bath, go to bed, drink hot lemonade or hot weak tea, and cover himself up well until a good perspiration is induced. Care should be taken next day to wrap up carefully if he goes out of the house, as otherwise the symptoms may return in greater severity. Aspirin in doses of 5 to 10 grains every three hours may be taken during a cold, if there is headache or pain in the limbs.

CONSUMPTION (TUBERCULOSIS).

The first noticeable symptom of tuberculosis of the lungs may be a hemorrhage, the blood being coughed up, but the onset is usually gradual. The patient has a slight cough, feels weak, and indisposed to do anything, loses weight, and has very little appetite. If the temperature is taken in the evening, it will often be found that he has a slight fever. In a few weeks or months the emaciation becomes more marked, the fever is higher, there are sweats at night, severe cough, shortness of breath, and a large amount of mucopurulent matter is expectorated. There may be severe diarrhea from extension of the disease to the bowel, or the larynx may be involved, causing the voice to be husky and swallowing extremely painful. The patient's sleep is disturbed by the coughing spells, which are violent and protracted. As the disease progresses the symptoms increase in severity and the patient is confined to his bed until death brings him relief from his suffering.

Treatment.—A person who has consumption should live out of doors. He should not go into a house except to dress or to get his meals. At night he should sleep on a porch, balcony, or lean-to, where he will be in the open air. Many persons who conscientiously follow this treatment recover.

There is little danger of a person infecting others in the same house if he will take the proper precautions. The danger lies in the sputum, which, after drying, is inhaled by others in the form of dust. To prevent this, a consumptive should never spit upon the floor or ground. The sputum should be caught on tissue paper, which should be placed after use in a paper bag. This bag and its contents should be burned in a few hours, before the sputum has had time to dry. If the sputum is profuse, a cup with a cover may be employed, but this cup should be boiled for half an hour several times each day. It is well also to keep the cup partially filled with a 3 per cent carbolic acid solution.

Handkerchiefs or pieces of cloth should not be used for wiping the mouth or nose unless they are boiled immediately afterwards. Sheets and pillowcases which may be soiled during the night by the sputum should be boiled the first thing in the morning. Towels used by the patient should be boiled immediately thereafter. The patient should have separate dishes and these should be sterilized by boiling after each meal. He should keep his face clean shaved, and he should kiss no one, nor should he under any circumstances sleep in the same bed or the same room with other persons. After death the room should be disinfected as described under "Measles."

It is dangerous to allow a seaman with consumption to remain aboard his vessel, as there are so many opportunities for conveying the disease to well persons. Such seaman should be sent to the near-

est marine hospital, from which he will be transferred, if the disease is not too far advanced, to the sanatorium at Fort Stanton, N. Mex., maintained for the care and treatment of consumptive seamen by the United States Public Health Service. After the seaman has been taken from the vessel the master should request the nearest officer of the Public Health Service to disinfect the forecastle or stateroom which the sick man has occupied.

TYPHOID FEVER.

Typhoid fever is caused by a germ known as the bacillus typhosus. This bacillus is found in the discharges of persons sick with the disease and sometimes for a considerable time after their recovery. When the food or drink of well persons becomes contaminated with these discharges, typhoid fever is apt to result. This contamination may be brought about by means of flies which convey small particles of fecal matter containing the bacillus of typhoid fever from privies to kitchens and dining rooms, and soil the food by lighting upon it. Drinking water may become infected through the drainage of a cesspool into a well or near-by stream. Milk may carry the disease through washing the cans with such water. Persons caring for typhoid fever cases may infect themselves or others if they are not careful. Finally, there are patients who have recovered from the disease but who still have typhoid bacilli in their stools. These individuals are called "carriers" and may cause sickness among many other persons. This is especially the case if they are employed in milking cows or in the preparation of food.

Typhoid fever begins with headache, diarrhea, cramps in the abdomen, nosebleed, loss of appetite, coated tongue, dry mouth, and fever, which is higher each day than on the day previous. The stools are foul smelling and of the color and consistency of pea soup. In mild cases some of these symptoms may be absent. As a general thing the patient has been feeling badly for several days before the attack begins. At the end of the first week the patient is dull and apathetic, twitches his fingers, and picks at the bedclothes. There may be a low muttering delirium. The abdomen is distended with gas, and small rose-colored spots appear here and there on the body. Later on there may be hemorrhage due to ulceration of the bowel. Sometimes an ulcer will perforate the intestine, and allow its contents to enter the general abdominal cavity; this usually causes death in a few hours. When hemorrhage or perforation occurs there is severe pain and the signs of shock are present. The pulse is weak and thready, the face is pale, the skin damp, and the temperature falls to normal.

Abscesses and boils may form in various parts of the body, and bedsores are not uncommon. In persons who have used stimulants

freely delirium tremens may be a prominent symptom. Pneumonia and meningitis are occasional complications.

Treatment.—Place the patient in bed and do not let him get up. When he desires to have an action of the bowels, the bedpan should be used. He should have a liquid diet, plenty of water, milk, and thin soups; no solid food should be given until 10 days after the fever has subsided. The temperature should be watched and the patient bathed with cold water whenever the fever rises above 39° C. (102.2° F.). Ice bags, if obtainable, applied to his abdomen and chest will assist in keeping the temperature down. One should also be applied to the head if there is delirium. If there is distension of the abdomen hot turpentine stupes should be applied. This is done by wringing a double layer of thin flannel out of hot water with which a teaspoonful of turpentine has been mixed. An injection of a pint of warm water containing a teaspoonful of turpentine is also beneficial. Stimulants should not be given except in collapse.

No person caring for a typhoid-fever patient should prepare food for others. The nurse should wash her hands carefully after waiting upon the patient and before she eats her meals. After washing, they should be immersed in a 1 to 2,000 solution of bichloride of mercury for a few minutes. All water employed in washing the nurse's hands or in bathing the patient should be boiled in a bucket or wash boiler kept for this purpose. All towels and bed linen used in the sick room must be boiled. The patient's urine and feces must be boiled before being thrown out, and the bedpan and urinal sterilized by boiling water immediately after being emptied.

Typhoid prophylaxis.—When typhoid fever is prevalent everyone should be inoculated with antityphoid vaccine to prevent taking the disease. This vaccine has practically eliminated this disease from the Army. All seamen should apply to officers of the Public Health Service for this treatment, as the protection afforded will save much suffering which they now undergo. During the fiscal year 1914 there were 372 cases of typhoid fever among sailors, of whom 37 died; if this vaccine had been administered to these men before they were taken sick, it is safe to say, none of them would have had the fever. An attack of typhoid fever usually lasts two months, and the patient is as a rule too weak to do much work for another month, so that at least 75 days are lost by each attack of this disease. From the above calculation it will be seen that this would amount to 25,125 days' sickness for those that survived.

Wells suspected of being infected with sewage should be closed until it is proved that such contamination has not taken place. If it is necessary to use water that is suspicious, it should first be boiled or treated with hypochlorite of lime, one-half teaspoonful to every 80 gallons of water. The lime should be dry and only that taken from

a freshly opened can should be used. During a typhoid epidemic milk should be pastuerized. This is done by heating the milk to 160° F. and keeping it at that temperature for half an hour.

DELIRIUM TREMENS.

Delirium tremens occurs as an incident in the life of persons addicted to the excessive use of intoxicating liquors.

Loss of appetite, sleeplessness, or a marked mental depression are the chief symptoms of the first stage of the affection which is known among drunkards as "the horrors."

As the disease advances the patient talks incoherently; has a wild expression; his mind wanders from one thing to another. He answers questions in a rambling manner. He fancies he is being pursued by wild animals or that he sees rats, snakes, and other animals crawling on the walls or around his bed, or he may imagine himself to be engaged in his regular duties or as master of the ship, giving directions to the men.

The delirium is always worse at night, but the patient requires careful watching all the time. He may try to jump overboard or commit suicide.

Delirium tremens may be confounded with acute inflammation of the brain or with acute mania (insanity) or with certain forms of pneumonia, and any one of these diseases may also be present. Pneumonia is a frequent complication of delirium tremens, and in fatal cases may be the direct cause of death.

In favorable cases the symptoms begin to improve in three or four days from the onset. The patient sleeps and gradually recovers.

Treatment.—The patient requires constant attendance. Physical restraint should be avoided if possible. To support the patient and to procure sleep are the great objects of treatment. Careful feeding is very important. Milk or concentrated broths should be given at regular intervals of two hours. A cold bath is of value in some cases, especially if agreeable to the patient. In other cases a warm bath or a hot foot bath may have a better effect.

The serious symptoms are largely, if not entirely, due to the sleeplessness, and if several hours of sound sleep can be procured improvement is almost sure to follow. To this end potassium bromide in 30-grain doses may be given in water every three hours. Morphia or opium are not to be recommended in this disease except under the immediate direction of a physician. All stimulants should be withheld except in rare cases when the pulse is weak. The giving of whisky, gin, etc., in small doses to gradually "sober him up" is a bad practice, as it delays the patient's recovery. No amount of begging for stimulants on the part of the patient should persuade his attendants to break this rule.

SUNSTROKE.

The term "sunstroke" denotes a sudden attack of illness from exposure or prolonged exposure to the rays of the sun; but the same condition may be produced in hot weather by exposure to high temperature not in the direct rays of the sun, particularly if the person is engaged at hard work in close quarters. Stokers on steamships are sometimes affected by the heat of the furnace. Men debilitated from or addicted to the excessive use of stimulants are more apt to suffer than those of temperate habits.

Sunstroke occurs in two forms: **Heat stroke** (heat fever), in which the temperature of the body is very high, and **heat prostration** or **heat exhaustion,** in which the surface of the body is cool, sometimes considerably below normal. The difference is very important because of the different treatment required.

In severe cases of **heat stroke** the patient may be stricken down in a state of unconsciousness and die instantly or within an hour or two. In other cases there may be intense headache, dizziness, marked restlessness, nausea and vomiting, and hot "burning" skin. The thermometer may register 105° F. Pulse is full and may be slow or fast. Breathing is labored, may be sighing or rattling. Patient soon becomes unconscious, the stupor deepens, and death may occur within 24 hours; or the temperature may drop, consciousness may return, and the patient get well.

In **heat prostration,** as already stated, the surface of the body is cool, the pulse rapid and feeble, and there is a feeling of general weakness. There may be only slight faintness and nausea, and under prompt treatment patient may rapidly recover, or, on the other hand, there may be complete loss of consciousness and a rapid and fatal termination from exhaustion.

Heat cramps.—Painful spasms of the muscles, especially those of the abdomen and limbs, may occur when persons who are exposed to high temperatures are required to perform hard labor. Stokers on steamships are liable to suffer from them. They are extremely painful, making the patient cry out; there is headache and the bowels are constipated. In some cases the patient is unconscious, and the convulsions resemble those of epilepsy. The attacks may last from 12 to 24 hours, but even after the patient becomes quiet the spasms may be renewed by a slight stimulus, such as a cold draft or a sudden movement. The muscles are sore and the patient weak and listless for several days following the seizure. The cases vary greatly in intensity; there may be simply a slight cramp in the abdomen or in one of the muscles of an extremity.

Treatment.—In **heat stroke** (fever heat) the temperature of the body should be reduced as rapidly as possible. Place the patient in

a cold-water bath, add ice, rub the body with the blocks of ice, apply iced water with ice cap to his head; and keep up the treatment until the temperature, as shown by the thermometer in the rectum, is reduced to 100° F. If the temperature rise again, repeat the treatment. If symptoms of exhaustion follow the reduction of the temperature, stimulants should be given—strychnia sulphate, one-fortieth grain.

In **heat prostration,** with cool skin, weak and rapid pulse, stimulants and friction are required. Give strychnia sulphate, one-fortieth grain, rub the surface of the body and the extremities, place hot-water bottles to the feet, and cover the body with blankets. If the head is hot, apply cold water to the forehead. If vomiting occur, inject stimulants into the rectum. Apply mustard over the region of the stomach. Mustard may also be applied to the feet.

Heat cramps.—Twenty drops of tincture of nux vomica in a glass of water taken three times a day will often prevent these cramps. Oatmeal water should be used by the firemen to quench their thirst. If a fireman feels faint, a cup of strong tea will frequently revive him. The minor spasms in the muscles of the arms and legs are usually treated by the men themselves by rubbing each other. When the cramps are severe the patient should be placed in a hot bath, the muscles vigorously rubbed, and large quantities of hot water given by the mouth and injected into the bowel. Thirty grains of bromide of potash should be given in half a glass of water. If the patient can not retain this, 60 grains in a pint of water should be administered by the rectum. The next day every effort should be made to get the patient's bowels opened by giving him castor oil or salts or injection of soapy water.

HEADACHE.

Headache is a symptom of disease of some portion of the body. When it is unilateral, localized, sharp, and paroxysmal it is known as neuralgia. It may be caused by many conditions, among which may be mentioned derangements of the stomach and liver, constipation, neurasthenia, eyestrain, heat exhaustion, exposure to cold and dampness, inflammation of the kidneys or genital organs. It is present in malarial fever, typhoid fever, smallpox, syphilis, diabetes, and influenza. In meningitis or inflammation of the coverings of the brain the pain in head is excruciating. Many of the diseases of childhood begin with headache.

Treatment.—Remove the cause, if possible. Open the bowels with a dose of castor oil or salts. Take 10 grains of aspirin and repeat if necessary in three hours. A little hot tea and toast should be given with this medicine to prevent nausea. If the headaches are frequent, a physician should be consulted to ascertain the cause.

ERYSIPELAS (ST. ANTHONY'S FIRE).

Erysipelas is an inflammation of the skin. It usually begins with a chill, followed by a high fever. It is a frequent complication of wounds, but is more frequently developed without any apparent injury. A large majority of cases begin on the face, usually on the nose, first as a small red spot, which is soon elevated above the surrounding skin, and gradually or rapidly spreads over the face and ears, and not infrequently over the entire hairy scalp; sometimes over the neck and chest, and occasionally down the back, and to other parts of the body. The skin is painful, red, hot, and swollen, and blisters frequently form. The swelling may be most marked about the eyes and ears, the eyes closed, and the patient's features changed and distorted to such a degree that the appearance once seen will not soon be forgotten. The disease limited to the face and scalp usually runs its course in a few days or a week, but sometimes before the face is healed red spots appear on other parts of the body, and the case may be prolonged. Abscesses beneath the skin are not uncommon.

Besides the symptoms already mentioned there are headache, loss of appetite, coated tongue, frequently vomiting, and in some cases delirium and marked depression.

The outcome is usually favorable, but in drunkards or in persons debilitated from previous diseases death is sometimes the result.

Treatment.—Erysipelas is only slightly contagious under ordinary circumstances; but persons suffering from wounds or scratches of the skin are very apt to be attacked. The patient should therefore be isolated—placed in a room by himself—and his attendant should be a healthy man and free from any skin injury.

Erysipelas being a self-limited disease, it is a common saying among physicians that the majority of ordinary or moderately severe cases would get well without any treatment. But this is probably true of many other diseases, and while it may be difficult, perhaps impossible, to limit the spread of the eruption or shorten the course of the disease in a given case of erysipelas, something may be done to relieve distressing symptoms and, particularly in feeble persons, to fortify the system against the attack. "Treat the patient rather than the disease" is good advice in more troubles than one.

The oldest and one of the best local applications for erysipelas is cold water, and if the fever is very high cold sponging of the entire body or a cold bath may afford considerable relief. Bismuth subnitrate may be dusted over, or petrolatum may be applied to the skin. In feeble persons stimulants may be required.

POISON IVY.

Contact of the skin with the poison ivy causes in many people a very annoying inflammation of the skin. The vine is of the climbing variety, with three pointed leaves on each stem. A few hours or

about a day after the skin is exposed to the poison of this plant a red rash appears, with more or less swelling and itching; small blisters appear, filled with serum, even becoming quite large. When they burst, there is considerable weeping from the surface. Later it may go on to a formation of pus. The hands and face, being the most exposed parts of the body, and the feet and ankles of those who go barefooted, are usually first affected. If the inflammation is very severe, there may be some incidental disturbance, such as fever, headache, and general feeling of malaise.

Treatment.—One of the best treatments for this disease is bathing with salt water, sea water being the best. Boric acid, about 15 grains to the ounce, is a good application. The large blisters should be punctured and the contents allowed to run out. Every one or two days the affected parts should be bathed with warm water, carefully dried without rubbing, and the boric acid treatment resumed.

BOILS.

A boil is a circumscribed inflammation of the skin and connective tissue. It is often caused by infection following a slight wound or scratch of the skin, but may occur apparently without any cause. It begins as a small red pimple and gradually increases in size and forms a dusky red swelling, the size of a silver dollar or less. The central portion of the swelling sloughs or forms a "core," and as soon as the core is separated or cast off the inflammation subsides, the pain lessens, and the ulcer begins to heal.

Treatment.—Compresses made of aseptic gauze or clean white cotton cloth wet with a 1 to 5,000 hot solution of bichloride of mercury should be applied every two hours until the central portion of the boil is softened. The bichloride solution should be made in a metal basin or some utensil not employed in cooking or for holding drinking water. The solution should be heated each time it is used, and in the intervals it should be kept upon a high shelf, so that no person or animal may be poisoned by it. The separation of the core of the boil may be aided by an incision. This incision should be made through the thickened tissues of the edge of the boil by a thin sharp blade previously sterilized by boiling. The blade should be wrapped in cotton before boiling, and a little soda added to the water to prevent the edge of the knife from becoming dull. After the core is discharged, the ulcer should be washed daily with the bichloride solution and dressed with dry sterile gauze.

FAINTING.

Treatment.—When a person feels faint, or actually faints, he should be laid flat upon the bed or the floor, with the head at least as low as the body, and the clothing around the neck and chest

loosened. A teaspoonful of aromatic spirits of ammonia should be given in a third of a glass of water. He should remain in this reclining position until the attack has passed off.

DYSENTERY.

Dysentery, or bloody flux, as it is sometimes called, is an affection—an inflammation and ulceration—of the mucous membrane of the large bowel. It occurs in different degrees of severity. It may be acute or chronic. There are different varieties. Its severest form is met with in tropical countries, where it frequently occurs in widespread epidemics. Epidemics also occur in temperate regions. Sporadic cases may be found almost everywhere. The disease prevails in summer and autumn. It may attack an entire ship's crew.

Bad food, unripe fruit, impure drinking water, exposure to cold and dampness, while probably not in themselves the direct cause of dysentery, doubtless favor the operation of other causes.

Symptoms.—The onset may be sudden or gradual. There may or may not be chills or chilliness. There is usually some feverishness. The tongue is furred and moist, but soon becomes red and dry or brownish and glazed.

The first stools may be like those of an ordinary diarrhea. After a day or two, or maybe within a few hours, these are replaced by small mucous stools frequently mixed with blood and small particles of fecal matter. Soon the evacuations consist of mucus alone, or of blood and mucus, or of a jelly-like matter and small white clumps of mucus. Later they may be shreddy, and brownish or greenish in color. Patient complains of cramps and "colicky" pains in his belly; a burning sensation in the rectum, with a feeling as if something must be expelled, and of a constant desire to go to stool. The evacuations may number from 10 to 20, or 40 to 50, or even 100 or more a day, according to the severity of the case. The quantity of each may not exceed a teaspoonful.

In mild cases there is a gradual change to normal, and patient may recover after a period of a week or 10 days. Severer cases continue for several weeks or longer and then recover, or become chronic and incurable, or death may occur from general weakness.

Tropical dysentery, the variety which occurs most frequently and in epidemic form in tropical or subtropical regions, but also occasionally in temperate climates, is said to be produced by a microorganism which enters the system in drinking water.

The symptoms in this form of dysentery are similar to those already described. The burning sensation and bearing-down pain, however, are less marked. The stools are less frequent, but they are larger and more watery; at times more like diarrhea than typical dysentery. The disease in favorable cases runs a course of from

6 to 12 weeks. Recovery is always slow. Death may occur from exhaustion, or from abscess of the liver, which is a common complication. In the most fatal epidemics the course of the disease is very rapid. Death sometimes occurs within a few hours.

Treatment.—Rest in bed. If possible, the patient should use the bedpan instead of the commode or closet, so as to insure the greatest amount of rest, which is very important. Stop all solid food. Give 2 tablespoonfuls (30 c. c.) of castor oil and 15 drops of laudanum in one dose, and, if necessary, repeat the dose in six hours, or give smaller doses at intervals of four hours. After the bowels have been thoroughly cleared out, a pill of camphor and opium should be given every three hours. Hot applications should be placed on the abdomen. The bearing-down pain and the burning sensation may be relieved by washing out the rectum with a pint of warm water and by injecting 2 ounces of thin starch containing 25 or 30 drops of laudanum.

In place of the castor oil, Epsom salts may be given in tablespoonful doses, repeated every two hours until a free and large action of the bowels results, and then the pill of camphor and opium given every three hours. Or, instead of the camphor and opium pills, bismuth subnitrate may be given in 30 or 40 grain (2 gm. or 2.6 gm.) doses.

After two or three days, if the disease continues, the castor oil or the Epsom salts may be repeated, and after its effect is produced, the same line of treatment continued.

The diet should be limited to the lightest articles, such as thin porridge, milk, and broths. And even in the lightest cases the patient should be kept warm in bed.

The best means of protection or prevention is to keep the body in sound condition. If the disease occurs among a ship's crew, the healthy men should be very careful not to catch cold, and to avoid errors in eating and drinking. Sudden changes of temperature should be guarded against by a proper supply of clothing. The drinking water should be boiled.

Tropical dysentery should be treated by injections of large amounts of cold water (45° F.), containing 1 part of sulphate of quinine to 5,000 parts of water, into the bowel. Hypodermic injections of emetin hydrochloride, one-half grain three times a day, is, however, the best treatment. When this drug can not be obtained, salol-coated capsules of powdered ipecac may be used instead.

DIARRHEA.

Acute diarrhea is caused by acute inflammation or by irritation of the intestines. It may occur as a complication in many different diseases. It is usually one of the symptoms of typhoid fever. It is not infrequently met with in severe cases of malaria. It is called

functional or **simple diarrhea** when it occurs independently of any other appreciable disease. It may be caused by exposure to cold or by errors in diet.

In **simple diarrhea** there may or may not be griping and colicky pains. In the more severe forms the tongue is coated and there is some fever. Thirst is marked in proportion to the size and frequency of the thin or watery discharges. If the rectum is affected, there is a constant desire to go to stool, and a burning sensation and bearing-down pain, as in dysentery.

Diarrhea may last from a few hours to as many days, or longer. It may become chronic.

Treatment.—In all cases, **rest** and light diet. In the milder forms nothing further may be required. Twenty grains of bismuth subnitrate with 5 grains of salol may be given every three hours. In the more severe forms it is a good plan to begin with a dose of 1 or 2 tablespoonfuls of castor oil, to which 10 or 12 drops of laudanum may be added, or in place of the oil and laudanum Epsom salts may be given. The diet should be limited to light articles, such as cornstarch, gruel, weak broths, soft-boiled eggs, milk, and thoroughly toasted bread. As a rule, in very acute cases, the less food and drink taken the better. The patient should rest in bed and keep his body warm.

After the bowels have been freely moved by the oil or salts, if the diarrhea or pain continue, give one camphor and opium pill, and, if necessary, repeat the dose after an interval of three or four hours. If nausea and vomiting occur, apply mustard to the region of the stomach, and give tablespoonful doses of equal parts of milk and limewater.

In **chronic diarrhea** careful attention to diet is of the greatest importance. The treatment is about the same as for chronic dysentery.

CHOLERA MORBUS (SPORADIC CHOLERA).

Cholera morbus is an affection of the stomach and intestines, attended by vomiting, purging, and cramps. It comes on suddenly, and may begin by vomiting or purging. It is usually met with during the hot months of summer. It is frequently caused by eating unripe and indigestible fruits and vegetables, decomposed or improperly cooked fish, shellfish, or salad mixtures. Drinking large quantities of iced water and sudden checking of the perspiration, or irritants of any kind, may set up the trouble. The disease usually begins suddenly, often at night, with vomiting, after a feeling of uneasiness, nausea, or a severe cramp. The contents of the stomach are first thrown up, then a bilious matter. The stools are at first solid or semisolid, but they soon become more watery, lose their color, and sometimes appear not unlike the rice-water stools of genuine Asiatic cholera. The patient soon has a wasted look. His thirst

is unquenchable. His skin may become cold and clammy and the pulse very weak. Cramps may occur in the feet and in the calves of the legs. The disease runs a rapid course. The acute symptoms may subside in a few hours. The attack seldom lasts more than twelve hours. Recovery is the rule, but treatment should be promptly applied.

Treatment.—Apply a large mustard plaster to the abdomen. Give 15 drops of laudanum. If the dose is rejected (immediately vomited), try it again. If it is still not retained, then try 2 tablets of "Sun Cholera Mixture." If vomiting quickly occurs, then inject into the rectum by means of a glass or rubber syringe about 20 drops of laudanum mixed with a little thin starch or a little water. The rectal injection should be given immediately after an evacuation, and the patient should be instructed to hold it as long as possible. In whatever way the remedy is given the dose should be repeated in about one hour if the vomiting and purging continue.

It must not be forgotten, however, that all these remedies contain opium, and that if the patient is inclined to sleep or shows other constitutional effect of the drug the dose must not be repeated.

The nausea and thirst may be controlled by cracked ice placed in the mouth. Small quantities of carbonated water may be allowed. If the thirst is very urgent, a tablespoonful of iced water may be given at short intervals.

COLIC.

Intestinal or spasmodic colic.—These terms are applied to abdominal pain occuring in paroxysms of different degrees of severity. The pain is usually referred to the region of the navel or middle of the belly. It may be due to indigestible food, cold or acid drinks, poisons, gases, or any irritating substance. It is often preceded by obstinate constipation. Vomiting frequently occurs.

Another variety of colic, called **lead colic** or **painter's colic,** is caused by lead poisoning. It is not uncommon in painters or workers in lead. It may be caused by drinking water taken from leaden pipes. An attack may be mild or exceedingly severe. It is usually attended by obstinate constipation and by contraction of the abdomen.

The severe, paroxysmal pain attending the passage of a gallstone from the gall bladder to the intestine is called **biliary colic.** In biliary colic the pain is usually most marked in the region above the navel or about the stomach (epigastric region). The paroxysms begin and end suddenly. Severe nausea and vomiting occur. The skin and eyes may become yellow or of a yellowish hue (jaundiced), the same as in bilious colic. Gallstones may occasionally be found in the stools, if carefully looked for. Some cases, however, are difficult to distinguish from ordinary intestinal colic.

The severe, excruciating pain caused by the passage of a small rough stone or calculus or particles of sandy substance from the kidney through the ureter to the urinary bladder is called **nephritic colic, kidney colic,** or an attack of "the gravel." The pain usually begins with a one-sided, boring backache. Suddenly it increases in intensity and shoots down the loin to the hip and thigh, and the patient writhes in agony until the "stone" or particle, sometimes not larger than the head of a medium-sized pin, reaches the bladder, when the pain suddenly ceases. The paroxysm may last from half an hour to a number of hours, or one or two days. It may not recur for months or years; on the other hand, there may be two or more paroxysms at comparatively short intervals.

Colicky pains are present in many different diseases. **Appendicitis** frequently begins with pain not unlike that of intestinal colic.

Treatment.—If the colic is due to indigestible food, or too much food of any kind, an emetic should be given, such as mustard and water.

After the stomach is emptied give a teaspoonful of aromatic spirits of ammonia in water. Apply a large mustard plaster or a hot poultice or cloths wrung out of hot water, or heat of any kind to the abdomen. (Local applications of hot water usually afford some relief in any variety of colic or wherever pain exists.) If the colicky pains persist, 10 or 12 drops of laudanum should be given by the mouth, and repeated, if necessary, in two hours; or 30 or 40 drops of laudanum in a little water or starch may be injected into the rectum.

If the bowels were constipated when the attack began, an injection of soap and warm water should be given by the rectum, or small doses of Epsom salts or castor oil may be given by the mouth. The diet for a day or two should be light articles in small quantities at a time. The treatment for **lead colic** is about the same, except that the constipation should be relieved at once by full doses of Epsom salts or castor oil. Apply heat to the abdomen or place the patient in a warm bath. Pressure applied to the abdomen affords some relief. Remove the cause or remove the patient from the cause of the disease.

In **biliary colic,** the bowels should be freely moved, patient should be placed in a hot bath, and laudanum, 30 drops, given to relieve pain.

In **nephritic** or **kidney colic,** hot baths and laudanum, 30 drops, are the remedies.

APPENDICITIS.

Appendicitis is an inflammation involving the appendix vermiformis. This is a small attachment of the large intestine situated in the right groin. It may begin suddenly with violent pains in the right groin, some fever, colicky pains, nausea, and vomiting. The seat of the pain is usually on a line drawn between the bony prominence (the large bone of the pelvis) just above and on the outer side

of the right groin and the umbilicus. As the attack progresses, that region of the abdomen may become hard like a board and exceedingly sensitive to the touch. Often you will find that the patient flexes the right leg on the abdomen, and the effort to straighten it out causes him great pain. Sometimes the attack is much milder with only an uneasy sensation in the right groin, very slight fever, if any, and a sense of tenderness over the part affected. This pain may be in the pit of the stomach or about the umbilicus.

After this pain has been present for a few days a swelling in the right groin may appear, due to the formation of pus or to a large protective exudation of lymph.

Treatment.—The right course to pursue in a case of appendicitis is to call in a surgeon. If the services of a surgeon or physician can not be secured, the plan of treatment should be as follows: Absolute rest in bed with an ice bag over the appendix, to be continued during the stage of severe pain. Do not give purgatives. Reduce the allowance of food and drink of all kinds to the lowest possible limit. If the pain is very severe, 20 drops of laudanum in a little water may be given to control it. If the bowels move, a bedpan should be used, and under no circumstances should the patient be allowed to get up.

PILES.

Piles are varicose dilatations of the veins of the rectum. The symptoms may be slight or severe. Inflamed piles are very painful. There is a constant burning sensation at the anus, which is greatly increased during and immediately after each movement of the bowels. When the veins rupture you have "bleeding piles." Occasionally the inflammation of a nodule results in an abscess.

Treatment.—Piles are frequently due to habitual constipation, and when that condition is improved the piles often disappear, or at least cease to be troublesome. The bowels should be kept in good condition. One easy movement should take place regularly every day. This desirable habit should be brought about by careful attention to diet and by drinking water in the morning before breakfast rather than by the use of cathartics.

In acute attacks, if the bowels are constipated give a full dose of Epsom salts; put the patient on light, soft diet. Apply ice to the anus or inject cold water into the rectum. A hot application is sometimes very grateful. If the piles protrude, especially if they become strangulated, they should be pushed back with the finger; olive oil or petrolatum may be applied. If the piles are large and persistently painful, see a surgeon and have them removed by operation, which is the only sure cure.

SCURVY.

Scurvy is a disease produced by improper or unsuitable food. Many years ago it was of frequent occurrence among seafaring men on long voyages. Now it is a comparatively rare disease, thanks to better provisions and better methods in issuing food supplies.

Symptoms.—Swelling, sponginess, and bleeding of the gums. The teeth become loose and frequently drop out. The breath is foul, the tongue swollen. The skin becomes dry and scaly. Hemorrhages (small dark red spots) occur under the skin, first on the legs and then on the arms and other parts of the body. Bleeding from the nose frequently occurs. Swelling about the ankles is common. The skin of the legs is frequently discolored in large blotches, and there is often a peculiar hardness or induration of the muscles of the calf of the leg. The complexion is frequently of greenish or dirty-yellow hue. The pulse is rapid and weak. There may or may not be slight fever. The bowels may be constipated or there may be a troublesome diarrhea.

In severe cases debility and emaciation are quite marked. The mind wanders, and occasionally there is wild delirium.

Treatment.—This consists almost wholly in a change of diet. Give fresh vegetables, fresh milk, fresh beef, oranges, lemons, limes, or lime juice. Begin with small quantities at short intervals, and increase the allowance as rapidly as the stomach can take care of it. Pickles, onions, sauerkraut, raw potatoes, and raw cabbage are valuable articles in the make-up of a varied diet.

Potassium chlorate dissolved in water should be used as a mouth wash, and the gums should be frequently painted with tincture of myrrh. The skin should be kept in good condition by frequent bathing. The sleeping quarters should be clean and well ventilated.

RHEUMATISM.

There are different forms of rheumatism and some of the forms have several different names. **Acute rheumatism, acute articular rheumatism, inflammatory rheumatism,** and **rheumatic fever** are terms applied to one and the same disease. A milder form of the affection is called **subacute rheumatism.** In this form the symptoms are less severe, but the disease is more prolonged. It may continue for a long time and become chronic. **Chronic rheumatism,** however, or the different affections and deformities of joints to which this term is frequently applied, may develop independently of any acute or subacute attack.

The term **muscular rheumatism** indicates an affection of the muscles as distinguished from joint affections. Lumbago and stiff neck are varieties of muscular rheumatism. The muscles, however, to a greater or less extent may be involved in any form of rheumatism.

Other conditions simulating rheumatism, occurring in connection with or directly due to gonorrhea or to syphilis, are called gonorrheal rheumatism or syphilitic rheumatism, as the case may be.

Acute rheumatism (rheumatic fever).—This is a comparatively common disease in all climates within the Temperate Zone. It occurs chiefly during the winter and spring. Exposure to a cold, damp atmosphere is the most frequent exciting cause in persons predisposed to the disease.

It may or may not begin with a chill or with a sore throat. The larger joints are usually affected. Swelling, heat, redness, tenderness, and pain are the chief symptoms. The inflammation is apt to shift from one joint to another. The pain and fever are usually increased in proportion to the number of joints involved. The majority of cases are attended with profuse perspirations, scanty, highly acid urine, coated tongue, and constipation. The heart is frequently involved.

In **treating**, wrap the joint in cotton or flannel; keep it very quiet—the slightest movement aggravates the pain. Flannel wrung out of hot water and applied to the joint sometimes affords relief. A few drops of oil of wintergreen may be applied on a piece of flannel if the pain is severe, or cold applications may be employed if agreeable to the patient.

Place the patient in a good bed, and let him wear flannel next to his skin. Change the flannel frequently, and bathe the body with tepid water.

For internal medication give salicylate of soda in doses of 10 to 15 grains (0.6 gm. to 1 gm.) every two hours until about eight doses are taken or the pain is relieved, then give it in smaller doses of from 3 to 5 grains (0.2 gm. to 0.3 gm.) every six hours.

The food should be soft and nourishing and given every three hours. Epsom salts should be given to keep the bowels open. The patient should be kept in bed for a few days after the symptoms have subsided. The duration of the disease is very uncertain. The acute symptoms may subside in a few days and the patient may be up and about in a week or 10 days, but relapses are common, and the acute may pass into the subacute or chronic form.

Chronic rheumatism.—In chronic rheumatism there is stiffness and pain. A cracking or grating sound is frequently produced when the joints are suddenly moved. In severe cases the joints become enlarged and distorted. The deformity is sometimes very great.

The **treatment** consists chiefly in local application of liniments, etc., which afford relief because of the rubbing (massage) by which they are applied. Severe pain in the joint may be relieved by cold applications (flannel wrung out of iced water, applied to the joint

and covered with muslin). Hot applications to the joints are sometimes of value. Belladonna plaster may be applied.

Five to eight grains (0.3 gm. to 0.5 gm.) of potassium iodide in a glass of water may be given three times a day between meals.

The general health should be looked after. The skin should be kept in good condition by frequent baths of tepid water. The bowels should be moved at least once a day. Patient should be allowed good food. Fresh air is also important.

Muscular rheumatism.—In this disease the muscles most frequently affected are those of the back (lumbago), side of neck (stiff neck or wry neck), and side of chest (pleurodynia). Exposure to cold, sudden cooling of the body—especially after active exercise and sitting in a draft of air—are the chief causes or exciting causes.

As a rule there are no symptoms other than the stiffness and pain on motion. The muscles may be slightly swollen and very sensitive. Sometimes the attacks come on suddenly and apparently without cause, or following a slight twist or strain, as a "kink in the back," or patient may wake up in the morning with a stiff neck.

In **treating** acute cases salicylate of soda may be given in 5 or 10 grain doses (0.3 gm. to 0.6 gm.) every three hours until four or six doses are taken. Apply hot applications, dry heat, hot-water bag, or a hot poultice locally, or the heat may be applied by a flat-iron over folds of flannel or a piece of blanket and the rheumatism "ironed out." Later apply liniment with friction (massage). Keep the affected muscles at rest. If the muscles of the chest are affected, apply strips of adhesive plaster, the same as for fractured rib. Acute attacks are of short duration, but relapses are not uncommon, and chronic forms are frequently met with. Good food, fresh air, and attention to the general health are especially important in the treatment of chronic muscular rheumatism.

Gonorrheal rheumatism (gonorrheal inflammation of joints).—This may occur during an acute attack of gonorrhea, but it is more frequently associated with chronic gonorrhea or gleet. One or several joints may be affected. There may or may not be considerable fever. If only one joint is affected, it is apt to be the knee or the ankle. In chronic cases the pain is sometimes centered in the heel. The attack may begin in the wrist, elbow, or shoulder. The disease is not always limited to the joints. Sometimes the inflammation is in the tissues outside the joint proper, in the sheaths of the tendons of muscles, or in the fascia of the soles of the feet. The swelling is frequently quite marked. In chronic cases there may be effusion ("water on the joint"). In very severe cases suppuration occurs (abscess forms). The eye and the heart may also be seriously involved.

Treatment is not very satisfactory. Give from 5 to 10 grains (0.3 gm. to 0.6 gm.) potassium iodide in a little water between meals.

Keep the joint at rest. Apply a flannel bandage. Change it frequently and wash the joint with hot water and soap. In chronic cases liniments and passive motion should be applied. Tincture of iodine may be painted over the joint. A few drops of oil of wintergreen rubbed gently on the joint before the application of a bandage will often allay the pain.

Syphilitic rheumatism.—This so-called rheumatism is associated with secondary or tertiary syphilis. The joints and the shafts of long bones may be affected—thickened and painful. The pain is always worse at night.

The **treatment** is by potassium iodide, beginning with 10 grains (0.66 gm.) of potassium iodide three times a day between meals. Good food and attention to the bowels are important.

SYPHILIS.

Syphilis is a constitutional disease. It is contagious, or communicable, and is usually acquired during sexual contact. It may, however, be contracted in many different ways, direct and indirect. It begins by a primary lesion or sore called a **chancre** at the seat of inoculation (where the virus enters), and is followed by eruptions of the skin of different forms and different degrees of severity and variable duration. Sores also appear at the angle of the mouth, and **mucous patches** develop on the lips, tongue, inner sides of the cheeks, and sore throat is very common.

Mucous patches or **syphilitic warts** are also frequently seen about the anus or in any region where the skin is moist. The hair frequently falls out, the eyes are sometimes seriously involved, and sooner or later every organ in the body may become affected. A man suffering from syphilis in active form should not be allowed to go on board a ship, and if the disease breaks out while on the voyage he should be isolated, or at least be compelled to use separate drinking cups, knives, spoons, forks, towels, etc. He should under no circumstances smoke the pipe belonging to another man nor allow another man to smoke his. All his belongings should be kept strictly to himself, for unless the greatest care is taken other men of the crew will suffer. Chancre of the lip may be acquired by smoking the pipe of a syphilitic.

The primary or initial lesion of syphilis (the hard chancre) usually appears about three weeks after exposure, but may be as early as 10 or 12 days or as late as 5 or 6 weeks. It begins as a red spot or papule, which usually breaks and forms a small ulcer with hard edges; sometimes the sore appears as a simple excoriation or superficial ulcer without hard edges. The neighboring lymph glands become, in the course of a week or two, enlarged and hard. They seldom suppurate. About two months later the skin eruption and

other secondary symptoms begin. The lymph glands above the elbow, along the side and back of neck, and all over the body are usually enlarged. Patient frequently complains of headache and pain in the limbs, always worse at night, and may have slight, occasionally considerable, fever.

Treatment.—For the primary sore bathe the part with soap and water and dust boric acid over it twice a day.

If secondary symptoms, eruptions of skin, etc., appear, give a pill of protiodide of mercury, one-sixth grain, three times a day. Salvorsan is the best remedy for the disease but this medicine can only be given by a physician. The mouth and teeth should be kept clean by means of a soft toothbrush and Castile soap and water, or water to which a small quantity of bicarbonate of soda (baking soda) or tincture of myrrh has been added. If mucous patches appear in the mouth, smoking must not be allowed. If on board ship, as soon as the ship arrives in port send or take the man to the marine-hospital office and receive the advice of a surgeon as to further treatment.

SOFT CHANCRE (CHANCROID).

Soft chancre or chancroid is a virulent ulcer. It usually begins within 36 hours after exposure, first as a red spot, but rapidly developing into an ulcer covered with thick yellowish pus. The period of development is about 3 or 4 days. Sometimes a week elapses from the time of exposure to the development of the sore, and occasionally a period of incubation is as long as 10 days. A sore appearing within a few days or a week or even as late as 10 days after the exposure is usually regarded as a chancroid; but in practice this is not a safe rule, for the reason that many venereal sores are of a mixed character. The inoculations of both poisons may take place at the one and same spot—the result is a mixed chancre; or if two sores appear, the origin of one may be syphilitic, the other chancroidal. It is therefore difficult, if not impossible, in many cases to determine the character of the disease from the period of incubation or from the appearance or local characteristics of the sore. A mixed chancre is a syphilitic chancre (a hard chancre), while its appearance may be precisely like that of the soft chancre or chancroid. The only safe plan is to regard all venereal sores as suspicious. But while this is true, treatment for syphilis should not be commenced before the appearance of secondary symptoms, for unless such symptoms appear it is impossible to determine that syphilis really exists in any case. The **mixed chancre,** as already stated, is essentially a syphilitic chancre, and the beginning of constitutional disease. Its local effects, however, may be precisely the same as those of soft chancre or chancroid. The ulcer (or ulcers—sometimes there

are two or more) may remain as small as a pea or grow as large as a quarter, and if it becomes phagedenic (eating) may spread over a large surface of the body. It is also proper to state that a **secondary** syphilitic sore may appear under the foreskin, as well as at any other place on the body, and that cancer (epithelioma) of the organ may begin as a small ulcer. The latter, however, is a rare disease as compared with the different varieties of chancre.

The most frequent complication of soft chancre or chancroid is inflammation of the lymph glands of the groin (bubo), known to the sailor as "blue balls." Another troublesome and serious complication is the elongation and contraction of the orifice of the foreskin (phimosis), on the inner surface of which the sores may be located, and the swelling and tension may be so great as to produce gangrene (mortification). If the foreskin is very tight and pulled back and can not be brought forward again, the condition is known as paraphimosis, which produces great swelling, the same as if a string were tied around the organ, frequently resulting in severe ulceration and destruction of tissue. This condition may also be the result if the inflammation and swelling are marked and the foreskin very tight.

The sore should be dried and covered with a small piece of aseptic gauze or absorbent cotton, and later a dusting powder of boric acid may be applied.

If phimosis exist, the cavity of the foreskin should be syringed out with hot water, and if there are sores under the foreskin which can not be reached by the acid the cavity should be syringed with a solution of 1 part of carbolic acid to 40 parts of water. Soft chancres or chancroids appearing at the anus or rectum should be treated by frequent washings of warm water and the application of calomel.

In all cases, wherever the sore is located, cleanliness must be insisted upon, and, as already stated, in nearly all inflammations of whatsoever character, hot water alone is a valuable remedy; and rest in bed is of equal importance. If a lump (bubo) appear in the groin, rest in bed is of the greatest importance. The diet should be light but nourishing. Tincture of iodine, pure or diluted one-half with alcohol, may be painted over the lump, but it is not of much value. Rest is the important thing. If the bubo go on to suppuration, it should be carefully opened with the point of a knife, and kept open by a strand of aseptic gauze, which must be frequently changed, and enough aseptic gauze should be placed on top of the wound to absorb the discharges. The soiled gauze should be burned, and the person handling it must be careful to wash his hands in soap and water and in one of the antiseptic solutions already referred to. The patient's bowels should be moved once a day.

GONORRHEA (CLAP).

Gonorrhea is a specific inflammation of the urethra due to a microorganism, called gonococcus. It usually begins during the first week after exposure, sometimes as early as 3 or 4 days, and occasionally as late as 10 days or 2 weeks. The first symptoms are a tickling or itching sensation and a slight swelling about the lips of the orifice of the urethra. A purulent creamy-colored discharge soon appears, and a burning or stinging pain attends the passage of urine. The inflammation gradually extends to the deeper parts of the urethra, and, unless checked by medication, reaches its height about the end of the second or during the third week. The patient may experience great difficulty in passing water. If the inflammation run very high, abscesses may form in the tissues around the urethra, and swelled testicle and bubo are frequent complications; also painful erections and bending of the organ (chordee). Phimosis or paraphimosis occurs if the foreskin is tight or becomes involved in the inflammation.

If phimosis occur, and if the cavity of the foreskin is not thoroughly and frequently washed out, "venereal warts" are apt to form.

True gonorrhea, if carefully treated, gradually subsides and recovery may take place in from four weeks to two months. A urethral discharge that recovers in a few days or a week is probably a **simple urethritis.**

Gonorrhea is urethritis (inflammation of the urethra), but urethritis is not necessarily gonorrhea.

Treatment.—Rest in bed, light diet, plenty of water to drink, regularity in eating and sleeping. Keep the bowels open by taking a moderate dose of Epsom salts in the morning. Avoid strong coffee and tea, all stimulants, and greasy articles of food. Keep the body and mind at rest. Bath frequently in hot water. Be very careful not to carry any of the pus from the urethra to the eyes. (Gonorrheal inflammation of the eyes is a very serious disease, which not infrequently results in total blindness and loss of the eyes.)

Give a copaiba capsule three times a day. If much pain in the back or over the region of the kidneys follow the use of the copaiba, it must be discontinued for a time or the dose lessened.

Injections of argyrol 10 parts, water 90 parts; permanganate of potash 1 part, water 5,000 parts; or sulphate of zinc 1 grain, water 1 ounce, into the urinary canal may be used. They should be employed as follows: The patient first passes his water, the urinary canal is then washed out with several syringes full of warm water. One of the above solutions is then injected slowly into the canal and held there 5 minutes by the watch. The best syringe for this purpose is one made of glass, having a plunger wrapped with cotton thread.

If the chordee is troublesome, apply cloths wrung out of cold water.

A snug suspensory bandage worn from the beginning may prevent the complication of swelled testicles. If the patient is lying in bed, the dragging of the testicles should be prevented by placing them on a support. The best local remedy for swelled testicles is heat, which may be applied by pieces of cloth or flannel wrung out of hot water.

STRICTURE OF THE URETHRA.

True or organic stricture of the urethra is a narrowing of the tube. It is commonly the result of long-continued or neglected gonorrhea. Stricture of the urethra may be produced by direct injuries, as kicks or falls on the perineum, or by the use of too strong injections, or by the careless passage of instruments.

Occasionally stricture results from simple urethritis, not gonorrheal, and symptoms not unlike those of stricture are sometimes caused by a stone in the bladder obstructing the passage, and by an enlarged prostate gland.

Gonorrheal stricture of the urethra is usually of slow development. It may be several months or years after the attack of gonorrhea before the patient becomes conscious of any change in the size or shape of the stream. First there may be only a twisting or flattening of the stream. In severe cases it gradually becomes smaller and smaller, until it is no larger than a knitting needle and passed with great difficulty, or it comes away drop by drop, and finally results in complete retention. One of the earliest symptoms of stricture is a gleety discharge from the urethra.

Occasionally retention of urine is the first symptom of the disease.

Sudden retention may be due to spasm of the urethra (spasmodic stricture).

Spasmodic stricture may occur independently of any specific disease of the urethra, but it is more frequently a complication of organic stricture. Exposure to cold and wet (catching cold), or a debauch, are the usual exciting causes.

When retention occurs the bladder gradually becomes distended and a fullness or distinct tumor may be felt in the lower part of the abdomen, which in severe cases may extend as high as the navel. Sometimes there is an involuntary flow, or an overflow of urine from a distended bladder—patient says he can not hold his water, and in such case it may be difficult to convince him that he is suffering from retention, until a catheter is passed and a quantity of urine is withdrawn.

Treatment.—A neglected stricture of the urethra is a serious disease, the treatment of which is very difficult in many cases, even in the hands of the most experienced surgeon.

If a case is allowed to run on until there is an actual stoppage or retention of urine, unless this condition is relieved the consequences are extremely serious and death may be the result.

Place the patient on his back with his knees slightly drawn up, and try to pass a catheter. The instrument should first be thoroughly cleansed by placing it in boiling water. It should then be oiled with olive oil, and carefully passed into the urethra and effort made with the greatest gentleness to pass into the bladder. (Fig. 1.)

Try the largest size catheter first; if this fail, try the smaller ones. If a catheter can not be passed at the first trial, place the patient in a hot bath, give him 20 drops of laudanum, and an hour or two later try the catheter again. If it is not practicable to place the patient in a full bath of hot water, then cover his belly and other parts of his body with flannels wrung out of hot water and change them every 15 minutes. The object of the hot bath and the laudanum is to produce relaxation. Sometimes a patient will pass his water in the bath. If, however, the symptoms are very urgent, if the patient can not pass any water, and after the most careful and gentle manipulation the catheter can not be passed into the bladder, the services of a surgeon should be secured.

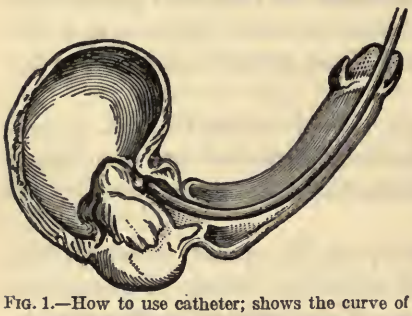

FIG. 1.—How to use catheter; shows the curve of the channel through which the catheter must pass.

VENEREAL PROPHYLAXIS.

Venereal disease may often be prevented in men by the application of calomel ointment after intercourse. The ointment must be used within 1 hour after the man has subjected himself to infection. It may possibly be efficacious after 3 hours, but the longer the time that has elapsed before the prophylactic is employed, the greater the danger of contracting the disease. The ointment should be well rubbed into the skin of the penis and scrotum, and a small portion should be injected into the urethra. Small packages containing this ointment are now put up. A short tube, attached to one end of the package, is for insertion into the urethra. No one should use a package belonging to another for fear of carrying disease from one person to another. The ointment should not be allowed to remain on the skin over 6 hours, as it may cause irritation. It should be removed by soap and hot water, after which a dusting powder should be applied.

FIRST AID TO THE INJURED.

RULES TO BE OBSERVED IN TIME OF ACCIDENT.

1. Give the patient air.
2. Lay the patient down, head lower than the body.
3. Rip the clothes off the injured part.
4. In removing a coat or shirt, first release the good arm, then the injured one.
5. Turn the head to one side to allow vomited matters to escape from the mouth.
6. Do not give whisky to the patient. If he can swallow, and needs a stimulant, give coffee, tea, hot milk, or hot water.
7. Then follow directions given elsewhere in this book.

BLEEDING (HEMORRHAGE).

Kinds of blood vessels.—There are two kinds of blood vessels. Those that carry the blood from the heart to all parts of the body are called arteries. The blood in them is bright red, and escapes in jets or spurts corresponding to each beat of the heart. Bleeding from these is more dangerous and more difficult to control, as a rule, than bleeding from the vessels that return the blood to the heart. Fortunately, however, the larger arteries in the limbs lie near the bones, and are consequently well protected in most parts by the mass of muscles covering them. The vessels that return the blood to the heart are veins. They contain a darker blood, and when cut, the blood escapes in a steady stream, not in spurts. While the largest veins in the limbs are also near the bones, there are some of considerable size just under the skin.

If we should desire to stop a stream of water flowing past a given point, we would naturally go upstream from that point and not downstream to adopt the necessary measures. In bleeding from an artery—the blood coming from the heart—the artery must be compressed at a place between the heart and the bleeding point. On the other hand, if a vein is bleeding—the blood flowing toward the heart—pressure must be made on the vein at a place farther from the heart than the bleeding point.

Bleeding, general treatment.—Before beginning the treatment of any wound or any bleeding point, the operator must carefully cleanse his hands and arms, also the wound and surrounding parts, and the instruments and silk ligature should be boiled, as described under the head of wounds.

In the after treatment of severe bleeding the patient should be kept perfectly quiet in mind and body, his head should be lowered by raising the foot end of his bed or bunk. Give him plenty of fresh air, but keep his body warm and give him hot drinks. After reaction the temperature of the body may rise a degree or two above normal, but if this should continue longer than two or, at most, three days, the dressing should be removed and the wound thoroughly irrigated, first with hot water, then with a solution of bichloride of mercury (1 to 5,000), and dressed with aseptic gauze.

Bleeding from arteries.—There are certain places in the body where the arteries are not covered by much muscle, and can be easily

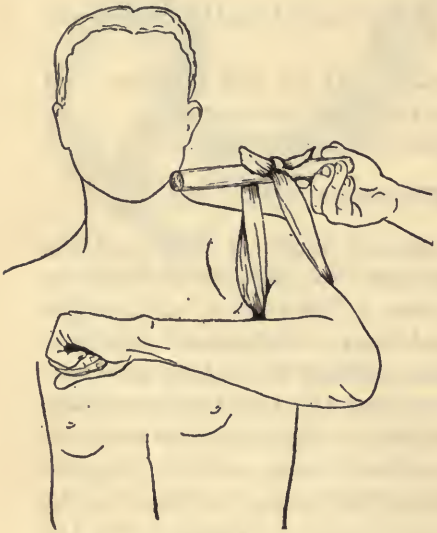

FIG. 2.

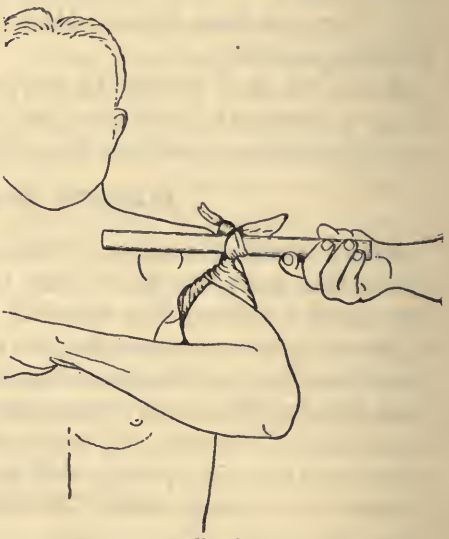

FIG. 3.

compressed against bone. These places are shown in the illustrations. The bleeding should first be controlled by thumb pressure at the points indicated in the illustrations, and if the services of a doctor can be secured without delay, this will be all that is necessary until he arrives. If there is any doubt as to the exact place at which pressure should be made, a slight shifting of the thumb from one point to another should be rapidly made, and when the bleeding stops it indicates that the proper location has been reached and pressure should be continuous at this point. If a doctor is not within reach, the bleeding must of course be controlled by some other device. When the bleeding is from one of the limbs, and some distance from the body, a bandage or clean handkerchief should be wrapped around the limb at the point indicated in the illustration, and drawn tight enough to stop the bleeding. The "Spanish windlass" (figs. 2 and 3) is made by knotting a handkerchief around the limb loosely, passing

a stick through the slack part, and taking up the slack by twisting the handkerchief. To prevent untwisting, the stick is then bound to the limb by one or two other bandages or handkerchiefs. A small round stone, a cork, or other similar object placed in the folds of the handkerchief and lying directly over the vessel will assist. Only sufficient pressure should be made to barely stop the bleeding The windlass must be loosened every 20 minutes to give a chance for the life blood to flow through the part as there is *great danger* of gangrene (mortification) if the blood is entirely shut off for longer than this time.

The knot in the windlass should not be untied, and the stick should be left in position for immediate tightening if the blood again begins to flow freely. If the windlass is to be used for several hours, it is best to encircle the limb with a folded towel before applying it, as there is less danger of injuring the skin and soft parts. If the bleeding artery is in or near the body, where a windlass can not be applied, thumb pressure must be kept up until the doctor arrives, one person relieving another. The second person's thumb should gradually push the first person's thumb aside, and thus prevent a spurt of blood. In exceptional cases it may be necessary to place the thumb directly in the wound to control the bleeding, but, no matter how clean the thumb may be, this should only be resorted to in desperate cases, as there is great danger of infecting the wound. Reference is made in this connection to the chapter on antiseptics.

In places where the services of a physician can not be obtained the wound should be stretched open, the blood vessel located, seized, and drawn gently forward with a pair of artery forceps and the ends tied with heavy thread that has been boiled for five minutes. If artery forceps can not be obtained, take a needle or a bent pin, pass it through a flame several times, hook onto the vessel, and draw it out; then tie it tightly with the thread described above. If a little flesh is tied in the knot with the artery, this will be of no consequence. After the artery has been securely tied the "Spanish windlass" should be removed, or, if thumb pressure has been employed, this should be discontinued. The wound should then be closed as described under the heading "Wounds."

Bleeding from veins.—The deep veins as a rule follow closely the course of the arteries. If thumb pressure on the far side (the side farthest from the heart) of the bleeding point fails to control the bleeding, a Spanish windlass should be applied on the far side. If the bleeding vein is near the surface, it may be possible in some cases to control it by a windlass with a stone or cork, the windlass not being drawn tight enough to shut off the deeper vessels. In some cases bleeding from veins is best controlled by pressure directly over the bleeding point, but the thumb should be covered by a clean

cloth, such as a handkerchief or towel. Elevation of the part and removal of all constricting bands, such as garters, will assist.

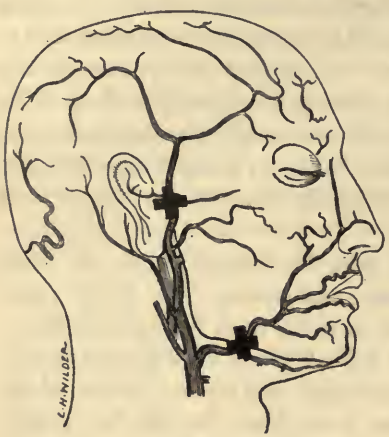

FIG. 4.

Where there is simply an oozing of blood and it does not appear that any vessel of size has been severed the case can frequently be controlled by steady pressure on the bleeding surface. Sometimes cloths soaked in water as near the boiling point as can be borne and constantly changed will accomplish the result. If peroxide of hydrogen is at hand, it is one of the best known agents to stop simple oozing.

Bleeding from head and face.—Reference to figure 4 will show a point in front of the ear, compression upon which will control bleeding about the temple. Another important point for pressure is shown where the artery crosses the edge of the lower jawbone. This controls bleeding in the parts supplied by this artery, as shown in the illustration. If the bleeding is severe and it is evident that a larger and deeper vessel is responsible, it is necessary to compress the large artery in the neck. If you will turn your own head well toward one shoulder, say the right, you will be able to feel a strong muscle standing out under the skin and extending from a point just back of the ear to the point where the left collar bone joins the breastbone. This is your guide to the deep artery. Pressure should be made deeply between the lower end of this muscle and the windpipe, compressing the artery directly against the backbone (figs. 5 and 6).

FIG. 5.

Bleeding from shoulder.—If the bleeding is in the neighborhood of the shoulder joint, the artery to be controlled is the one lying directly under the collar bone. Pressure is made downward behind the collar bone, near the point where it joins the breastbone, the artery being compressed against the rib (figs. 5 and 7).

Bleeding from arm, forearm, and hand.—If you will place your left hand on your right arm between the shoulder and elbow and then

FIG. 6.

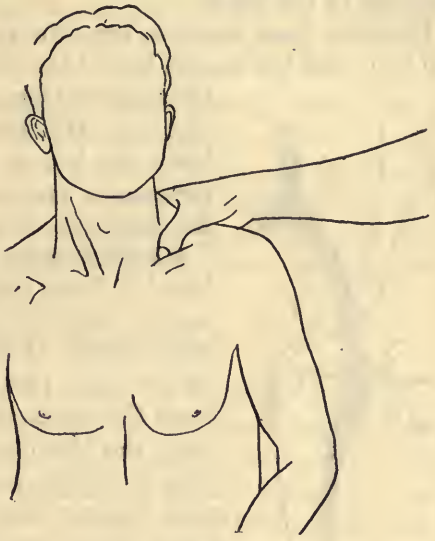

FIG. 7.

bend the right elbow and straighten it out several times, you will feel a muscle swell up in the arm and subside again. Extending

FIG. 8.

FIG. 9.

along the inner edge of this muscle and close to the bone a large artery can be felt beating (figs. 8 and 9). This is the one to compress when bleeding is from a point in the arm or forearm. If in the fore-

arm, the best place to compress this last-mentioned artery is just above the elbow; and this is also the best point if there is severe bleeding in the hand.

Bleeding from thigh or leg.—In the groin, halfway between the hip bone and the middle line of the body, the main artery supplying the thigh and leg can be pressed against the bone (fig. 10). If the bleeding is from the back of the knee, the leg, or foot, the best place to apply pressure is just above the knee at the back of the thigh (fig. 11).

Fig. 10.

Bleeding from lungs and stomach.—If the blood is from the lungs it is generally coughed up and has the bright red appearance of ordinary blood. If from the stomach, the acid of the stomach juice changes the blood until it has more the appearance of coffee grounds. If, however, the bleeding is severe, the vomited blood may be bright red, as the acid of the stomach may not have had time to act upon it. Sometimes blood brought into the throat from the lungs is swallowed by the patient and later vomited in its changed condition.

In the treatment of either of these conditions, it is best to keep the patient very quiet in bed, let him suck small pieces of ice in limited quantity, and apply cracked ice in some waterproof covering over the chest or pit of the stomach, as the case may be. Moral encouragement and cheerfulness on the part of the attendants are very necessary.

Fig. 11.

Bleeding from the nose.—If bleeding of the nose occur in a full-blooded person, especially if such person is subject to dizziness, we should not be in too much of a hurry to stop it. But if the bleeding is the result of injury or if it occur in a person suffering from disease of the heart or lungs or from the effects of malarial fever, scurvy, or any disease of the general system, effort should be made to stop it. Nosebleed from a blow, in a healthy individual, usually stops in a short time without any particular treatment. If it does not stop, place a piece of paper folded to the thickness of a quarter of an inch well up between the upper lip and gum, and compress the lip tightly against it. The main blood vessels supplying the nose pass upward from the corners of the mouth to the sides of the nose, and this paper tends to compress the vessels and shut off the blood supply. The patient should lie on his back with his head on a pillow. If ice is obtainable, it should be cracked into small pieces, wrapped in a thin

cloth, and placed over the nose, sufficient being used to cover the whole surface. Cold applied to the back of the neck will also do good in some cases. If the bleeding is obstinate, a strip of gauze or soft cloth can be pushed gently into the nostrils, the ends being allowed to hang out.

Bleeding from the urinary canal.—This is usually caused by falling astride of a hard object. The bleeding may be profuse, but is usually controlled by pressure with a folded towel. If the bleeding is severe, a stick with a crosspiece at one end should be placed at the foot of the bed, the crosspiece pressing against the towel in the crotch. After the bleeding ceases, the patient should be kept very quiet and cold applications should be applied.

BROKEN BONES (FRACTURES).

There are many varieties of fracture. A fracture is said to be **simple** where there is no open wound directly over the bone injury; **compound** when there is an opening in the skin and soft parts extending down to the broken bone; **comminuted** when the bone is broken in several places; **complicated** when associated with other injuries, as dislocation of the joint or rupture of the main artery of the limb; **impacted** when one fragment is driven into another.

SIMPLE FRACTURES.

In a typical, well-marked fracture of a bone in one of the limbs we will find the following:

1. History of an injury.
2. Pain and tenderness, and later swelling; and sometimes discoloration of the part.
3. Deformity, in some cases.
4. Shortening, due to the fact that in most cases the break is obliquely across the bone and the fragments override.
5. Scraping noise, called crepitus, when the ends of the bones are rubbed together.
6. Inability or disinclination to use the part.

Any of these signs may be absent in a given case. Sometimes it is impossible to tell without an X-ray examination whether we have to deal with a fracture, a sprain, or a bruise, but in such cases it is always best to assume that we have a fracture to treat

In transverse fracture, where the break is straight across the bone at a right angle with the long axis of the bone, or in a fracture near a joint, there may be no shortening and no deformity. In fractures of certain bones, as the skull or the spine, or in an impacted fracture, there may be no motion. In fracture of the kneepan or the elbow the fragments are pulled apart by the muscles, so there is lengthening instead of shortening.

Examination should always be made as soon as possible after the accident. Under the most favorable circumstances it is difficult in some cases to determine whether a bone is broken or not, and the difficulty is greatly increased if the examination is delayed until inflammatory swelling has set in. In fractures of the extremities the sound limb should always be placed alongside the injured one for comparison. The shortening in fracture of the thigh may be from 1 to 3 inches, but it must not be forgotten that in some persons there is a natural difference of as much as half an inch in length of the pair of legs; and a limb may be otherwise naturally deformed which should not be mistaken for accidental deformity. In the leg below the knee there are two parallel bones (tibia and fibula). In simple fracture affecting only one of these bones the deformity and crepitus are less marked; and the same may be said of the forearm, if fracture exists in only one of the bones (radius or ulna). If both bones of the leg (tibia and fibula) or of the arm (radius and ulna) are affected, there may be considerable deformity, and it is a curious fact that fracture of these bones seldom occurs on the same level. The distance between the fractures may be from 1 to 3 inches, usually greater in the leg than in the forearm.

Crepitus (the sound heard or feeling imparted to the hand when the broken ends of the bone are rubbed together) is a valuable symptom of fracture, but it can not always be detected, and when other marked signs or symptoms are present need not and should not be looked for. In fractures of the leg below the knee or of the forearm, involving only one of the bones, it is hard to make out because of the difficulty of rubbing the broken ends together, and when much swelling exists the difficulty is increased, or a false crepitus may be produced. In impacted fractures, which occur chiefly in the neck of the thigh bone, no effort should be made to obtain crepitus. The important thing in such cases is not to disturb the impacted fragments, for if pulled apart recovery is rendered more difficult.

Treatment.—This can best be described by taking as an example a fracture of both bones in the middle of the leg. The object of the treatment is to—

1. Set the bone (known as reducing the fracture).
2. Apply some dressing that will hold the broken pieces of bone in position.
3. Watch for swelling, and see that the bandages are not too tight.

In handling a broken leg, or one in which a broken bone is suspected, the leg should always be stretched by grasping it above and below the fracture point. This prevents deformity, injury to the blood vessels, nerves, and soft parts by the sharp ends of the bones, and causes the patient less pain. If a patient with a broken leg is to be placed on a bed, one or two boards should be passed under the

springs of the bed from side to side to prevent sagging, as this would cause displacement of the bones and pain to the patient. One person grasps the foot firmly, with both hands placed over the instep and heel, respectively, and pulls down, while another person grasps the thigh just above the knee with both hands and pulls in the opposite direction. While the leg is thus extended and the attention of the two assistants is directed solely to this injured leg, other persons pick up the patient carefully and transfer him to the bed. If a doctor can be reached in a comparatively short time, the leg can be held in position by means of sandbags. The two legs of a pair of overhauls cut off, filled with sand or heavy earth, and tied at the ends, when placed along either side of the leg will answer the purpose. The broken leg is approximately in proper position when the ball of the great toe, the inner ankle, and the inside of the knee are in the same verticle plane; in other words, if a board were placed on edge along the inside of the leg, the three points mentioned would all touch the board.

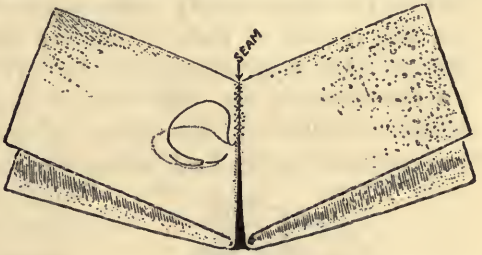

FIG. 12.

If the patient is to be transported to the doctor, or if some time will elapse before the doctor can arrive, the leg must be incased in some dressing that will hold it stiff and not allow the broken bones to move. Any dressing applied for this purpose should be well padded with cotton, soft underclothing, moss, or anything that is available. Particular attention should be paid to the ankle, the heel, and also the parts near the break to see that they are all well cushioned. A piece of heavy pasteboard moistened can be molded fairly well to the leg. Sometimes a pillow, particularly a hair pillow, if supported by strips of wood on the outside to prevent it bending, can be used. The dressing is bound to the limb with bandages. These may be made by tearing up a sheet, pillowcase, shirt, or blanket.

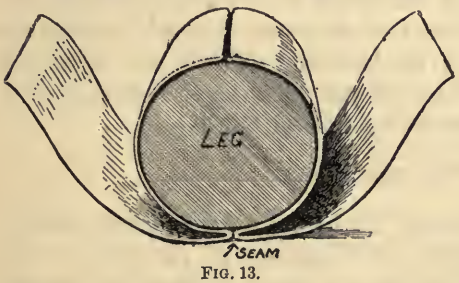

FIG. 13.

The toes should not be inclosed in the dressing, because if the doctor can not be reached in a short time, it is necessary to watch the toes to determine whether the swelling has made the dressing too tight. If the toes are bluish and cold, the bandages should be loosened to let the blood circulate. If plaster of Paris or cement is at hand, the old Bavarian splint (figs. 12, 13, and 14) can be

made by a layman. Take two pieces of blanket as long as the lower leg and 18 inches wide. Fold each piece in the center along its long dimension and sew these folds together, as shown in the illustration. Place the leg on the seam, bring the upper fold on either side, and let the two surround the leg, trimming off the blanket so that the edges simply come together but do not lap. Now smear the wet plaster of Paris or cement over this layer, and then bring up the other layer around the leg, trim it in the same manner, and tie the dressing on with several bandages until it "sets." This kind of a splint can be opened at any time for examination of the leg, the seam at the back acting like the hinge of a clam shell. Possibly wet clay could be used in such a dressing if the limb could be placed before a fire to dry.

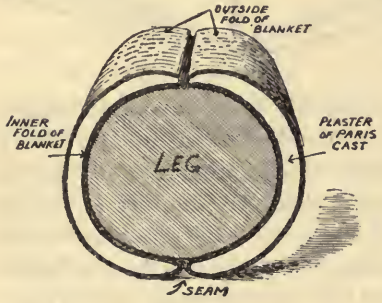

FIG. 14.

The necessary thing in all first-aid work is to get the principles firmly fixed in the mind, and human ingenuity will find a way of carrying out these principles. A box can be constructed to incase the limb, it being properly padded. Whatever dressing is applied, if the patient is to be moved any distance, it is best to make the dressing long enough to cover the joints above and below the fracture and thus prevent the bones moving, as there will then be less danger of displacing them and the patient will be more comfortable. If the bandage is rolled loosely and stirred about in a vessel of thick starch, it can then be applied hot, and when dry forms an excellent stiff dressing; but such a bandage should not be stretched while being applied because the starch contracts in drying and the dressing will be too tight. A starch dressing, after drying, can be slit up along the front leg to loosen it, and then held in position by several bandages.

COMPOUND FRACTURES.

Compound fractures are serious accidents and require prompt attention. The general principles of treatment so far as the bone is concerned (place it in normal position and keep it there) are the same as for simple fracture. But to do this and at the same time give proper attention to the wound in the soft parts (the open wound extending down to the bone) frequently demands the highest surgical skill.

Shock from loss of blood is the immediate danger. Inflammation, erysipelas, blood poisoning, or lockjaw may set in later, and still later the patient may become exhausted from long-continued suppuration.

Treatment.—If the wound is very small it should be well cleaned with hot water (water that has been raised to the boiling point and allowed to cool down to about 120° F.) or by antiseptic solution (solution bichloride of mercury 1 to 5,000), then covered with aseptic gauze, and the case treated as a simple fracture. (Clean hands as indicated on p. 96.)

In nearly all cases, however, the safest and best plan is to leave the wound uncovered by splint or bandage, so that light dressings may be easily applied and frequently changed. The wound should be thoroughly cleansed with hot water and antiseptic solution before reducing the fracture, for, if dirt on the end of the bone or skin is drawn into the wound when the bone is returned to its proper place, infection with organisms causing lockjaw or other dangerous conditions may occur, by which the patient may lose his limb or his life. The splints or extending apparatus should be so arranged that the wound is freely accessible and easily drained. Strips of aseptic gauze should be placed in the wound and gently carried down to the bottom by means of a probe, and a larger piece of aseptic gauze in loose folds should be laid over the wound.

The aseptic-gauze dressing should be renewed every day or every second day or as often as necessary to keep the wound well drained until it heals from the bottom.

In severe cases amputation may be necessary to save life, and in all cases the patient should be placed under the care of a surgeon as soon as possible.

FRACTURE OF THE LOWER JAW.

Fracture of the lower jaw may be simple, compound, or comminuted. The mucous membrane of the mouth is nearly always lacerated, the bleeding is usually not severe (oozing only), but there may be hemorrhage from an artery (the inferior dental), saliva dribbles from the half-open mouth, the teeth may be out of line, pain is apt to be severe, there may be considerable deformity and a false point of motion.

Treatment.—Restore the parts to the natural position and keep them at perfect rest, first washing out the mouth with hot water to cleanse it and check bleeding. If the bleeding is very severe, pressure should be made by the thumb or finger for a time on the bleeding point, if possible, or on the large artery (carotid) on the side of the neck, which may be easily located by the pulsation. Loose teeth or pieces of bone should not as a rule be removed. Mold them into place, bring the teeth and jaw into natural line, and keep them so by a pasteboard or binder's board splint, held in place by a four-tailed bandage, as described under bandaging.

If the parts can not be kept in place by the methods described, the teeth may be fastened together with silver wire passed between the teeth on each side of the break and twisting the ends together. Feed the patient on liquid food through a rubber tube introduced behind the last tooth or through any space left by the loss of a tooth, the object being to prevent movement of the jaw. Wash out the mouth frequently with hot water, and if necessary change the dressing every two or three days until the end of about the sixth or eighth week, when, if all goes well, union will be complete, and the splint and bandage may be discontinued.

FRACTURE OF THE NOSE.

If the nose is broken and it is possible to reach a doctor within four or five days, it is best for the layman not to attempt to restore the bones to position. If, however, there is great depression of the nose, and a doctor's services can not be obtained for a long time, a very gentle effort may be made to lift the bones into position by passing into the nostrils a thin stiff piece of metal well wrapped with some soft material. When the patient can breathe well through either nostril while the other nostril is held closed, it is an indication that the bones are in fairly good position. The operation described is a technical procedure and should not be attempted by a layman except in an extreme case where medical assistance can not be obtained.

FRACTURE OF THE SKULL.

If the skull is fractured, there may be unconsciousness, paralysis, bleeding from the nose or ears, or other unusual manifestations. It is important to get the doctor as soon as possible. In the meantime, it is a very good general rule in this, as well as in all first-aid work, to keep the patient's head cool and the feet warm. If ice is at hand, an ice cap can be made by tying up the broken ice in a piece of mackintosh, oilcloth, rubber sheeting, or other waterproof material that will keep the patient from getting wet. Warmth to the feet and body can be applied by hot water in bottles or jugs, or by heating plates, stones, or bricks in water and wrapping them well. Remember always that an unconscious man or one seriously injured can not tell his willing helpers when a thing is too hot, and due care should be exercised. Do not pour whisky down the patient's throat. If he is able to swallow, he probably does not need a stimulant; and if he can not swallow, the whisky will choke him. In many cases, the first resort of the layman is the whisky bottle, and when the doctor arrives he can not tell how much of the stupor is due to the whisky and how much to the injury.

If it is impossible to obtain the services of a physician for several days, care should be taken to see that the patient passes his urine. If no urine is voided for 24 hours after the injury, a hot pack of towels,

wrung out of hot water, should be placed over the bladder; the pack must not be too hot or the patient may be burnt. If this does not have the desired effect, a soft rubber catheter, if one is obtainable, after being boiled for five minutes, should be carefully introduced into the urinary canal and the urine drawn off. Before taking this step, the person who has charge of the patient should thoroughly cleanse his own hands and carefully wash the genital organs of the patient with soap and water.

BROKEN BACK.

If the back is broken, there is usually paralysis of the lower limbs, and sometimes the patient passes the urine and contents of the bowels involuntarily.

Special care should be taken to prevent bedsores. The bed should be as comfortable as it is possible to make it. A rubber sheet should be placed over the mattress and the bed linen should be changed frequently. The back and buttocks should be kept clean by frequent washing with soap and water. The skin should then be dried with a soft towel, bathed with a mixture of equal parts of alcohol and water, and then dusted over with starch. If the skin becomes red, zinc ointment should be applied.

At other times the patient may pass no urine and then it has to be drawn, as described under the previous heading.

The mind may be perfectly clear and the patient as a rule suffers no pain.

FRACTURE OF RIBS.

Fractures of the ribs are sometimes difficult to determine, but if present, there will usually be a stitchlike pain upon taking a deep breath; and if the chest is quickly compressed by one hand on the breastbone and the other on the backbone, the patient may complain of pain at the point where the bone is broken, usually somewhere under the armpit. As splints can not be applied to a part like this, and as the ribs are constantly moving in breathing, the best that can be done in the way of first aid is to strap the injured side with strips of sticking plaster 2 or 3 inches wide, long enough to reach from the middle line in front or a little beyond to the middle line behind or farther, the strips lapping over one another, drawn rather tightly, and extending from the lowest ribs well up into the armpit. In the absence of sticking plaster a strip of muslin 12 inches wide, passed around the chest rather tightly several times and snugly pinned, will give some comfort until the doctor arrives.

FRACTURE OF THE THUMB AND FINGERS.

Treatment.—Put the fragments in place by extension and pressure; then cut a piece of pasteboard, leather, cigar box, or thin board long enough to extend from above the wrist joint to a little below the ends

of the fingers and a little wider than the hand. Cover the board with lint or any soft cloth, place the palm of the hand flat upon it, and apply a bandage around the whole hand and wrist.

If pasteboard or leather be used, it may first be dipped into hot water and then molded to the shape of the thumb or finger and palm of the hand, then lined or covered with cloth, and bandaged as above, care being taken not to make the bandage too tight.

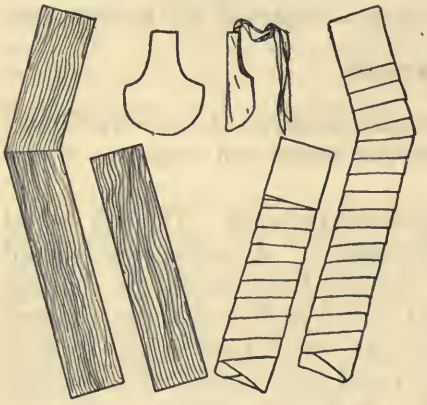

FIG. 15.

FRACTURE OF THE FOREARM.

The forearm extends from the wrist to the elbow. When both bones are broken there is apt to be marked displacement and crepitus (grating felt by rubbing the broken ends of the bone together). When only one bone is broken the signs and symptoms are not so clear, but by careful examination the nature of the injury may be determined. When fracture of one of the bones (the radius) occurs near the wrist joint (Colles' fracture) there is generally marked deformity resembling a silver fork in shape.

In fracture of the forearm take a thin board 3½ inches wide, and long enough to reach from the elbow to the tips of the fingers (fig. 15). After stretching the forearm by grasping the hand and the arm above the elbow until it seems fairly straight, lay the palm side of the forearm and hand on the board, well padded, and place on the back of the forearm and hand another similar padded board extending from the elbow to the knuckles. Carefully and evenly bandage the splints, starting at the fingers and working up. Leave the tips of the fingers uncovered to watch the circulation (fig. 16). The bandaged arm can be carried in a sling.

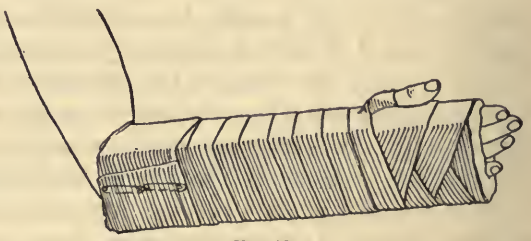

FIG. 16.

Another way to hold the splints in place is to apply strips of adhesive plaster around them, one at the upper and the other at the lower end. If swelling occurs, the bandage must be loosened. The splints should be worn six weeks or two months, and passive motion—that is, gently bending and straightening of the fingers with the other hand—must be made every few days to prevent stiffening.

FRACTURE OF THE ARM (BETWEEN THE ELBOW AND SHOULDER).

Treatment.—In a break of the upper arm it is well to make two gutters of moistened pasteboard, and apply them after padding to the outside and inside of the arm. The entire arm and forearm should then be supported by two angular splints (figs. 15 and 17) made of thin board, one applied from the fingers to the armpit, the other from the fingers to the shoulder. The padding should be especially heavy and even about the elbow and any other place where the bones naturally come near the skin.

If much swelling occurs, all bandages must be loosened.

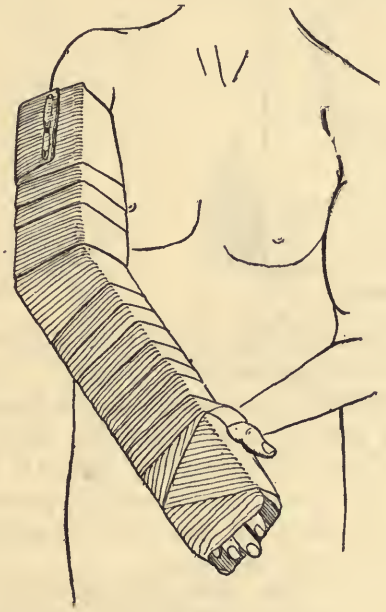

FIG. 17.

The splint should be worn about eight weeks. Under the most favorable circumstances, after fracture, this bone (the humerus) sometimes fails to unite. At least once a week the joints should be moved to prevent stiffness.

Fractures of the arm (of the humerus) at or near the elbow joint or shoulder joint are frequently very difficult to make out, even by the most skillful surgeon, especially if some time has elapsed since the injury was received; and the treatment of necessity is equally difficult.

If near or at the elbow joint, and if there is much pain, heat, and swelling, as is apt to be the case, cold applications should be applied, and the arm laid upon a pillow until the swelling has gone down. A

rectangular splint of binder's board or leather should then be dipped in hot water and applied to the inner side of the arm and forearm. The splint should be wide enough to extend nearly halfway around

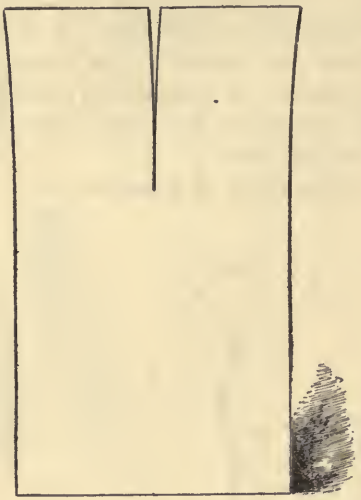

FIG. 18.

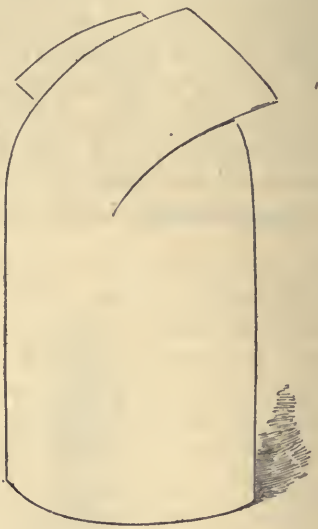

FIG. 19.

the arm. It must be well padded and held in place by a roller bandage, and the forearm supported by a sling.

If the break is near the shoulder joint, the dressing can be supplemented by slitting a piece of pasteboard at one end, moistening it, and molding it to form a shoulder cap (figs. 18, 19, and 20), which is bound in place by passing bandages from the injured shoulder around the body and opposite shoulder.

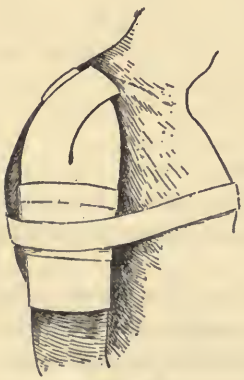

FIG. 20.

After the application of any apparatus for fracture of the arm or forearm, the circulation should be carefully watched by feeling the pulse at the wrist. If it can not be felt, or if the fingers swell, the bandages should be removed and reapplied less tightly.

FRACTURE OF COLLAR BONE.

The collar bone connects the breastbone to the shoulder. Children may have a green-stick fracture in which this bone is not completely broken across. In adults the fracture is nearly always a simple one, the bones overriding. The shoulder drops downward from its own weight, and is drawn inward and forward by the muscles. The first-aid indications are therefore to overcome these actions

as far as possible, and to force the shoulder upward, outward, and backward. Placing the arm in a sling will draw the shoulder upward to a certain extent, and this can be assisted, if sticking plaster is available, by placing the hand of the injured side on the opposite shoulder, and then binding it there by placing the middle of a long strip of 2 or 3 inch sticking plaster under the elbow, one end passing along the forearm to the hand on the shoulder and the other end passing diagonally across the back to meet the first end on the shoulder. Other strips of sticking plaster or a bandage

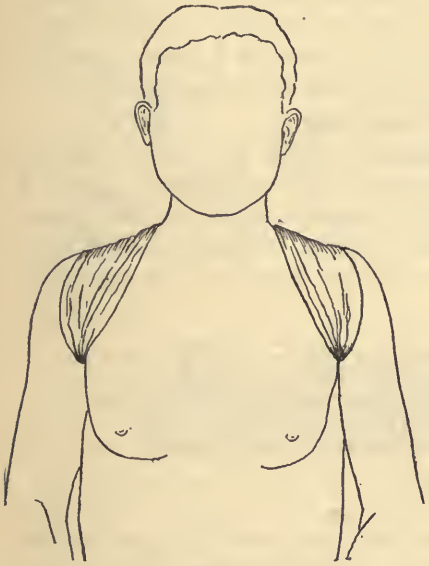

FIG. 21.

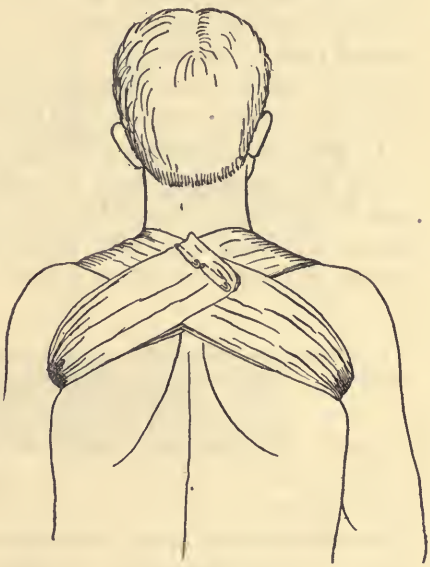

FIG. 22.

passed around the injured shoulder, then across the back, and fastened around the body, will force the shoulder backward and to a slight extent outward, and make the patient more comfortable until the doctor arrives. In the absence of sticking plaster a bandage applied in a "figure of eight" may hold the shoulders in fairly good position (figs. 21 and 22). Stand at the patient's back, pass the bandage over one shoulder to the front, then under the armpit to the back, across the back to the front of the opposite shoulder, through this armpit to the starting point on the back. Go over the route several times with some tension on the bandage, and then make the end fast.

FRACTURE OF THE THIGH.

The thigh bone (femur) extends from the hip to the knee. Fracture of this bone may occur in any portion of the shaft, but the most common seat of fracture is about the middle or the middle third.

Fractures high up near the hip joint are frequently very difficult to make out, and the results of treatment in such cases, even under the care of skillful surgeons, are not always satisfactory.

In fracture of the middle or middle third of the bone, the deformity is usually produced by the lower fragment (the broken end of the lower portion of the bone) being drawn up behind and to the inner side of the upper fragment; the weight of the limb then causes rotation and the foot and toes are turned outward.

If the fracture is a little higher up, displacement is shown by the upper fragment, which, by the action of the muscles, is thrown strongly forward and outward. In either case there are complete **loss of power, shortening** to the extent of 1 to 2 or 3 inches, pain on the slightest movement, **crepitus** (grating) if the broken ends of the bone are rubbed together, and abnormal motion.

In impacted fractures, which are met chiefly at or near the hip joint, the shortening may be, and usually is, less marked. Loss of power is usually complete, but not always. Patients have been known to stand and even walk a few steps. Injuries of this kind require the greatest care; the limbs should be handled very carefully.

FIG. 23.

If on slight traction or manipulation crepitus is not felt, no further attempt should be made to obtain this symptom, for in doing so the impacted bones may be pulled apart, which is to be avoided unless especially directed by a skillful surgeon.

Treatment.—In the absence of a physician, about all that may reasonably be expected to be done in impacted fracture is to apply a broad bandage around the hips and place the patient in a good bed on a firm mattress and make lateral support by means of boards (fig. 23), or by sandbags, one on the outside long enough to reach from the upper end of the hip bone to the foot, the other along the inner side of the leg from the crotch to the foot. Fill the bags three-quarters full of dry sand. Keep the leg straight, toes upward.

Treatment of nonimpacted fracture of the thigh bone at or near the hip joint.—Place both legs on the double-inclined plane, or make extension and fix the limb in the straight position by means of a long splint (a splint extending from the armpit to the foot), or by the weight and pulley, or by the long splint and the weight and pulley combined, in the manner now about to be explained in connection with the treatment of fractures of the shaft of the thigh bone.

Treatment of fractures of the shaft of the thigh bone.—In fracture of the shaft of this bone the signs and symptoms, as already stated, are usually well marked. If the fracture is at the upper end or in the upper third of the bone, especially if the upper fragment is tilted forward, the double-inclined plane (fig. 24) well padded or

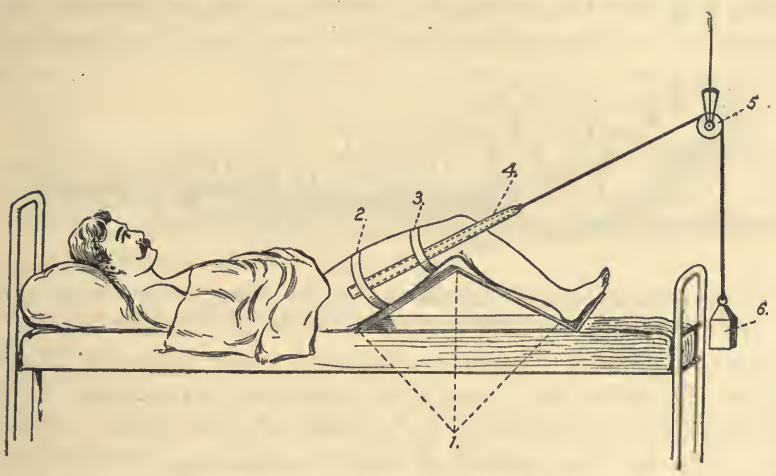

FIG. 24.—Shows a double-inclined plane with the weight and pulley—1 is the double-inclined plane, 2 and 3 are circular pieces of adhesive plaster to prevent 4, the longitudinal strip on each side of the thigh, from slipping; 5 and 6 are the pulley and weight.

covered with pillows, with weight and pulley attached by means of adhesive plaster stuck to each side of the thigh as far as the knee, affords the easiest and probably the best means of treatment. But in the majority of cases when the fracture is farther down, about the middle or in the middle third of the bone, the weight and pulley with

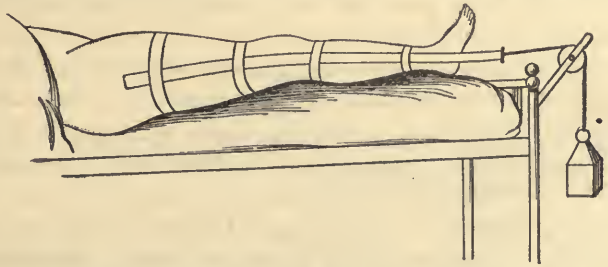

FIG. 25.—Shows the weight and pulley applied with the leg and thigh in the straight position—the adhesive strips being attached to the leg as well as the thigh.

the leg and thigh in a straight line (fig. 25), or the weight and pulley and long splint combined (fig. 26) are better adapted if properly applied. Sandbags may also be used in connection with any of the straight splints placed alongside. In all cases the fracture should be reduced by gradually pulling and carefully pressing the broken bones into their natural position. In addition to the splints already men-

tioned, short splints of narrow strips of thin board or binder's board should be applied directly over the seat of fracture.

If a double-inclined plane is not at hand, two broad pieces of board may be nailed together at a suitable angle and used instead, always properly padded or covered with pillows.

The weight and pulley (figs. 25 and 27).—The weight and pulley are applied as follows: Measure the distance from 1 inch below the

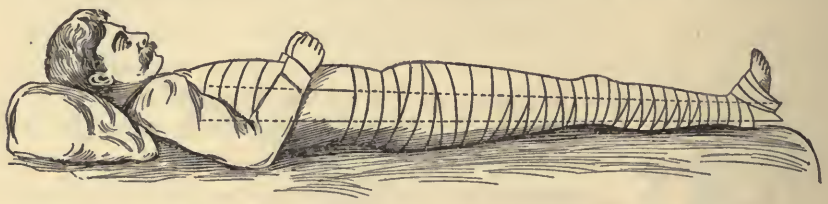

FIG. 26.—Shows the long lateral splint extending from the armpit to a point a little below the foot. It is bandaged to the body and the lower extremity, and may be used with the weight and pulley.

crotch to a point 4 inches below the foot. Cut a strip of adhesive plaster exactly twice as long as the distance just measured and 3 inches wide, and stretch it on a table or on the floor, with the sticky side up. Get a block of wood 4 inches long, about 3 inches wide, and about one-half inch thick, with a hole bored through the center large enough to admit a large cord. Place the block exactly in the center of the long strip of adhesive plaster. Cut another strip

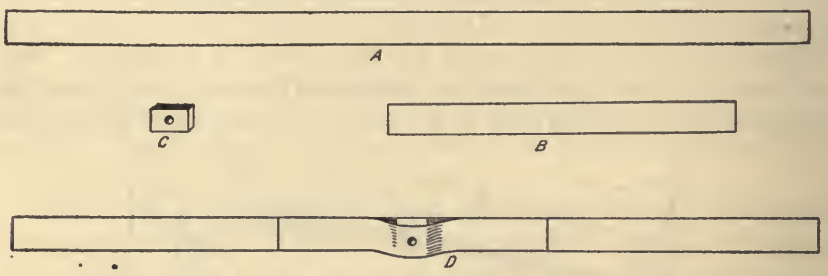

FIG. 27.—*A* shows the long strip of adhesive plaster; *B* shows the short strip. *C* is the block of wood 4 by 3 by ½ inches with a hole in the center. *D* shows the block placed between the two strips of plaster, all ready for application to the leg or thigh.

of plaster the width of the first and 18 inches long, and place it on the first strip, sticky surfaces together, so as to include the block between the center of each. Thus a stirrup is made and the plaster kept from sticking to the ankle bones, because it would make them sore. The long strip of plaster on each side of the stirrup is then applied to the leg and thigh after shaving on each side the surface to which it is to be applied, extending from a point just above the ankle bone to a point about 1 inch below the crotch on the inner side and to the same level on the outer side, being careful to keep the block square when the two ends of the plaster are stuck to the limb.

A roller bandage is then applied over the plaster from the ankle up. A strong cord is then passed through the hole in the block and knotted so that it can not slip through, the other end being passed over a pulley attached to the foot of the bed or elsewhere, as may be convenient, on a line with the extended limb, and a weight of from 5 to 30 pounds, as may be necessary or comfortable to the patient, gradually increased, attached. The same kind of apparatus may be used with the double-inclined plane, except that the plaster is applied only to the thigh, the stirrup coming just below the bent knee.

Counter extension may be obtained by raising the foot end of the bed on blocks 4 to 6 inches high. The short splints should be well padded and extend well above and below the fracture, and be held in place by strips of plaster or bandage.

The long splint gives additional support and prevents outward rotation of the leg. It should be well padded, and have a cross-piece at the lower end to keep it in position. Treatment will be required for a period of 8 to 10 weeks, but the extension may be lessened about the end of the sixth week and passive motion made at the knee joint.

FRACTURE OF THE KNEECAP.

Fracture of the kneecap may be transverse, vertical, or oblique. The bone may be broken into two or more irregularly shaped pieces.

Symptoms and signs.—**Loss of power, inability to extend** the joint or raise the limb from the bed. In the transverse variety the fragments are widely **separated.** If seen soon after the accident, the line of fracture—the gap between the fragments—may be seen and felt. **Swelling** rapidly appears and the signs are obscured.

Treatment.—Various forms of apparatus are employed, and in hospital practice the injury is frequently treated by surgical operation, with good result. The simplest form of treatment is to place the limb on a long posterior splint with the foot raised so as to relax the thigh muscles, or if the patient is propped up in bed by pillows or a back rest, the limb may be allowed to lie on a level.

This splint should be applied as follows: A padded straight board should be bound on the back of the limb, extending from the heel to the upper part of the thigh. A folded towel placed at the back of the knee, allowing the joint to bend slightly, will be comfortable. One handkerchief or bandage should be applied below the kneecap, passing up and knotted at the back above the knee. Another handkerchief should be passed above the kneecap, and be knotted at the back below the knee (fig. 28). Nails driven into the edge of the board at convenient points assist in holding the bandage in position.

Apply iced water or the ice bag for a few days. If swelling or numbness of the foot is complained of the bandage is too tight and must be removed.

If the bandages become loose, as they are apt to do every few days, they should be reapplied.

The long splint should be worn about six weeks or two months, when it may be replaced by a shorter molded splint of leather, felt,

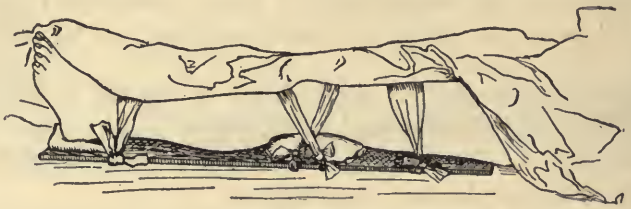

FIG. 28.

or pasteboard to prevent motion at the joint when the patient may be allowed to walk with canes or crutches. The short splint should be worn for at least a month, and then a suitably constructed knee-cap should be worn for one year to support the joint. More or less stiffness of the joint is to be expected.

FRACTURE OF THE LEG (BETWEEN THE KNEE AND ANKLE).

The leg extends from the knee to the ankle and has two bones, tibia and fibula.

Fracture of the leg may be simple or compound. Both bones may be broken or only one; the line of fracture may be oblique or transverse. When both bones are broken at the middle or lower third the deformity is usually quite marked. The break is apt to be in an oblique direction and at a lower level in the tibia (the shin) than in the fibula. In simple fracture of the upper part of the leg the de-

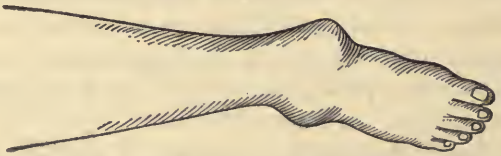

FIG. 29.—Shows the appearance of the right foot after a "Pott's fracture."

formity may be less marked, but if the knee is involved there may be great swelling because of acute and serious inflammation of the joint.

When the shaft of only one bone (the tibia or fibula) is broken there is not much displacement, because in such case the sound bone acts as a side splint. Fracture at the lower end of the tibia at the projection on inner side of ankle is sometimes mistaken for sprained

ankle, and if the small fragment of bone is not accurately adjusted and kept in proper position the result may be a weak and stiff joint.

The fibula may be fractured at any point, but the important fracture of this bone is known as "Pott's fracture" (fig. 29). This fracture occurs about 3 inches above the ankle, on outer side of the leg, and is accompanied or complicated by outward dislocation of the foot, and not infrequently by the breaking or tearing off of the tip of the lower end of the tibia.

Treatment.—If the line of fracture is oblique the limb must be handled very carefully so as to prevent injury to the soft parts by the sharp ends of the bone and thus avoid the conversion of a simple fracture into a compound one.

The treatment of fracture of the leg has been described under the heading "Simple fractures," page 58.

A Pott's fracture should be treated as follows: Take a board splint long enough to extend from the knee to a few inches beyond the sole of the foot. Pad the splint well, having the lower end of the padding at least 2 inches thick, and do not let it extend quite to the ankle

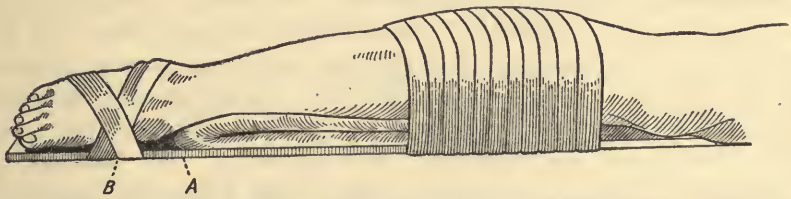

FIG. 30.—Shows the splint applied for a "Pott's fracture." *A* shows the thick padding (3 inches) ending just above the ankle. The bandage *B* keeps the foot turned in and prevents the tendency to outward displacement.

joint below. Apply the splint to the inner side of the leg so that the foot and ankle project below the padding. The foot and leg are then bandaged to the splint in such a way as to turn the foot inward and thus correct the outward displacement. (Fig. 30.)

FRACTURE IN FOOT.

If a bone in the foot is broken, have the patient place his sound foot on a thin board or heavy pasteboard. With a lead pencil draw an outline of the foot, allowing an eighth of an inch extra all the way around. Cut this out, turn it over, and it will fit the sole of the injured foot. Pad this and bind it to the foot, the starch bandage making an excellent dressing. Leave the toes exposed for observation of the circulation.

DISLOCATIONS.

A bone is dislocated or "out of joint" when it is displaced or forcibly separated from another bone entering into the composition of a joint.

Dislocations may be complete or incomplete. A dislocation is **complete** when the articular surfaces are entirely separated and the ligaments torn, as in dislocation of the hip joint; **incomplete** when the articular surfaces are not entirely displaced. Dislocations may be **simple, compound,** or **complicated.**

A dislocation is **simple** when there is no wound of the skin and soft parts—when the articular surfaces are not exposed to the outer air; **compound** when there is an open wound and the outer air is brought into contact with the articular surfaces of the joint; **complicated** when besides the dislocation there is a fracture and serious damage to the soft parts, or to blood vessels or nerves.

Dislocations are said to be most common in adult or middle life, when the bones are strong and the muscles powerful. In the young and old the bones are more apt to break. There are, however, striking exceptions to this rule when applied to the elbow joint and the shoulder joint. The elbow joint in young subjects is frequently dislocated; and dislocation of the shoulder joint in old men is not uncommon.

Symptoms and signs of dislocations.—Deformity is always present and may be determined by comparing the injured side with the sound one. The head or end of the bone is in an abnormal position; the attitude of the limb is changed; the patient can not move the limb; and when effort is made to move the joint it is found to be very stiff. There may be shortening or lengthening. For example, in dislocation of the hip the head of the thigh bone may be thrown outward and upward, when there will be shortening of the leg; or it may be forced downward and inward, when the length of the limb will be increased.

Treatment.—The indications are to replace the bones in their natural position and to keep the parts at rest until the ligaments and damaged tissues about the joint are healed. A dislocation should be reduced immediately after the accident while the patient is faint and the muscles are in a relaxed condition.

Having thus briefly described a dislocation and the treatment indicated, the question now arises, How shall the treatment be applied, how shall the dislocation be reduced? And when it is taken into consideration that the reduction of dislocations not infrequently taxes the skill of the most experienced surgeon (even with the aid of general anesthetics), it is hardly to be expected that a nonprofessional man will be able to accomplish the desired results in many cases. It must also be borne in mind that there are certain dangers attending efforts at reduction, especially at the larger joints, if improperly or too forcibly applied—such as fracture of bone or rupture of blood vessel.

DISLOCATION OF THE FINGERS.

Dislocation of the bones of the fingers may be backward or forward.

Treatment.—Extension and counter extension and manipulation. Pull the finger directly in line with the hand, and when fully extended make pressure on the head of the bone. Reduction is usually effected without much difficulty. Place the finger on a well-padded splint for one week, then make passive motion, and, if necessary, the splint may be worn for another week.

DISLOCATION OF THE THUMB.

Dislocation of the thumb may be backward or forward.

Treatment.—The treatment is not the same as for dislocation of the fingers, and reduction, especially of the backward dislocation, is usually very difficult. Try by pushing the end of the thumb upward and backward until it stands perpendicularly on the bone from which it is dislocated, then make strong pressure against the base of the dislocated bone from behind forward, sliding it on the bone beneath till it gets to the end, then flex or bend the thumb into place.

DISLOCATION OF THE WRIST.

Dislocation of the wrist joint may be backward or forward. It is a rare injury. Fracture about the wrist is more common, and is sometimes mistaken for dislocation. A stiff joint is apt to be the result.

Treatment.—Extension, counter extension, and direct pressure. Grasp the hand of the patient, pull in a straight line, and have an assistant pull on the forearm in the opposite direction, and when the parts are fully extended make direct pressure upon the wrist bones. Apply a bandage, and place the hand and forearm on a well-padded splint for a week; then remove the splint and make passive motion at the joint; reapply the splint and remove it after an interval of another week. If there is much pain or swelling after reduction of the dislocation, apply cold water.

DISLOCATION OF THE ELBOW.

Dislocations of the elbow are serious accidents. They present a variety of forms, **backward, forward, outward,** and **inward,** and these are divided into a number of subvarieties. One or both bones may be involved, and the dislocation may be associated with fracture. Reduction in some cases is comparatively easy; in others it is very difficult, even in the hands of experienced surgeons.

Without a thorough knowledge of the anatomy of the normal joint it is very difficult to understand the different forms of dislocation, and of necessity equally difficult to apply the proper treatment.

Immediately after the accident and before swelling sets in the injured elbow should be carefully compared with the sound one. When the normal arm is extended (straight) the tip of the elbow and the bony points on either side should be in a transverse line across the joint. If these prominences are found out of line, dislocation or fracture is probably present.

Treatment.—Fixation of the arm above the elbow, extension or flexion of the forearm, and direct pressure by means of the thumbs or fingers on the head of the dislocated bone, so as to push it back into the socket. After reduction an angular splint should be applied to inner side of arm, lightly bandaged, and the forearm carried in a sling. Cold water may be applied to reduce inflammatory action. Passive motion should be employed at the end of a week.

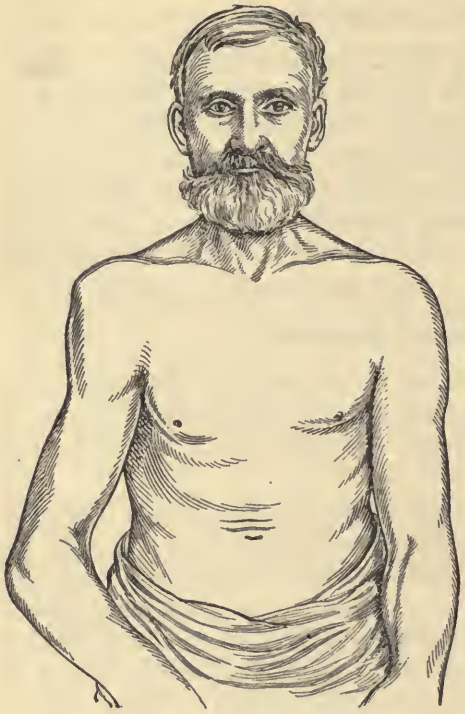

FIG. 31.—Dislocation of the right shoulder.

DISLOCATION OF THE SHOULDER.

[After Helfrich.]

Dislocation of the shoulder joint is a very common accident. It occurs as frequently as all other dislocations put together. The frequency is explained by the great latitude of motion of the joint, the shallowness of the socket, and the size and rounded shape of the head of the bone, the laxity of the capsular ligament, and the leverage exerted on the joint by the long bone.

There are three chief forms of dislocation of the shoulder—(1) forward and downward below the collar bone, (2) directly downward into the armpit, and (3) backward on the shoulder blade.

The symptoms and signs are **pain, swelling, rigidity** (stiffness), **loss of power, flattening** and **angular appearance** of the shoulder as compared with the other shoulder, abnormal situation of the head of the bones, and **change** in the **axis** of the long bone. (Fig. 31.) In the first variety, the most common of all, the head of the bone may be felt in front of the armpit and below the collar bone, and the elbow points outward and backward. In the second the head of the bone may be felt in the armpit, and the elbow points outward. In the

third the head of the bone may be felt on the back of the shoulder blade, the elbow points forward, and the forearm is thrown across the chest. Another valuable sign is that when the elbow is placed on the chest the patient can not place the hand of the injured side upon the opposite shoulder, or if the hand is placed on the shoulder the elbow can not be brought into contact with the chest.

Treatment.—The treatment for the first variety (forward and downward) is as follows: Lay the patient down or let him sit on a chair; bend the forearm on the arm; press the elbow against the side of the chest and hold it there; rotate the arm outward by carrying the forearm outward; pull steadily on the arm and rotate inward by carrying the elbow upward and forward with forearm across the chest. While this is going on have an assistant place his hand in the armpit and press the head of the bone into place.

For the second variety (directly downward into the armpit) place the patient on his back; remove your boot; place your heel in the armpit; grasp the wrist and pull steadily on the arm. If the dislocation is in the right shoulder, seat yourself on the right side of the patient and use your right foot; and if the injury is in the left shoulder seat yourself on the left side and use your left foot. The same principles may be carried out by seating the patient on a low chair and placing your knee in the armpit.

Another method is to have an assistant stand upon a table and make counterextension with a towel, or a strong piece of soft cloth of any kind, passed under the armpit of the patient, while the operator pulls the arm downward. The same method may be employed by causing the patient to lie on his back, and an additional advantage may be obtained by placing a rolled bandage or a pad of any kind in the folds of a towel in the armpit.

In dislocation backward on the shoulder blade, pull the arm forward and make direct pressure forward on the head of the bone, or stand behind the patient, draw the elbow backward, and with the thumb press upon the head of the bone and guide it into place.

After reduction a soft pad should be placed in the armpit, the upper arm bandaged to the body, and the forearm placed in a sling across the chest. Passive motion at the joint should begin at the end of a week and be repeated daily, but the arm should be carried in the sling about three weeks.

DISLOCATION OF THE COLLAR BONE.

The collar bone extends from the upper border of the breast bone to the highest point of the shoulder blade. Dislocation may occur at either end. Reduction is comparatively easy, but it is difficult to retain the bone in position.

Treatment.—Make extension by drawing back the shoulders, the knee, if necessary, being placed between the shoulder blades; push

the end of the bone in place and try to keep it there by a firm pad fastened by adhesive plaster and bandage. The best result may be obtained by placing the patient at rest on his back for three weeks.

DISLOCATION OF THE TOES.

Dislocations of the toes are very rare accidents. The treatment is the same as for dislocation of the fingers. Dislocation of the big toe may be treated the same as dislocation of the thumb.

DISLOCATION OF THE ANKLE.

The foot may be dislocated **forward, backward, outward, inward,** or **upward.** The dislocation may be complete or incomplete.

The lower ends of the bones of the leg enter into the formation of the ankle joint, the end of the tibia on the inner side and the end of the fibula on the outer side of the joint. Dislocations of the ankle are usually complicated by fracture of the tip of one or both of these bones. When, in addition, the fibula is broken above the ankle, the injury is known as Pott's fracture, already referred to.

Treatment.—Extension, counterextension, and pressure. Flex the leg on the thigh and the thigh at right angle to body; pull steadily on the foot, while an assistant makes counterextension at the thigh, and press the bones in place. Apply cold water and place the foot and leg in a fracture box or apply well-padded molded splints. Binder's board dipped in warm water and molded to the part and lined with thick layers of cotton will answer the purpose. If a Pott's fracture, use the splint shown in figure 30. Make passive motion at the joint at the end of two weeks.

DISLOCATION OF THE KNEE.

Dislocation of the knee may be complete, incomplete, compound, or complicated. The direction of the dislocation may be forward, backward, outward, or inward. The deformity is quite marked. Reduction is not very difficult, but the injury is a serious one and care must be taken in making reduction not to produce additional damage by too forcible extension. Fortunately the injury is exceedingly rare.

Treatment.—Extension, counterextension, and pressure. Have one assistant pull steadily, not too hard, on the leg or ankle, while another fixes or pulls on the thigh and presses the bone into place. After reduction apply cold water, and place the leg in a posterior straight splint, well padded, especially below the hollow of the knee, and make passive motion at the end of two weeks. When the patient begins to walk, a kneecap or flannel bandage should be applied.

DISLOCATION OF THE HIP.

Dislocation of the hip joint is a serious injury. It occurs much less frequently than dislocation of the shoulder joint. The socket of the hip joint is very deep, and the ligaments and muscles surrounding the joint are very strong and powerful. Dislocation occurs only when the limb is in a certain position, when its axis is changed from that of the body, and when in consequence of any sudden or great force received on the lower end of the leg or knee the head of the bone is forced through the ligament (the capsule) which surrounds the joints. The head of the bone may then be thrown (1) **backward and upward,**

FIG. 32.

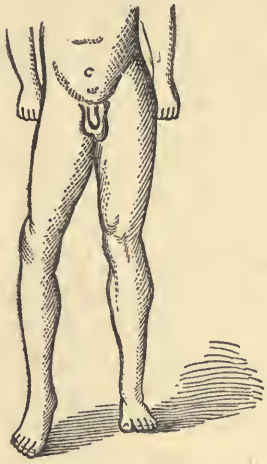

FIG. 33.

FIG. 32 shows a backward dislocation of the hip with the knee and toe turned in and the heel raised and the limb shortened. FIG. 33 shows a forward and downward dislocation of the right hip with the knee and toe turned out and the limb lengthened.

(2) **backward,** (3) **forward and downward,** (4) **forward.** The different directions indicate the different forms of dislocation. The first is the most common.

In the first form, examination from below up shows the **big toe turned toward** or resting on the instep of the opposite foot; the knee flexed and resting against thigh at upper margin of opposite knee-cap; the thigh rotated inward and drawn toward its fellow; bulging of the hip; and about 2 inches shortening of the entire limb.

In the second form the signs are the same as in the first, but less marked (fig. 32). Fracture of the neck of the thigh bone is sometimes mistaken for this injury. But in fracture there is abnormal motion, and the foot is turned outward.

In the third form (fig. 33) the signs are almost exactly the reverse of the first form. The foot and knee are turned outward, the hip is flattened, and the entire limb is lengthened.

The signs of the fourth form are nearly the same as those of the third, except that the entire limb is shortened.

Treatment.—The treatment is by manipulation, or by extension and counterextension.

For the first and second forms of dislocation, above-described treatment may be applied as follows: Place the patient on his back on a mattress on the floor. Seize the foot or ankle with one hand and place the other hand under the knee. Flex the leg upon the back of the thigh, and the thigh upon the body to about a right angle; then carry the knee inward and rotate it inward on its own axis, then suddenly raise it (lift it toward the ceiling) so that the head of the bone may be thrown over the rim of the socket, and immediately extend the limb with outward rotation to its normal position so that the head of the bone may return to the socket through the hole in the capsule by which it escaped.

The treatment of the third and fourth forms of injury corresponds to that for the first and second, except that the limb should be carried outward first, then inward, across the median line, and rotated inward on its own axis, and then suddenly lifted and brought down to its normal position by the side of its fellow.

No great force should be used in making these movements. If any considerable resistance is met with in rotating or lifting the bone the movement should be modified in such a way that the head of the bone may follow the path of least resistance.

If extension and counterextension be applied they should follow the line of the axis of the dislocated thigh. It must not be forgotten in the consideration of these methods that the application of too much force or of force improperly applied may produce fracture of the bone.

SPRAINS.

A sprain is a stretching or wrenching of a joint. The joints most frequently affected are the ankle, wrist, knee, and shoulder.

The symptoms and signs are pain, swelling, impairment or loss of motion, and discoloration from effusion of blood. When there is much swelling it may be difficult to determine whether sprain or fracture, or both, are present.

As explained under "Broken bones," page 57, it is sometimes very difficult to determine whether an injury near a joint is a sprain, a bruise, a broken bone, or all combined; and if there is doubt, the case should be treated as a broken bone. Injuries about the ankle joint are especially confusing, and sometimes the X ray shows a fracture that could not have been detected in any other way. It should also be understood that a sprain, particularly if some of the soft parts about the joint are torn, may be much longer in being restored to a normal condition than if a simple break of the bone had occurred without other injury.

Treatment.—Either hot or cold applications are good first-aid measures, but they should be distinctly either hot or cold, and not tepid. Soaking the part for half an hour several times a day in water as hot as can be borne, and gently rubbing the skin, are excellent. If it is more convenient to apply a bag of ice, this can be used, but the heat and cold should not alternate. Propping the part up on pillows assists. If there is much pain, great relief is obtained by surrounding the joint with a thick layer of cotton and applying a plaster bandage. The circulation of the lower part of the limb should be watched, and if found to be impaired, the bandage should be cut from above downward, and the sides spread apart to relieve any constriction that may be present. After the swelling has subsided somewhat, rubbing with any kind of liniment or with alcohol will help, but it is the rubbing more than the liniment that does the good.

It is a popular belief among laymen that a large quantity of liniment, perhaps applied on flannel cloth, is all that is necessary, and that the rubbing is only of secondary importance. This is a decided mistake. Later on the part should be grasped and gently moved in various directions, making what is known as passive motion. In some cases this is inadvisable and the patient appears to do better under perfect rest, which can be obtained by strapping the joint with strips of sticking plaster, or placing the limb in a splint. The black and blue condition of the skin that sometimes appears will gradually subside as the part gets better.

WOUNDS.

Doctors divide wounds into several classes, namely, incised, lacerated, contused, punctured, poisoned, and gunshot. The nature of the first three is sufficiently clear from their names and from a first-aid standpoint may be considered together. The first thing to do is to control severe bleeding by pressure on the wound or upon a distant part of the blood vessel, as explained in the chapter on "Bleeding." Then, after the dresser has disinfected his own hands, the wound should be thoroughly cleansed and disinfected; these matters will be explained in the chapter on "Antiseptics." Iodine, if at hand, is the best agent to use. If the wound is on a hairy part, as the scalp, the hair should be shaved for a distance of several inches from the wound. An antiseptic dressing should then be applied, or in the absence of any such agent one may use a clean cloth boiled for 10 minutes in clear water or in water to which table salt has been added in the proportion of 1 teaspoonful to the pint. This dressing is retained by a bandage, and should not be disturbed for any reason except bleeding if the doctor can be reached within 48 hours.

If it is impossible to secure the services of a doctor for several days, and the wound gapes to such an extent that it can not be readily closed by bandaging, or is in a part where a scar will mean disfigurement, the layman may attempt to close the wound by stitching, and this can be done by using an ordinary sewing needle with silk or linen thread, both boiled for 10 minutes, the needle being pushed through the flesh by means of a thimble, also boiled. The stitches should pierce the skin about an eighth or quarter of an inch from the edge of the wound, and come out of the fleshy part of the wound about the same distance from the skin. They should be placed about half an inch apart, and each one should be tied and cut off. The stitches should only be drawn tight enough to barely close the wound, because the swelling may make them too tight. No wound should be closed by a layman without leaving drainage; that is, something that will lead off the bloody water that oozes from a wound.

A piece of boiled sewing silk or linen folded back and forth and then twisted until it makes a skein one-eighth of an inch thick should be laid in the bottom of the wound and allowed to hang out at the lower end for a distance of an inch. This drains by capillary attraction, and there is far less danger of blood poison than if the wound were closed tightly. This drain should be removed after 24 hours by simply drawing it out without disturbing the stitches. The stitches themselves should be left in place from three to six days, depending principally upon the depth of the wound and its tendency to gape. The stitching of a wound should only be attempted by a layman when a doctor can not be reached within 48 hours.

The closure of a wound by sticking plaster is a questionable expedient, because it seals the wound, prevents drainage, and blood poison may follow. If the wound is not large, a strip of boiled cloth may be laid directly over it and the wound then drawn together by strips of sticking plaster applied outside the cloth.

Whether the wound is closed by stitches or not, the layman should apply an antiseptic dressing, if such is available, and if not, a boiled cloth, as described above, can be used.

A badly contused or bruised wound should not be stitched by a layman. In a lacerated wound it may be necessary to trim off with boiled scissors a few ragged edges of skin before stitching.

If a wound has penetrated the belly and the bowel is protruding, it is best not to attempt to push it back if the doctor can be reached within a few hours. It should be gently washed with the salt solution, described elsewhere (p. 81), and kept covered with towels frequently wet with the same solution. If a doctor can not be reached within a few hours, and the person in charge of the patient after a careful examination is sure that the bowel has not been opened or

otherwise seriously injured, he should, after carefully washing the bowel with the salt solution mentioned above, return it to the belly. If the bowel is allowed to remain for too great a time outside of the belly, its circulation may be cut off by the pressure of the belly walls and gangrene result. If the bowel has been opened or severely bruised, it should not be returned, as there is danger of forcing fecal matter out of the bowel into the belly cavity, which would cause a dangerous inflammation. If the bowel is not protruding from the wound, simply treat as an ordinary wound.

Punctured wounds.—A punctured wound is one made by a piercing agent, such as a nail, tack, knife, or needle. Such a wound is dangerous, because it almost completely closes and does not drain. If germs are introduced at the time of the accident, they can not escape. A wound of this kind, except of the chest or belly, should be disinfected or burned, and the best agent is pure carbolic acid. In the absence of suitable instruments a knitting needle or other thin blunt implement should be dipped into the carbolic acid and then inserted to the full depth of the wound. This should be repeated several times. The first application causes a burning sensation, but the acid itself soon deadens the part, and the subsequent applications are less painful. If the knitting needle is then dipped in alcohol or whisky and inserted once or twice and a little is applied to the skin about the wound, it will stop the burning action of the carbolic acid. In the absence of carbolic acid the alcohol or whisky can be used alone, but are far less efficient. After this treatment an antiseptic dressing or a boiled cloth should be applied to the wound. The frequency with which lockjaw follows punctured wounds, particularly nail wounds, makes it imperative that the doctor be consulted promptly and that the wound be not regarded as trivial because it is small in size.

Poisoned wounds.—The principal poisoned wounds met with are those due to bites of animals or bites and stings of insects, and these will be considered under a separate heading. (See p. 93.)

Gunshot wounds.—A gunshot wound is similar to a punctured wound in that it is small and almost completely closes. If the ball has passed entirely through a part—as the leg—and has not struck an important vessel or broken a bone, the wound is apt to cause less trouble than one in which the ball remains in the flesh. If a portion of clothing is found in the mouth of the wound, it should be removed. The part should be well cleansed with soap and hot water and an antiseptic dressing or a boiled cloth applied. Further than this it is not best for the layman to attempt anything, particularly probing for the bullet. If a bone has been broken by the ball, the case should be treated as described under "Compound fracture."

BRUISES AND CONTUSIONS.

A bruise or contusion is an injury where the tissues beneath the skin have been torn but the skin itself has not been opened. Blood oozes out of the injured vessels, but can not escape, as the skin is still intact. The symptoms are swelling, tenderness, and a feeling of soreness or pain. Discoloration of the skin occurs quickly in superficial contusions and in places where loose tissue abounds, but only after days when the injury is deep-seated. This discoloration is at first red and then, successively, purple, black, green, and yellow. This play of colors is due to the changes which take place in the blood while undergoing absorption.

Treatment.—A pad of gauze or soft towel should be tightly bandaged over the injured part to stop hemorrhage, after which cold should be applied except in old or feeble persons or where the contusion is extensive. In the latter cases heat is best, as cold might cause gangrene. Evaporating solutions—such as witch-hazel, a 15 per cent solution of alcohol in water, or a saturated solution of Epsom salts—are often found of great benefit. A contusion should never be opened except in rare cases when it is necessary to stop persistent bleeding. If an opening is made through the skin, germs are liable to enter and cause severe inflammation, resulting in the formation of pus.

FOREIGN BODIES IN THE EYE, EAR, NOSE, AND THROAT.

Foreign bodies in the eye.—When a piece of steel, a cinder, or any foreign body enters the eye nature at once floods the eye with tears in an endeavor to wash the offending agent away, and frequently succeeds. Sometimes, however, the foreign body is embedded in the eyeball, the lid, or other part of the eye, or keeps moving about from one part to another without escaping; then assistance is necessary.

Occasionally drawing the upper lid well down with the fingers, and allowing the lashes of the lower lid to act as a brush, will remove the body if it is not tightly embedded. Usually, however, it is necessary to invert the upper lid; in other words, turn it inside out. This is not difficult with a little practice. The upper eyelid contains a piece of cartilage or gristle along its lower edge which makes it easier to turn. To invert the eyelid face the patient, or stand behind him as seems more convenient; have him look well down toward the floor; take hold of the lashes of the upper lid with the fingers and thumb of one hand; then lay entirely across the middle of the eyelid a wooden toothpick, match, knitting needle, lead pencil, or other thin object (fig. 34); press it downward, and at the same time gently pull the lashes upward, when the lid will suddenly turn inside out (fig. 35).

Drawing down the lower lid by simply pressing upon it will also expose its inside surface. If the foreign body is seen, it should be very gently removed with the corner of a handkerchief. If it is partly embedded in the eyelid, it may be possible to gently dislodge it with a wooden toothpick or other similar object. If the foreign body is on the eyeball, it sometimes requires a good light, good eyesight, and even a magnifying glass to detect it. If found, it should be removed with a handkerchief or other soft material, but if embedded too tightly to be removed in this manner, it is best for the layman not to attempt anything further for fear of greater injury to the eye. Under such circumstances one or both of the eyes should be snugly bandaged with a soft light-proof material, such as red flannel, and the doctor should be called as soon as possible. The patient should be cautioned not to wink his eyes, as all motion will increase the irritation.

FIG. 34.

FIG. 35.

If you have succeeded in removing the body, and the eye appears very red, a little sweet oil dropped in will be very soothing. It should be remembered that the scratching of the eyeball makes it feel as if the body were still present after its removal. The old household remedy of dropping a flaxseed into the eye in the hope that in slipping about it may dislodge the body is said by specialists to do no good, and may do harm.

Foreign bodies in the ear.—Children occasionally place buttons or similar objects in the ear. If near the outlet, they can sometimes be removed (in the absence of suitable instruments) by gently passing along one side a crochet needle or other similar implement. It should be remembered, however, that the drum of the ear, which is extremely delicate, and means so much to the child in the future, is only a short distance inside, and any effort of this kind made by the layman

should be very gentle indeed. A stream of water from a small syringe may wash the object out. If these measures do not succeed, wait for the doctor by all means. Sometimes an insect crawls into the ear. The actual physical danger is less than the mental horror, as the insect soon dies. A little sweet oil dropped into the ear may cause the insect to back out to free itself from the unpleasant predicament; if not the oil will kill it.

Foreign bodies in the nose.—If near enough to the nostril to be seen the body may possibly be expelled by compressing the other nostril and having the patient blow his nose hard. A fountain syringe placed 1 foot above the head, the nozzle of the syringe inserted in the clear nostril and the patient's face looking somewhat downward, will cause the water to gently flow in at one side of the nose and out at the other side, and may dislodge the object. A crochet needle may be gently tried as described for the ear. All these things failing wait for the doctor.

Foreign bodies in the throat.—If the body can be seen by holding the tongue down with a spoon or by drawing the tongue out with a towel, it can sometimes be hooked out by means of a finger passed well in. If the body is in the windpipe, this will be manifested by violent coughing, which may dislodge it. Inverting the patient and slapping his back may be tried. If these measures do not succeed, then use every effort to quiet the patient, and if practicable send for a physician. If the body is in the gullet on the way to the stomach, vomiting may bring it up, and this can be excited by tickling the throat, or using some of the simple vomiting agents mentioned in the chapter on poisons (p. 111), provided the patient can swallow. If it is not dislodged, and is known to be an object without sharp edges, as a coin, for instance, it is best to induce it to go on into the stomach by drinking water, eating bread, mashed potatoes, or other soft food. Once in the stomach the patient, usually a child, should be made to eat all the mashed potatoes he can possibly hold, and a large dose of castor oil should follow. The potatoes form a mass around the foreign body, and the oil usually pushes this mass through the bowels without any trouble whatever. The stools or passages should be carefully watched to determine that the object passes, and if it does not, the doctor should be consulted without delay.

BURNS OR SCALDS.

Burns or scalds are serious and dangerous to life in proportion to the extent and depth of the injury. A burn covering a large area and producing mere reddening and swelling of the skin is as serious as a burn one-half the size in which the skin is destroyed. The danger is from shock, from fever following reaction, from hemorrhage following sloughing, and from congestion and inflammation

of internal organs. Burns of slight extent or moderate degree are not so dangerous, and most of the cases commonly met with will recover. But all cases require careful treatment.

Treatment.—The indications for treatment in these two conditions are virtually the same if the damage is superficial; and this is usually the case, the injuries being only skin-deep. Blisters should be pricked with a needle that has been passed through a flame several times. This allows the water to escape from the blisters, but the skin raised by the blisters should not be removed. If the burning agent is pitch or tar, and adheres to the skin, it should not be removed; it will come away later with the blistered skin. Any bland oil, such as sweet oil, linseed oil, or vaseline, forms a soothing application. Ordinary baking soda or a saturated solution of soda in water can be used. The old "Carron oil" made of linseed oil and lime water, half and half, is excellent, but has an unpleasant odor. If lime water is not at hand, it may be obtained as follows: Quicklime is first slaked by adding to it gradually about 30 times its weight of water. Agitate during one-half hour, allow the lime to settle, and reject the liquid. Add to the residue of lime about 300 times its weight of water, agitate frequently during the next 24 hours, and allow the lime to settle. The clear water standing above the undissolved lime is lime water.

The parts burned or the entire body, except the head, may be kept immersed in tepid or warm water for days. Cream or white of eggs may be used, but they are apt to become offensive after 24 hours. Kerosene is an old household remedy. One teaspoonful of table salt in a pint of water makes a solution that can be employed. Keep the patient quiet and his bowels active. Pain or restlessness may be relieved by laudanum 20 drops, repeated in two hours if necessary.

If the eye is red from contact with the flames or hot fluid, sweet oil is perhaps the best household remedy to drop in. A bandage lightly applied over the eyes to keep out the light will be soothing.

If the skin or the eye is burned with acid, a solution of baking soda should be used first. If the burning agent is an alkali, such as hartshorn or lye, weak vinegar or lemon juice should be used. Sweet oil should be dropped in the eye after such treatment.

If the patient has breathed the flame or steam, the condition is apt to be a serious one, even though it does not appear so at once. Complete rest and quiet, an ice bag to the chest, the giving of milk and cream, half and half, if swallowing is possible, should be employed. Artificial respiration, as described elsewhere, may be applicable in some cases.

Speaking generally of burns and scalds, a superficial burn covering a large part of the skin may be more dangerous than a deep burn confined to a small part, for reasons which it is unnecessary to discuss in

a book of this kind. No burn or scald should therefore be treated as a trivial matter. Where solutions are used the bandages should be soaked in the same before applying and the solution should be poured over the bandaged part at frequent intervals.

The scars resulting from burns and scalds always contract, and in severe cases terrible deformities are produced. These may be prevented to some extent by active and passive motion and by splints.

RESUSCITATION FROM APPARENT DROWNING.

In the act of breathing the oxygen from the air is absorbed from the lungs into the blood vessels and purifies the blood; at the same time the impure matters picked up by the blood in circulating through the body are filtered out by the lungs and pass off to the atmosphere with the breath. When a person is under water he can hold his breath for a short time, keeping out the water. Then he swallows some water into the stomach; and as his strength fails water enters the lungs. The water in the stomach does no particular harm; but that in the lungs is of vital importance because it stops breathing, causes poisoning of the system from lack of purification of the blood, and if allowed to remain for any length of time produces stoppage of the heart and death.

The indications, therefore, in one apparently drowned are to remove the water from the lungs, to make the patient breathe, and to stimulate the weak heart.

The old method of rolling a patient over a barrel to remove the water from the lungs is not considered efficient by those who have had most experience. Inverting the patient by grasping his feet and holding him head down for a few moments, at the same time making pressure on his belly inward and toward the chest, may remove part of the water. The chest is separated from the belly by a partition consisting of a thin flat muscle, and pressure inward and upward on the belly forces this partition up against the lungs, and may mechanically squeeze some water out of the tubes in the lungs. Time should not be wasted in prolonged efforts to remove the water, as it is important to proceed as quickly as possible with artificial breathing, which will not only squeeze the water out of the lungs but will renew respiration and revive the patient.

There are several methods that have been suggested and used for inducing artificial breathing, but to save delay in selecting one the layman should have explained to him in a book of this kind one method only, and that one the method that has been accepted as the best, namely, the Schäfer method. (See figs. 36 and 37.) [1]

[1] The two illustrations on p. 89 are reprinted by permission from a booklet entitled "Rules for resuscitation from electric shock," issued by the National Electric Light Association.

Schäfer's description of his method, as quoted by Crile, is as follows, except that the technical words and expressions have been eliminated and ordinary ones that will be understood by a layman substituted:

The subject, whether a drowned person or not, is allowed to lie prone, i. e., face downward, no preliminary manipulation of the tongue being required. The operator

FIG. 36.

kneels or squats either across or on one side of the subject, facing the head, and places his hands close together flat upon the back of the subject over the loins, the fingers extending over the lowest ribs. By now leaning forward upon the hands, keeping the elbows extended, the weight of the operator's body is brought to bear upon the subject, and this not only compresses the lower part of the chest but also the belly upon the ground, the pressure being fairly equally distributed. The result of this is that not

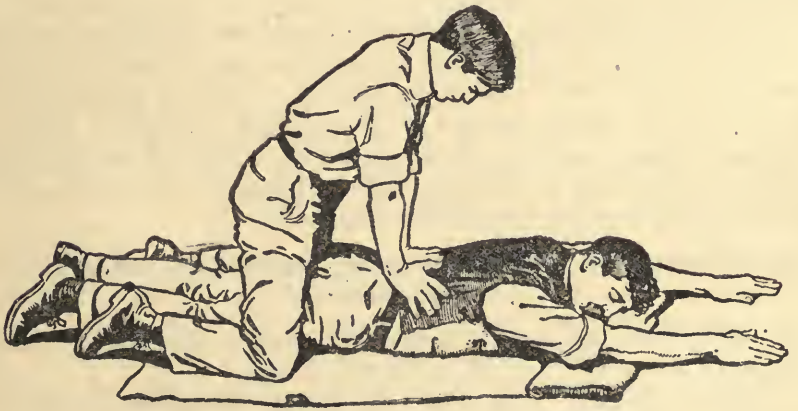

FIG. 37.

only is the chest diminished in extent from before back, but, owing to the pressure which is communicated to the belly, the belly contents are compressed and tend to force the muscle partition between the chest and belly up, so that the chest is diminished in capacity from above down. This is no doubt the reason why the pressure method when applied with the subject lying on his belly is more effective than when applied, as by Howard, with the subject lying on his back. The pressure is applied

not violently but gradually during about three seconds, and is then released by the operator swinging his body back, but without removing his hands. The elasticity of the chest and belly causes these to resume their original dimensions and air passes in through the windpipe. After two seconds the process is again commenced, and is continued in the same way, the operator swinging his body forward and backward once every five seconds, or about twelve times a minute, without any violent effort and with the least possible exertion. This last condition, viz, the absence of muscular exertion, other than that involved in swinging forward and backward, renders it possible to continue the process without fatigue for an indefinite time. It can further be carried out unaided by a woman almost as well as a man, by children upon children; it hardly requires to be taught—a simple demonstration sufficiently teaches it to a large audience. Its advantages in drowning cases, over any other method which involves the position on the back, are sufficiently obvious—for with it there is no risk of obstruction by water or slime or the contents of the stomach, which can not accumulate in the throat, but must come away by the mouth; and the tongue, in place of falling back, as in the position on the back, falls forward and is unable to produce obstruction.

Crile says in regard to this method: "Schäfer's method should be used in all cases in the absence of medical assistance or outside of a hospital, and even in a hospital in the absence of immediate surgical aid." He further says: "Simple artificial respiration is the only hope in drowning and other accidents occurring when professional help is not at hand." When the patient is able to swallow, a small cup of black coffee or hot milk with a tablespoonful of whisky may be given, and repeated a few times at intervals of an hour. If he does not swallow well, and an ordinary syringe is available, the coffee and whisky may be injected into the bowel and left there, but the effect is slower.

It is scarcely necessary to state that the patient should be removed to a warm place, the wet clothing removed, and the lower parts of the body covered and artificially warmed. Pending the arrival of the doctor the patient should be closely watched, and if signs of collapse appear, renewed efforts should be made. Prolonged and systematic rubbing of the skin and kneading of the muscles will assist in promoting the circulation of the blood.

INSTRUCTIONS FOR SAVING DROWNING PERSONS BY SWIMMING TO THEIR RELIEF.

1. When you approach a person drowning in the water, assure him, with a loud and firm voice, that he is safe.

2. Before jumping in to save him, divest yourself as far and as quickly as possible of all clothes; tear them off, if necessary; but if there is not time, loose at all events the foot of your drawers, if they are tied, as, if you do not do so, they fill with water and drag you.

3. On swimming to a person in the sea, if he be struggling do not seize him then, but keep off for a few seconds till he gets quiet, for it is sheer madness to take hold of a man when he is struggling in the water; and if you do, you run a great risk.

4. Then get close to him and take fast hold of the hair of his head, turn him as quickly as possible onto his back, give him a sudden pull, and this will cause him to float, then throw yourself on your back also and swim for the shore, having hold of his hair, you on your back and he also on his, and, of course, his back to your stomach. In this way you will get sooner and safer ashore than by any other means, and you can easily thus swim with two or three persons; the writer has even, as an experiment, done it with four, and gone with them 40 or 50 yards in the sea. One great advantage of this method is that it enables you to keep your head up and also to hold the person's head up you are trying to save. It is of primary importance that you take fast hold of the hair and throw both the person and yourself on your backs. After many experiments, it is usually found preferable to all other methods. You can in this manner float nearly as long as you please, or until a boat or other help can be obtained.

5. It is believed there is no such thing as a **death grasp;** at least it is very unusual to witness it. As soon as a drowning man begins to get feeble and to lose his recollection, he gradually slackens his hold until he quits it altogether. No apprehension need, therefore, be felt on that head when attempting to rescue a drowning person.

6. After a person has sunk to the bottom, if the water be smooth, the exact position where the body lies may be known by the air bubbles, which will occasionally rise to the surface, allowance being, of course, made for the motion of the water, if in a tideway or stream which will have carried the bubbles out of a perpendicular course in rising to the surface. Oftentimes a body may be regained from the bottom before too late for recovery by diving for it in the direction indicated by these bubbles.

7. On rescuing a person by diving to the bottom the hair of the head should be seized by one hand only and the other used in conjunction with the feet in raising yourself and the drowning person to the surface.

8. If in the sea, it may sometimes be a great error to try to get to land. If there be a strong "outsetting" tide, and you are swimming either by yourself or having hold of a person who can not swim, then get on your back and float till help comes. Many a man exhausts himself by stemming the billows for the shore on a back-going tide and sinks in the effort, when if he had floated a boat or other aid might have been obtained.

9. These instructions apply alike to all circumstances, whether as regards the roughest sea or smooth water.

RESUSCITATION FROM GAS POISONING.

In this condition there is nothing to block the entrance of air to the tubes in the lungs as there is in drowning, but the blood has

absorbed so much of the poisonous gas that the life is threatened, and the lungs and heart gradually fail. The indications are to remove the patient to a good atmosphere, with plenty of fresh air, and employ artificial respiration as described under drowning. Rubbing and the stimulants mentioned in the foregoing are helpful.

It may not be out of place to state here that persons who have attempted drowning, gas poisoning, etc., with suicidal intent are very apt to make another effort at the first opportunity. It is therefore necessary that means to this end be kept away from them, and that moral encouragement be extended by all possible means.

RESUSCITATION FROM ELECTRIC SHOCK.[1]

An accidental electric shock usually does not kill at once, but may only stun the victim and for a while stop his breathing.

The shock is not likely to be immediately fatal because—(*a*) The conductors may make only a brief and imperfect contact with the body. (*b*) The skin, unless it is wet, offers high resistance to the current.

Hope of restoring the victim lies in prompt and continued use of artificial respiration. The reasons for this statement are: (*a*) The body continuously depends on an exchange of air, as shown by the fact that we must breathe in and out about 15 times a minute. (*b*) If the body is not thus repeatedly supplied with air, suffocation occurs. (*c*) Persons whose breathing has been stopped by electric shock have been restored after artificial respiration has been continued for approximately two hours.

Instructions.—*Follow these instructions even if victim appears dead:*

I. Break the circuit immediately.

1. With a single quick motion separate the victim from the live conductor. In so doing avoid receiving a shock yourself. Many have, by their carelessness, received injury in trying to disconnect victims of shock from live conductors.

Observe the following precautions: (*a*) Use a dry coat, a dry rope, a dry stick or board, or any other dry nonconductor to move either the victim or the wire, so as to break the electrical contact. Beware of using metal or any moist material. The victim's loose clothing, if dry, may be used to pull him away; do not touch the soles or heels of his shoes while he remains in contact—the nails are dangerous. (*b*) If the body must be touched by your hands, be sure to cover them with rubber gloves, mackintosh, rubber sheeting, or dry cloth; or stand on a dry board or some other dry insulating surface. If possible, use only one hand. If the victim is conducting the current to ground, and is convulsively clutching the live conductor, it may be

[1] Taken from "Rules for resuscitation from electric shock," issued by the National Electric Light Association.

easier to shut off the current by lifting him than by leaving him on the ground and trying to break his grasp.

2. Open the nearest switch, if that is the quickest way to break the circuit.

3. If necessary to cut a live wire, use an ax or a hatchet with a dry wooden handle, or properly insulated pliers.

II. Attend instantly to the victim's breathing. Use the Schäfer method of artificial respiration as described under treatment of the apparently drowned (p. 89). Burns of the skin should be treated as described for ordinary burns. Warmth to the body, gentle rubbing, and later light stimulants and hot milk if the subject can swallow, are indicated, but do not give any liquids whatever by mouth until the subject is fully conscious.

BITES AND STINGS OF POISONOUS ANIMALS OR INSECTS.

Bite of dog or cat.—This is usually a punctured wound; that is, the teeth enter without tearing the flesh, and the wound almost entirely closes, thereby preventing drainage and increasing the danger. Sucking the wound hard repeatedly and washing out the mouth with hot water may remove some of the poison. Squeezing is less effective. The wound should then be burned either with carbolic acid or a red-hot iron carried to the bottom, and the skin about the wound should be scrubbed with alcohol or other antiseptic. A drain of several strands of boiled sewing silk should be pushed into the bottom of the wound, and an antiseptic dressing or boiled cloth applied over the wound. The patient should then be taken to the nearest place where the Pasteur treatment to prevent hydrophobia or rabies can be secured. The hygienic laboratory of the United States Public Health Service in Washington, D. C., administers this treatment without cost.

If the animal is known to be mad, this treatment is imperative and whether mad or not, it is a very wise precaution, and relieves the anxiety of the patient. Do not kill the dog or cat for the purpose of rubbing the hair of the tail on the wound. It will do no good, and you will never know whether or not the animal was mad. Capture the animal, watch it, and if it shows any signs of being mad kill it and send the body to the nearest laboratory for examination.

Snake bite.—In snake bite a handkerchief, rope, or the Spanish windlass, described on page 52, should be applied above the part bitten if this be on a limb, and the part should be immediately and repeatedly sucked to remove as much of the poison as possible. Washing the mouth several times with hot water will prevent any danger from this source. The windlass must be loosened every 20 minutes for the reasons given on page 53. It should be again tightened after 2 minutes. The intention of this treatment is to pre-

vent more than a small portion of the poison entering the circulation at one time. This procedure should not be continued for more than 3 hours. Great care should be taken to see that too much blood is not cut off from the limb as gangrene will result. The bite should be burned with carbolic acid or a red-hot iron passed into the bottom of the wound. A strong solution (saturated) of permanganate of potash poured into the wound or injected around the wound may have some effect.

Bites and stings of insects.—In a spider bite, a mosquito bite, or a bee sting, baking soda moistened and placed on the part tends to relieve and shorten the pain. Hartshorn and water, half and half, have the same effect. Ice or cold water, or very hot applications of water may help to reduce the swelling after the pain has subsided.

Tick bite.—The tick, which is instrumental in spreading Rocky Mountain spotted fever, should be removed from the skin by means of hartshorn, kerosene, turpentine, or carbolized vaseline, which prevent the head remaining in the skin.

Lice.—Three kinds of lice infest human beings, the pediculosis capitis or head louse, the pediculosis corporis or body louse, and the pediculosis pubis or crab louse. They cause itching and burning, and in some cases severe inflammation of the skin with the formation of sores. Crusts, interspersed with bleeding areas, may be present. The body louse, and possibly the head louse, transmits typhus fever and perhaps other diseases from one person to another.

Every effort should be made to free the body from lice and their eggs if one should be so unfortunate as to become infested with these insects. The head louse is destroyed by washing the hair with kerosene, care being taken that it does not run down over the face or neck. Gasoline is as efficient as kerosene, but it should not be used as its inflammability is much greater than kerosene. The danger of burning a patient in case either of these preparations is employed should be borne in mind, and the patient should be outdoors at the time of application and remain outside until the hair becomes dry. Several applications at intervals of two or three days are required, as the nits, or eggs, are hard to kill. These may sometimes be combed from the hair with a fine-toothed comb. The body louse exists principally in the clothing, so this should be boiled or baked. If this is impossible, the clothing and especially the seams should be ironed with a hot iron. An efficient method is to soak the clothing in gasoline, or the vapor of gasoline may be forced through them. Another less expensive method is to put the clothes for half an hour in a soapy solution to which 2 per cent of trichlorethylene has been added. The best application to the body is a solution made by mixing one part of gasoline with three parts of vaseline. This preparation is noninflammable under working condi-

tions. "Crabs" are killed by the application of mercurial or blue ointment. This, however, is a nasty treatment, and the same results can be obtained by washing with bichloride of mercury solution, one part to five hundred of water.

EFFECTS OF COLD—FROSTBITE.

Severe cold depresses the action of the heart—suspends the circulation. These effects are first noticed in the ears, nose, fingers, and toes. Numbness and tingling are the first symptoms, then loss of sensation. If not too long exposed, the circulation may be restored by proper treatment. But if the exposure is long continued, or if the cold is very intense, the parts are hopelessly frozen and gangrene will be the result. The parts may look all right for a few days after reaction, and then become discolored, bluish, and finally black. Another effect of extreme cold is an overpowering sense of drowsiness, but to lie down under such circumstances and go to sleep is almost certain death.

Treatment of frostbites.—1. Do not bring the patient to the fire nor bathe the parts in warm water.

2. If snow be on the ground, or accessible, take a woolen cloth in the hand, place a handful of snow upon it, and gently rub the frozen part until the natural color is restored. In case snow is not at hand, bathe the part gently with a woolen cloth in the coldest **fresh** water obtainable—ice water if practicable.

3. In case the frostbite is old and the skin has turned black or begun to scale off, do not attempt to restore its vitality by friction, but apply a little cotton, after which wrap the part loosely in flannel.

4. In the case of a person apparently dead from exposure to cold, friction should be applied to the body and the lower extremities, and artificial respiration practiced as in cases of the apparently drowned. As soon as the circulation appears to be restored, administer strychnia sulphate one-fortieth grain. Even if no signs of life appear, friction should be kept up for a long period, as instances are on record of recovery after several hours of suspended animation.

RUPTURE.

The usual rupture encountered by the layman appears in the groin. If it comes on suddenly for the first time, there is generally a history of heavy lifting or some other unusual exertion, followed by considerable pain and the appearance of a swelling. This swelling as a rule contains a loup of bowel. The bowel may slip back readily and the swelling subside for the time being if the patient lies down. Sometimes, however, the bowel does not slip back, and this is particularly true if it has been down before.

Treatment.—Placing the patient in a hot bath and gently manipulating the swelling may cause the bowel to return to its proper place in the belly. In the manipulation it should be remembered

that the bowel is a delicate structure, and that it has come down through a very small opening. The last part to descend should be the first part pushed back. If a few minutes' manipulation does not restore the bowel, place the patient in bed with an ice bag on the swelling and secure the services of a doctor if possible, because there is danger of mortification of the bowel.

ANTISEPSIS, ANTISEPTICS, AND THE DRESSING OF WOUNDS.

We are surrounded at all times by very minute organisms capable of producing various diseases or complications. They are sometimes called germs, and more vulgarly called "bugs." The latter name is incorrect, as the germs belong to the vegetable and not the animal kingdom. In first-aid work the germs that particularly interest us are those that get into wounds and infect them, causing pus or "matter" and sometimes blood poison.

Definitions.—When these complications arise the process is known as "sepsis." "Antisepsis," therefore, refers to the question of removing or killing the germs, and "antiseptics" are the medicines or other agents used in accomplishing these purposes. This explanation is made for the reason that it is necessary to use the terms "antisepsis" and "antiseptics" in this chapter, there being no common names quite as expressive. There is another term, "asepsis," used by doctors, which refers to the condition where all germs have been removed or killed, but this is a condition that does not often obtain in first-aid work administered by a layman, and therefore will not be further discussed. We frequently hear a person say that he has good blood because when he cuts himself the wound heals quickly. This is apt to give him a false sense of security and cause him to neglect the precautions that should be taken. Some of the worst cases of "sepsis" and blood poison occur in strong healthy men who have had no previous trouble in the healing of wounds. Germs are always present on the skin and can be demonstrated by laboratory methods. They can only be seen by a microscope of high power. A patient may have taken a hot soap bath before being injured, but his skin is not surgically clean, and antiseptics are therefore employed to destroy the germs that remain.

The dresser's hands.—The one who is to make the dressing should see that his own hands are surgically clean before he attempts to clean or "sterilize" the wound; otherwise he is apt to transfer germs from his hands to the wounds or to the dressings. The hands should be scrubbed with a nailbrush, hot water, and soap. Then the finger nails should be cleansed and the hands scrubbed again. A good way to clean the finger nails is to rake them across a cake of soap, filling the space under each nail with the soap. As this is removed with a pocketknife the dirt comes away with it. Then after the second scrubbing the hands should be soaked and rubbed in some antiseptic solution and not dried. The skin about the

wound should now be scrubbed with the nailbrush and soap; and if it is a hairy part, the hair should be shaved for some distance on all sides of the wound before the scrubbing. The wound and the parts about it should then be thoroughly cleansed with the antiseptic solution; and a cloth, preferably one that has been boiled, soaked in the antiseptic solution, laid over the wound, and bound there with a bandage.

Alcohol.—The antiseptic that is most apt to be at hand or most easily obtained is alcohol. It creates a burning sensation when applied to a wound, but this is a small matter if it prevents infection in the wound. Where alcohol can not be obtained, whisky or brandy, which contain about 50 per cent of alcohol, may be obtainable. Some experiments have recently been made in the San Francisco Federal Laboratory by officers of the United States Public Health Service showing that whisky and brandy are very good antiseptics.

Iodine.—Tincture of iodine, usually known by the layman as simply "iodine," is one of the best antiseptics known at the present time. Its power is far greater if applied to a dry surface than to a wet surface. The burning sensation produced in the wound does not last long. A dry sterile dressing over it is preferable to a wet dressing, as the wet dressing lessens its power and is apt to blister the skin. Too much iodine may also blister.

Bichloride of mercury.—An antiseptic much used in hospitals is bichloride of mercury or corrosive sublimate. It is not apt to be on hand in the ordinary household or camp, but is mentioned as one of the agents to be kept in the first-aid chest. It can be purchased in tablet form, and each tablet added to a pint of water makes a solution of a certain strength. The strength that is safest for the layman to use is 1 part of bichloride of mercury to 5,000 parts of water. This is an excellent antiseptic. It is deadly poison, however, if taken internally, and should therefore be handled with care.

Peroxide of hydrogen.—Peroxide of hydrogen has become a favorite and popular antiseptic. Its power in this regard is weak, but it is a cleansing agent and can be employed as a dressing in the absence of anything better. It tends also to stop oozing of blood in a wound where no large vessels are cut.

Carbolic acid.—The pure carbolic acid should be obtained if possible, and as a dressing for wounds should be made into a solution of 1 part of carbolic acid to 100 parts of water.

Turpentine.—Turpentine is used by veterinary surgeons in dressing wounds of horses, and probably depends largely for its virtue upon its antiseptic power, which is considerable. It can be poured into a wound, but only a small amount should be placed on the dressing, as it may blister. If sterile gauze is available for the dressing, it will be better not to pour any turpentine on the gauze but to trust to that which has been poured into the wound.

Sterile dressings.—There can be purchased for the first-aid chest various kinds of sterile dressings; that is, dressings that have had all germs killed by exposure to heat. Sterile gauze comes packed in a bottle in the form of a roll, and it unrolls as pieces are drawn out and cut off. From a theoretical standpoint the gauze is no longer sterile after the package has once been opened; but for practical first-aid work it answers the purpose if each piece cut off is carefully unfolded with clean hands and the inside of the piece applied next to the wound. It is advisable to buy small packages, so that a new one will be opened from time to time.

How to sterilize dressings.—The one most efficient and always available method of sterilizing dressings is by boiling for 10 minutes in plain water, which, from a practical standpoint, kills all germs that can infect a wound. If a dry dressing is desirable, it can be placed in a pan in a hot oven for 15 or 20 minutes and removed just as it is beginning to be scorched. If several layers of a sterile dressing are applied directly over a wound and lap around it at all sides, it is not absolutely necessary that the additional dressing material placed over this be sterile, although it is desirable.

Sterilizing instruments, etc.—If scissors, knitting needles, ordinary needles, or other metal instruments or implements are necessary in dressing a wound, they should be boiled in water for 10 minutes, or can be passed through a flame several times, or some alcohol can be poured on the instrument and then set on fire with a match. Actual fire is apt to remove the temper from the instrument much more easily than boiling, for which reason boiling is preferable.

BANDAGING.

Bandaging is an art, and it is not necessary in first-aid work that the bandage be an object of beauty if it accomplishes the purpose for which it is intended, but at the same time the average first-aid bandage is torn from an old sheet, pillowcase, or shirt; the material is limited in quantity, and if the same result can be achieved by half the bandage material applied in a systematic manner, the other half will be available for the second dressing.

Muslin forms a very good bandage and can be readily torn in strips. Hospitals now almost universally use gauze, which is a bleached cheesecloth, known sometimes to the trade as buttercloth. It is light, stretches so as to apply itself to a part, and is not expensive. Some grades of gauze tear fairly well; others do not. Gauze bandages put up for sale are rolled in bolts about 18 inches wide, of any desired length, and then cut with a sharp knife directly through the roll. This leaves a clean, smooth edge to the bandage. Each one is wrapped in paper to preserve this edge. The most convenient bandage, if but one size is to be purchased, is 3 inches wide and 5 yards long. There are only a few locations in the body where a

wider bandage is necessary, and if a narrower one is desired, the rolled bandage can be cut through with a pocket knife. Flannel is used where it is desired to exert pressure, the bandage being wrapped snugly several times around the part; it is also serviceable in excluding light, as in an eye bandage.

Crinoline, used by ladies to stiffen dress skirts, is a loosely woven cotton fabric filled with starch. One grade has a crossbar pattern of heavier threads; the other is made throughout of the same size thread. The latter is better for bandages, as it stretches more evenly. If a grade can be secured that contains a sufficient amount of starch, it can be wet for a few moments, then applied, and when dry forms an excellent starch dressing that will hold its position perfectly. If the crinoline does not contain sufficient starch for the purpose, it should be rolled very loosely, with quite an opening left at the core, and then dropped into a utensil of hot starch and gently stirred about and compressed with a spoon or stick. To prepare the starch for this purpose use a double boiler, such as oatmeal is cooked in, if available, and into a quart of cold water drop a double handful of granulated starch, then bring the water to a boil, stirring constantly. When the starch is a thoroughly consistent gummy mass, drop in the bandage, and by manipulation cause the starch to reach all parts of it. The utensil can then be cooled somewhat by standing it in a vessel of cold water, and the bandage is ready to apply; it should not be stretched, however, because it contracts in drying and will be too tight. If parts of the bandage do not contain enough starch, a little can be taken from the vessel and rubbed on these parts during the application. To strengthen the whole bandage and to insure a smooth finish, some more starch can be added to the outside. As a starch bandage will stick to the hairs on the skin, it is best to first apply a plain bandage and the starch bandage over this. If a broken leg, for instance, is to be transported some distance, a padded pasteboard splint, covered with a starch bandage, well dried, will insure that the bones will not move during the trip. If crinoline is not at hand, gauze or muslin can be used for the starch bandage, but they are not as satisfactory.

Plaster of Paris.—Plaster of Paris bandages can be purchased ready-made, each one in a tin box to protect it from moisture. If such a bandage is to be made, crinoline is preferable to gauze. The bandage is either drawn through a pan containing dry plaster (dental plaster being best) and rolled as it emerges from the pan, or the bandage can be stretched out on a table, the plaster sprinkled on, and rubbed smooth with a spoon or knife, and then the rolling done. Fresh plaster is absolutely necessary, as lumpy plaster can not be used. These bandages should be rolled loosely; otherwise the wetting will not reach the center. Lukewarm water should be used, and the bandage simply rolled on, not stretched, or it will be too tight.

A layer of cotton or other soft material should always be placed around the limb before the plaster bandage is applied to prevent the constriction. A little plaster added to the outside before it dries insures a smoother finish and strengthens the dressing. Salt or alum added to the water hastens the setting and glue delays it, but in first-aid work it is best to use plain water.

FIG. 38.

Method of applying.—The bandaging of a leg will be taken as an illustration of the proper method of applying a bandage, as the leg requires such treatment as frequently, perhaps, as any part of the body. We will consider first a muslin bandage, such as would be made by tearing up a sheet. A bandage 3 inches wide is a convenient size. If the wound or other injury is above the ankle, it is far better to begin the bandage at the foot and work up; otherwise the foot is very apt to swell. This is particularly important if for any reason it is necessary to apply the bandage rather tightly. The bandage should never be placed around a limb under a splint. Thick layers of cotton or other resilient substance should be put between the splint and the leg, and the bandage put on outside of the splint. The leg tapers, and a muslin bandage can not therefore be applied by simply passing around and around the limb as we work up. It must be reversed; that is, turned over sharply at a certain point each time it passes around the leg. If the dresser is right-handed, he should stand at the patient's feet and always apply the bandage from left to right, the direction that the hands of a clock turn. The end of the bandage should be placed across the instep (fig. 38), the tip end being left long enough to extend to the back of the heel, for a reason to be presently explained. The bandage should be simply rolled around the part at all times, and the hand should not get far away from the leg; otherwise the long piece of unrolled bandage will wrinkle. Pass the first

FIG. 39.

turn across the instep, then under the sole, and once directly around the foot just back of the toes. As the bandage comes up from under the sole the second time, pass it again across the instep, making a letter X with the part first applied (fig. 39). The bandage now passes back of the ankle and emerges where the start was made and near the loose tip end. This tip end is now folded directly on itself (fig. 40) and laid across the instep, where it is locked and held fast by the next turn of the bandage. The bandage now crosses the instep again parallel with the first strip and covering the upper half of it. On emerging from the sole it follows the line of the second arm of the X previously mentioned, covers the upper half of it, and passes to the back of the ankle (fig. 41). Two or three turns, depending upon the shape of the leg, are now made directly around the ankle, each one concealing the upper half of the previous one, and at this point the expanding outline of the calf requires that the reversing process begin. The bandage is passed diagonally upward this time instead of straight around. The tip of the left index finger is placed on the upper edge of the bandage as it crosses the shin bone, the bandage is unrolled only 2 or 3 inches, and then turned directly over, using the finger tip as a pivot (fig. 42). The bandage now passes around the leg, and when it emerges from behind it follows the line of the previous turn, concealing the upper half of it, and another reverse is made over the shin bone. When the curvature of the calf is thus covered a few circular turns just below the knee complete the bandage (fig. 43), and it can then be pinned, preferably by two safety pins, placed up and down the leg, one above the other; ordinary pins can be used, or the last foot of the bandage can be split, one end passed either way around the leg and the two ends tied. If pins are used, they should be inserted before the surplus bandage material is cut off, as the unoccupied hand can hold the bandage snug and smooth during the pinning. If the bandages available are short, and more

FIG. 40.

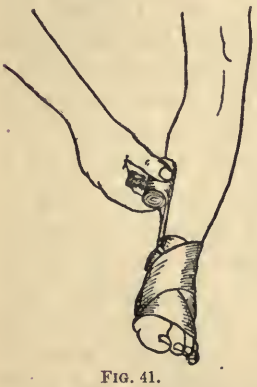

FIG. 41.

than one is necessary, the first end of the second one is made to lap over the last end of the first one for several inches, and the next turn of the bandage secures them in position.

FIG. 42.

FIG. 43.

FIG. 44.

If a gauze bandage is available for this dressing, it is applied somewhat differently. A gauze bandage should not be reversed; in the first place it is not necessary, and in the second place it does not reverse well owing to its soft, yielding nature. The bandaging follows the same lines described above to and including the circular turns at the ankle. When the expansion of the lower part of the calf is reached, the bandage is applied in what is known as a "figure of eight" around the calf. Beginning at the uppermost of the ankle turns the bandage is passed diagonally upward across the shin bone to a point just below the back of the knee (fig. 44). Then one turn is taken around the leg below the knee to take the kink out of the bandage, and as it emerges from the back of the leg the second time it passes diagonally down the front of the leg across the shinbone, making an X with the part passing up the other side (fig. 45). It now passes behind the leg and comes out at a point where in contin-

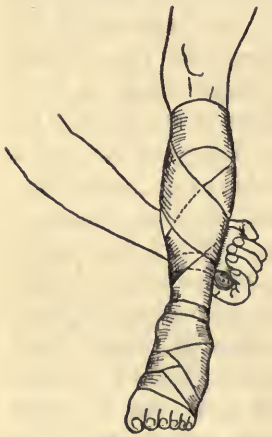

FIG. 45.

uing diagonally upward again it will be parallel to and conceal the upper half of the previous strip laid in the same direction. Upon reaching the point below the knee another circular turn is made to remove the kink, and then the bandage passes diagonally downward parallel to and concealing the upper half of the last strip there applied. This figure of eight is continued until the calf is covered, when a few circular turns complete the dressing (fig. 46).

FIG. 46.

Special bandages.—In the absence of suitable bandages a piece of muslin can be cut or torn into various forms to fit different parts of the body.

Esmarch triangular bandage.—The Esmarch bandage is a triangular piece of muslin 52 inches across the long side and 26 inches from the middle of the long side to the angle opposite. It is said to form a part of the equipment of every German soldier, and on it are printed figures showing the various uses to which it may be put. It is illustrated in figure 47.[1] A sheet or pillowcase cut to the same size and shape answers every purpose.

Head bandage.—A handkerchief knotted at the four corners and slipped over the head, as shown in figure 48, will hold a dressing on the scalp. If it shows a tendency to slip, it can be retained in position by another handkerchief passing under the chin and tied over the head (fig. 49).

Jaw bandage.—In a broken-jaw case a handkerchief passing under the chin and tied over the head will hold the bones fairly well for a short time. A second handkerchief passing in front of the chin and tied at the back of the head assists (fig. 50). A better way to bandage the jaw is to tear a strip of muslin 36 inches long and 6 inches wide. Each end is split to a point near the center. The upper strip is now passed in front of the chin and tied at the back of the head (fig. 51), and the lower strip is then brought under the chin and tied over the head (fig. 52). If the jaw is to be held in place several days before a doctor can be reached, it is best to cut a piece of pasteboard 10 inches long and 4 inches wide and slit it at the ends (fig. 53). This is then moistened and molded to the chin (fig. 54). This mold when padded and held in place by the split bandage, or preferably by a starch bandage applied along the same lines, will hold the jaw very well until surgical aid can be secured.

Chest or belly bandage.—In a burn or scald on the chest, belly, or back it sometimes taxes the ingenuity of an expert to keep a suit-

[1] The Esmarch triangular bandage shown on p. 104 is reproduced by courtesy of Johnson & Johnson, New Brunswick, N. J.

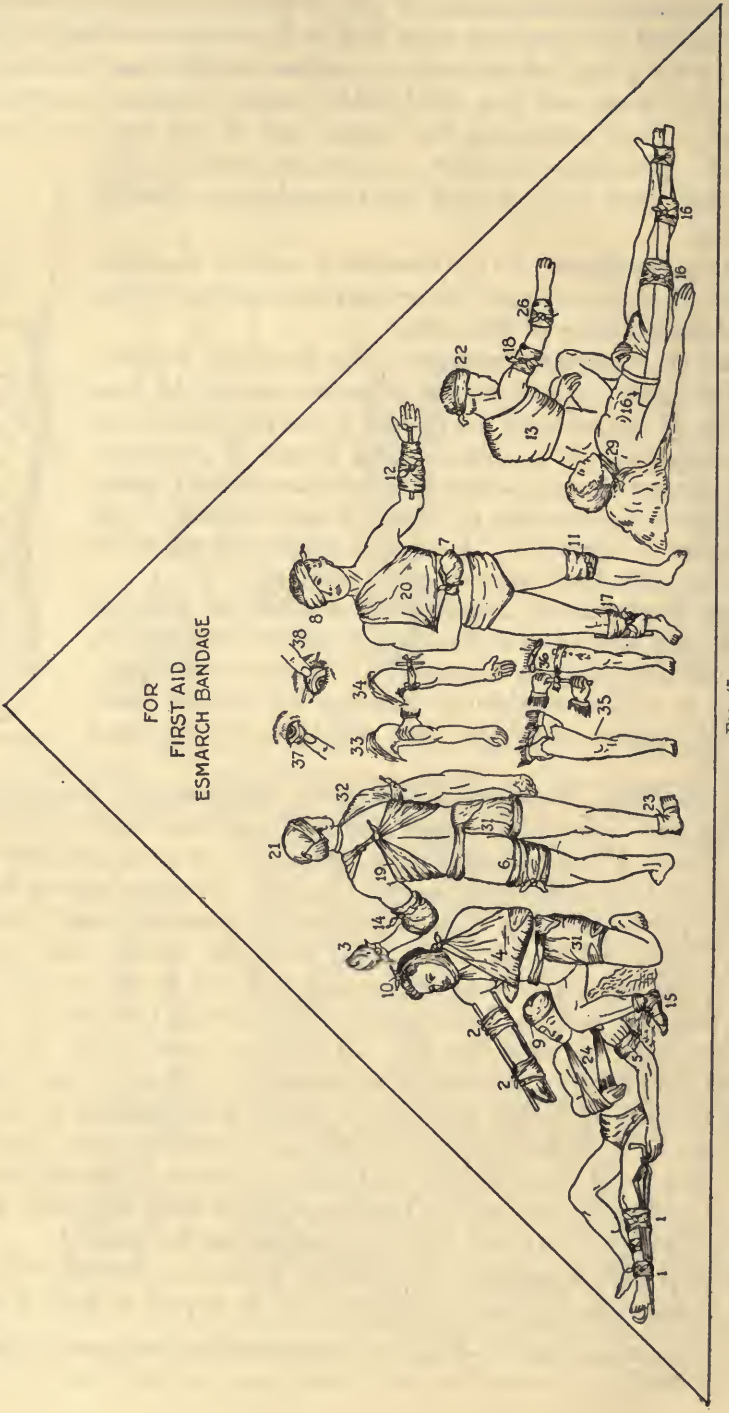

FIG. 47.

EXPLANATION OF NUMBERS SHOWN ON FIGURES IN ILLUSTRATION OF ESMARCH BANDAGE (fig. 47).

1. Broken leg below knee and at ankle. Umbrella used as splint.
2. Broken arm—upper arm and at wrist. Rough wood splints used.
3. Hand bandage. (See also No. 7.)
4. Wide sling for arm.
5. Upper-arm bandage. (See also No. 18.)
6. Thigh bandage.
7. Hand bandage. (See also No. 3.)
8. Eye bandage.
9. Scalp bandage.
10. Chin and face bandage.
11. Knee bandage.
12. Wrist and fore-arm bandage. Rough wood splints used.
13. Bandage for back.
14. Elbow bandage.
15. Foot bandage.
16. Splint and bandage for broken thigh and ankle.
17. Splint and bandage for broken leg.
18. Arm bandage.
19. Chest bandage, rear view.
20. Chest bandage, front view.
21. Skull bandage.
22. Forehead bandage.
23. Heel bandage.
24. Narrow sling for arm.
26. Fore-arm bandage.
29. Throat bandage.
31. Hip bandage.
32. Shoulder bandage.
33. Stopping artery bleeding of arm with hand pressure.
34. Stopping artery bleeding of arm with tourniquet.
35. Stopping artery bleeding of leg with hand pressure.
36. Stopping artery bleeding of leg with tourniquet.
37, 38. Removing foreign substance from eye.

FIG. 48.

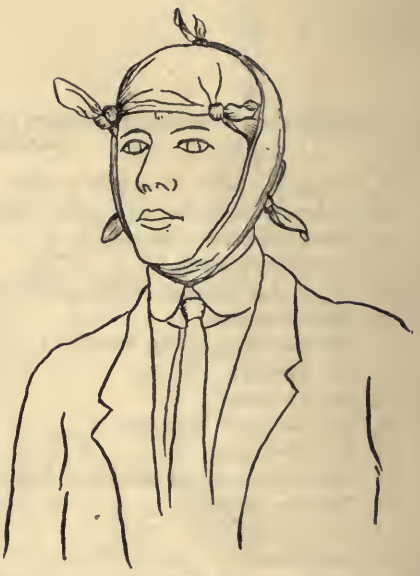

FIG. 49.

FIG. 50.

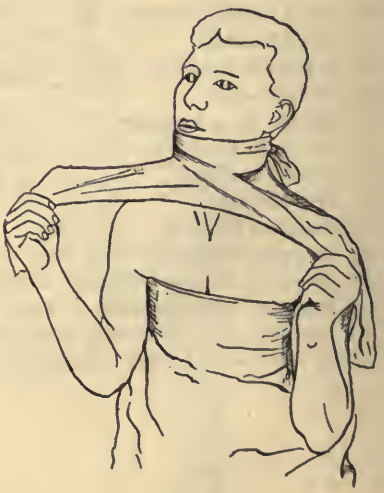

FIG. 51.

able dressing in place. A towel or strip of muslin passed around the body and pinned in front can be held in place by two strips of bandage passing over the shoulders as suspenders (fig. 55). If this

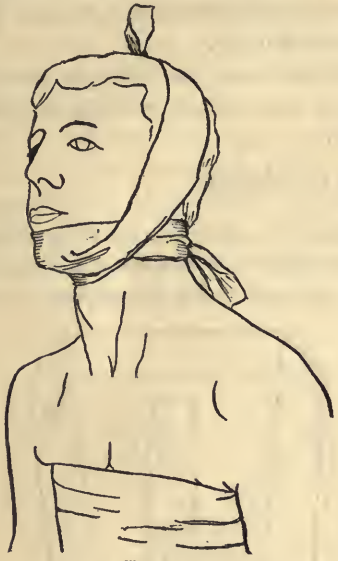

FIG. 52.

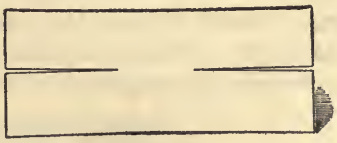

FIG. 53.

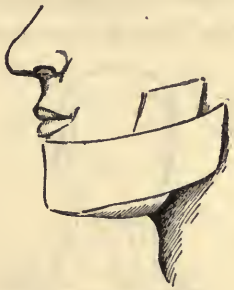

FIG. 54.

bandage shows a tendency to slip up from below, another strip can be pinned to the lower edge in front, the strip split, the two pieces carried between the thighs, separated, and pinned to the lower part of the bandage at the back. Another good method is to make a vest by cutting two armholes in a strip of muslin (fig. 56). After passing the patient's arms through the holes the vest is pinned up the front, and the slack over the shoulders is taken up by other pins (fig. 57). This can also have strips passing between the thighs.

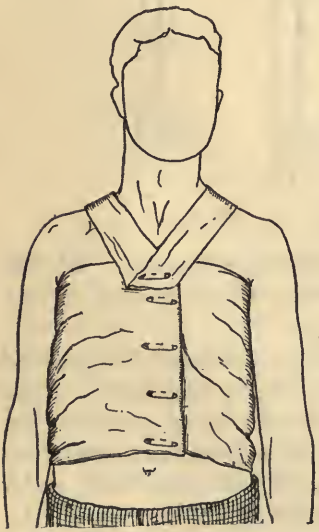

FIG. 55.

Bandage for crotch. — A triangular piece of muslin applied as a diaper

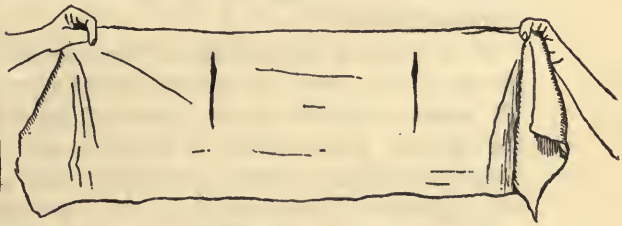

FIG. 56.

will answer in some cases. A more comfortable bandage can be made of two strips of muslin about 4 inches wide and 60 inches long. At the end of one strip cut several slits (fig. 58). Thread

the second strip through these slits to its center, making a T-shaped bandage. Place the cross of the T under the patient's back at the waist line and tie the top part of the T around the waist. Split the vertical end of the T, bring the two ends between the thighs from behind forward, and tie them to the waistband.

Finger stall.—Figure 15 shows the pattern for a finger stall, as well as the completed stall, this being a convenient bandage for keeping a dressing on the finger or thumb.

TRANSPORTATION OF INJURED.

It seems almost unnecessary to include a chapter on this subject, because when a person is injured his friends will find some way of transporting him to the doctor, the method being prompted by the

FIG. 57.

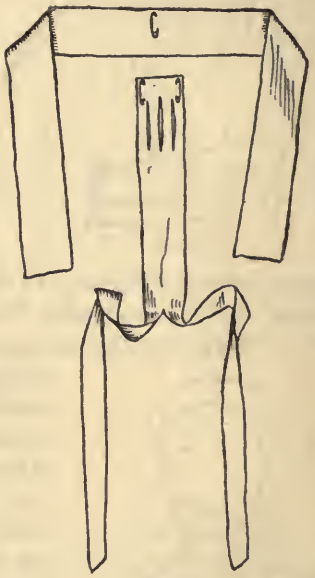

FIG. 58.

facilities available, coupled with their own good sense. At the same time a few hints may add to the comfort of the patient during transportation.

If it is but a short distance the injured person has to be moved he may be carried in one of several ways, depending largely upon the nature of the injury. Carrying on one's back, as practiced by schoolboys, will answer in some cases. If two persons stand at either side of the patient, and join hands under the knees and under the shoulders, the patient at the same time steadying himself by passing his arms around the necks or shoulders of the carriers, he can be transported in comfort quite a distance. Again, let the two carriers face one another; each one grasps his own left wrist

with his right hand; then the two persons approach, and each with his unoccupied hand grasps the unoccupied wrist of the other, forming a chair (fig. 59). If the patient is faint and requires support, a back may be made to this chair as follows: Assistant No. 1 grasps his own left wrist with his right hand, assistant No. 2 grasps the unoccupied wrist of No. 1 with his left hand, while the left hand of No. 1 grasps the left wrist of No. 2. This makes a three-handed chair and leaves the right arm of No. 2 disengaged; he passes this arm across the shoulders of No. 1, forming a back to the chair (fig. 60). One assistant can pass his arms through the armpits of the patient and clasp his hands over the patient's chest, while the second assistant stands between the patient's legs and supports them with his arms, both assistants facing toward the patient's feet.

FIG. 59.

FIG. 60.

A chair can be utilized in carrying a patient in the following manner: Pass a pole under the center of the seat from side to side, nail it fast, and allow it to protrude for about a foot at either side. Pass another pole across the back of the chair from side to side at a convenient height, and lash it fast, allowing it to protrude at either side about 2 feet. The two assistants stand one at either side of the chair. The hands that are next to the chair grasp the pole passing under the seat, while the outside arms are thrown back of the upper pole, steadying it (fig. 61). A wide chair can also be used by nailing two poles under the seat, these extending several feet in front and behind.

A stretcher can be constructed of two poles and a blanket or piece of a tent. Roll the poles into the borders of the blanket or

canvas for several inches, and make them fast by twine passed through at intervals. The poles are cut long enough to protrude at the ends as handles. If it is a case that will be more comfortable on a flat stretcher than on one that wraps around the patient like a hammock, the poles can be held apart by cutting two sticks, notching them at the ends, and lashing them in place, one at the head and one at the foot. Straps attached to the handles and passing over the shoulders of the carriers help to relieve the strain. A door, shutter, or ladder can be used for transportation over a short distance, but they are very uncomfortable and difficult to carry. If there are a number of assistants, a stick passed under the head and another under the foot of such a stretcher, protruding from either side, will provide for four carriers. A stretcher has been suggested, made of two poles and two coats; the poles are passed through the sleeves of the coats and the coats are then buttoned. This will answer if the patient is not heavy. It is said that some patients ride easier if the carriers do not try to keep step; this is a matter that can be safely left to the decision of the patient himself.

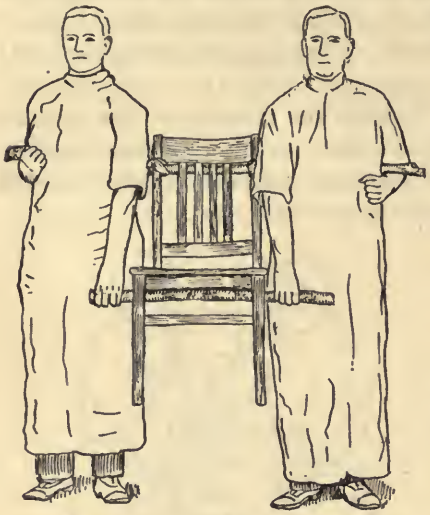

FIG. 61.

If a horse is available, but no vehicle can be obtained, the old Indian method may be adopted of lashing two long poles to the sides of the horse and letting them drag behind; the blanket or canvas being attached between the poles.

POISONS.

The scope of this book does not permit an extended discussion of the many agents that may cause poisoning in the human being, but a brief outline will be given of the general management of such cases where the nature of the poison is unknown, and also a few rules regarding the treatment in poisoning by the more common poisons.[1]

DIRECTIONS TO BE FOLLOWED IN CASE OF POISONING.

Send for the doctor immediately, if practicable, and if the nature of the poison is known, have the messenger inform the doctor so

[1] Solutions containing poisonous substances should be kept in bottles marked "poison" or in basins—never in pitchers, cups, or utensils employed in cooking. The bottle or basin containing the poison should be placed upon a high shelf where it can not readily be mistaken for a harmless substance.

that he may come prepared. If the poison is unknown, but the bottle from which it was taken is found, save the bottle, as it may help in case of legal investigation. If the poison has been taken with suicidal intent and the patient survives, the same caution is applicable that was mentioned under drowning, gas poisoning, etc. Warmth to the body, light stimulation, and encouragement are indicated.

In treating cases of poisoning first give an antidote, if one is available; second, promote early and repeated vomiting to remove the bulk of the poison; third, give something that will help envelope the poison left in the stomach and prevent its further absorption into the system; fourth, remedy the damage that has been done, so far as this is possible.

The following "general antidote," which should be prepared as needed, should be given when poisoning by any of the poisons mentioned in this book occurs or if the poison is unknown: Magnesia, 2 teaspoonfuls; charcoal, 2 teaspoonfuls; tannic acid, 1 teaspoonful. These dry powders should be kept thoroughly mixed in the above proportions in an air-tight bottle and when needed one heaping tablespoonful should be mixed with a cupful of water. This is one adult dose and should be repeated.

Should there be no tannic acid on hand, a cupful of very strong tea or tea of oak bark will take the place of the tannic acid and water.

Vomiting or puking may be induced by tickling the throat with a feather or pushing the finger down the throat, or by the administration of one of the following emetics by mouth:

Mustard.—One tablespoonful stirred to a cream with a cupful of tepid water.

Common salt.—One tablespoonful to a cupful of tepid water. Not very certain as an emetic.

Alum.—Two teaspoonfuls to a cupful of tepid water. This is a rather feeble emetic.

Ipecac.—Give 1 tablespoonful of the sirup of ipecac in a cupful of tepid water. Repeat once if necessary.

The doses recommended throughout this article are for adults; the amount should be proportionately small for children.

UNKNOWN POISON.

Give "general antidote" followed by emetics or raw whites of several eggs; or in their absence milk, or flour and water. The white of egg, particularly, is inclined to pick up part of the poison left in the stomach and hold it until the patient can be made to vomit again. If the body is limp and respiration is feeble, tea or coffee can be given as a stimulant, and warmth applied to the body with massage or rubbing will tend to support the circulation.

OPIUM, LAUDANUM, PAREGORIC, MORPHINE, CODEINE, HEROIN, INDIAN HEMP.

Give the "general antidote," or potassium permanganate (one-third teaspoonful dissolved in a pint of water—no undissolved crystals should remain in the fluid), or hydrogen peroxide (2 teaspoonfuls in a pint of water), or borax, or baking soda (about 1 tablespoonful to the pint of water), followed by an emetic. Whites of eggs and considerable quantities of strong tea or strong black coffee should be given, or if unable to swallow, inject the coffee into the bowel with a syringe.

Give sweet spirit of niter (1 teaspoonful in water three times a day) to aid excretion by kidneys.

Keep patient awake by shaking, striking with wet towel, applying cold water over face and chest, or forced walking.

Wines and liquors must not be given.

When respiration becomes slow and irregular, artificial respiration should be employed, the same as is used to restore the partially drowned.

The patient should be put in bed and warmth applied, and carefully watched for some time after the dangerous symptoms have subsided.

ARSENIC, RATSBANE, PARIS GREEN, "ROUGH ON RATS," FOWLER'S SOLUTION.

The best antidote, if the ingredients can be obtained, is prepared by mixing a teaspoonful of magnesia with a cup of water, adding 2 tablespoonfuls of tincture of iron, stirring well, and giving the whole in one dose; or the "general antidote" may be given, followed by emetics, raw whites of eggs mixed with water, or large drinks of hot greasy water, or salt and water (tablespoonful to pint), or strong tea. Magnesia may be given in tablespoonful doses mixed with water. Lime water in large quantities is of some value, and in its absence lime which may be scraped from the walls or ceiling and mixed with water may be administered.

Protect stomach with 2 tablespoonfuls of sweet oil, gruel, starch, mucilage, flaxseed tea, or elm-bark tea. Castor oil (1 ounce) should be given after vomiting occurs even though the bowel movements are frequent.

Pain can possibly be lessened by hot bottles to the stomach and bowels.

Keep patient warm with artificial heat or extra garments, and give strong coffee to avert collapse.

STRYCHNINE, NUX VOMICA (DOG BUTTON), FISH BERRIES, IGNATIA BEAN.

Give "general antidote" or charcoal (1 tablespoonful) or strong tea followed by an emetic, then doses of bromide of soda or potash (one-fourth of a teaspoonful in water) repeated every hour until three or four doses have been taken. Several whiffs of ether may be inhaled from a handkerchief at the beginning of a spasm.

Give sweet spirit of niter (1 teaspoonful in water three times a day).

Follow by a purge of Epsom salts or any other saline cathartic that is at hand.

Artificial respiration should be employed the same as is used to restore the partially drowned (pp. 89–90). Remove the patient to a darkened room and keep as quiet as possible; avoid any sudden noises.

BICHLORIDE OF MERCURY (CORROSIVE SUBLIMATE).

Promote vomiting, if not already present, by giving mustard in water. Do not use salt as an emetic.

Give raw whites of eggs in water or milk or give milk or mucilage in abundance. In absence of eggs, chop up raw, lean meat finely and diffuse through water or milk and give. It is necessary that vomiting be induced after the eggs, milk, or meat are given, as the mixture formed of these substances will be absorbed if allowed to remain.

The "general antidote," strong tea, and later flour and water, barley water, or flaxseed tea, or elm-bark tea may be given.

Borax in water, about a tablespoonful to the pint of water, is recommended, but is of doubtful value.

Stimulate with strong coffee if necessary.

ACID POISON—ACETIC, MURIATIC, NITRIC, SULPHURIC, ETC.

Give no emetic.

Give "general antidote," large drinks of water (or milk) with chalk, whiting, borax, magnesia, or baking soda, or wood ashes, or strong soapsuds; plaster from the wall may be given in emergency; olive oil, raw whites of eggs beaten up with water, and later flaxseed tea, elm-bark tea, gruel, starch, mucilage freely.

Laudanum (20 drops) may be given if there is much pain.

CARBOLIC ACID AND CRESOL AND COAL TAR DISINFECTANTS GENERALLY.

Give alcoholic liquors (whisky, brandy, etc.) or equal parts of alcohol and water freely to dissolve the poison. Produce vomiting to get rid of the alcoholic mixture. In the absence of alcoholic liquors, give vinegar, soapsuds, or raw whites of eggs in water. Give solution of Epsom or Glauber salt or sodium phosphate well diluted to hasten elimination of acid that may have entered the circulation.

Do not give oils or glycerin.

Milk, gruel, flaxseed tea, or elm-bark tea may then be given. Hot applications to extremeties. For collapse give strong coffee. Apply artificial respiration if breathing stops.

ALKALI POISONS—LYE, HARTSHORN, PEARLASH, ETC.

Assist vomiting with large drinks of tepid water.

Give vinegar, lemon juice or orange juice, hard cider, whites of eggs beaten with water.

Follow by sweet oil, milk, gruel, barley water, flaxseed tea, or elm-bark tea.

PTOMAINE POISONING FROM FISH.

The symptoms of ptomaine poisoning are practically the same as those included under the head of "Cholera morbus" (p. 38).

"General antidote," emetics, copious drinks of strong tea, repeat emetic, then castor oil (2 tablespoonfuls) should be given. Continue treatment as given for cholera morbus.

A LIST OF DON'TS.

Don't fail to send for the doctor. He knows best.

Don't leave the patient in order to go for the doctor if there is anyone you can send. He may need your moral encouragement if nothing more.

Don't get excited. An appearance of agitation on your part will discourage the patient.

Don't hold an injured person on his feet, nor require him to sit in a chair. He will be better off and less apt to faint if he lies down, preferably with the head low.

If you have a first-aid chest, and a bottle of medicine is exhausted, don't wait until you need it again before having the bottle filled.

Don't put your fingers on a wound. They are covered with germs, and you will almost surely infect the wound.

Don't use a spider web or a quid of tobacco on a wound. They are filthy, do no good, and are very apt to infect the wound. The same thing is true to a less extent in regard to salves of various kinds.

Don't place cotton next to a wound. Always keep at least one layer of gauze or boiled cloth between the cotton and the raw surface. The cotton sticks to the wound and is very difficult to remove.

Don't apply bandages too tightly.

Don't remove a dressing to see how a wound looks. Let the doctor do that.

Don't sit down at the bedside and discuss with the callers all of the horrible accidents you ever heard of. Your conversation will not be appreciated by the patient.

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