

THE
SHIP'S MEDICINE CHEST
AND
FIRST AID AT SEA



TREASURY DEPARTMENT
UNITED STATES PUBLIC HEALTH SERVICE



85.5.20
S. S. BYLAYL.

1929



Miscellaneous Publication No. 9

THE
SHIP'S MEDICINE CHEST
AND
FIRST AID AT SEA

Compiled and Edited by
Medical Officers of the United States Public Health Service
By Direction of the Surgeon General



UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON

1929

DEDICATED
TO
THE AMERICAN MERCHANT SEAMAN
AT WHOSE BEHEST THE MARINE HOSPITALS
WERE FIRST ESTABLISHED IN THE YEAR
1798 AND WHOSE HISTORY AS A
PATIENT OF THE PUBLIC HEALTH
SERVICE IS A RECORD OF
THE PROGRESS OF MEDICINE
AND SANITATION IN
THE UNITED STATES

FOREWORD

The duty of furnishing medical and surgical relief to sick and disabled American merchant seamen was begun in 1798, but it was not until 1881 that a medical handbook, *The Ship's Medicine Chest*, was prepared for use aboard ship. That volume, representing a considerable knowledge acquired by officers of the United States Public Health Service of the needs of seamen and the conditions under which they work, has been revised and rewritten from time to time as medical science advanced. The present handbook, like its predecessors, is for use on ships having no physician. It can not, in the nature of things, cover all emergencies arising on shipboard; but in the hands of intelligent seamen and ship's officers, who have always displayed great ingenuity and resourcefulness in the emergency treatment of their sick and injured, it may be useful.

I would urge upon ship's officers a study of this book, especially of the chapter on hygiene and sanitation on shipboard. A sick man on board ship not only weakens the crew but may be a danger to the health of others. Care in the selection of the ship's company and the preservation of its health are measures of insurance against disease, death, and quarantine delays. Nothing which affects the well-being of the sailor is trivial; and medical officers of the United States Public Health Service are always ready to advise ship's officers how to protect the health of crews. In the interests of both ship and crew and to the end that suffering may be prevented and human life at sea made more safe, this book has been written.

H. S. CUMMING,
Surgeon General



PREFACE

Since the object of this book is to teach officers and crews of American merchant vessels how to preserve their health and to meet intelligently the accidents of disease and injury, the structure and uses of the various parts of the human body are taken as the point of departure. This is logical, since, in order that a machine may be operated successfully and repaired when it is out of order, the person in charge of it must know of what each part consists, what it is supposed to do, and how it does it. It is, therefore, urged that this portion of the book be carefully studied in order that when emergencies arise, their nature will be promptly recognized and the exigency met.

If the entire book is read and its basic points are remembered, it will be possible to apply appropriate treatment without delay, and this may lessen pain and perhaps save life. Emergencies are best met by knowing how and why to do the necessary thing at the moment. Such knowledge is not to be acquired in an instant, particularly in times of urgent stress, and preparation before the event is the surest way of avoiding errors and preventing loss of time. This is especially true in the first-aid care of the sick and injured, when every moment may be of the utmost importance. Throughout the book, wherever a technical word is used, its meaning is placed in parentheses. In logging an accident or in making a wireless request for medical or surgical advice, these words will be found concise and accurate. For convenience in reference, important words and phrases have been printed in *italics*.

For ready reference, there is appended a set of concise directions, at the beginning of which a tab should be placed so that they may be consulted without the necessity of searching through the index. This is intended for emergency use only, it being urged that the remainder of the book be studied in time of leisure as a preparation for the time of acute need. As a further aid in consulting the book, its subject matter is arranged alphabetically.

It should be the aim of every seafarer to keep himself and his ship in the best possible condition. To do so makes for efficiency and usefulness. Careful attention to the rules of health is the surest way of preventing sickness, disability, expense, and, perhaps, premature death. The safety factor of ships is now so high that there is no reason why the mariner should not live to a happy, ripe old age, if

he will but avoid those things which bring disease and suffering in their train. These things are set forth in considerable detail in the second chapter, which should be carefully read and followed.

It is desired to acknowledge valuable assistance received from numerous officers of the United States Public Health Service who have reviewed the manuscript of this book in whole or in part and have contributed photographs and drawings thereto. Numerous standard American works on medicine, surgery, hygiene, and sanitation have been consulted freely and used in the compilation of this book. It is not practicable to mention them individually, but, representing as they do the best thought of the medical profession of the United States, their help is highly appreciated.

The Ship's Medicine Chest and First Aid at Sea has been adopted by the United States Coast Guard, the United States Coast and Geodetic Survey, and the United States Lighthouse Service as the official standard for use on ships and at stations where no medical officer is available.

NOTICE

Special Attention Is Called to

THE EMERGENCY REFERENCE SECTION

on page 182

and

FIRST AID BY RADIO

on page 188

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THE SHIP'S MEDICINE CHEST AND FIRST AID AT SEA

CHAPTER I

THE STRUCTURE AND FUNCTIONS OF THE HUMAN BODY

ANATOMY—PHYSIOLOGY—HYGIENE—SANITATION—THE BONES—THE JOINTS—THE
MUSCLES—THE BLOOD VESSELS—THE BLOOD—THE RESPIRATORY SYSTEM—THE
ABDOMINAL CAVITY—THE SKIN—THE NERVOUS SYSTEM

No man can intelligently operate, maintain, and repair a machine unless he knows how it is built and how it works. With this knowledge, he can get the most out of it with the smallest repair bills; and should it get out of order, he will immediately know that it is not working properly, what is necessary to fix it, and how this is to be done.

Anatomy is the science of the structure of the bodies of living things.

Human anatomy is the science of the structure of the body of man.

Physiology is the science of the functions of living things, both as a whole and as to their various organs.

Human physiology is the application of this knowledge to human bodies and organs.

Anatomy is the science of how the machine is made; physiology is the science of how it works.

Hygiene is the science of keeping living things in good working condition. It includes the prevention of the accidents of disease and other injuries, but, more important still, it has for its object the maintenance of man in the state of abounding good health.

Sanitation really means the same thing as hygiene, it being merely a Latin word for the Greek word "hygiene," but it has come to mean those measures which are applied to the place in which living things live and work, in order that disease may be prevented. As now generally used, hygiene applies to the body and sanitation to the place.

ANATOMY

THE BONES

The human body is built up over a framework of bones bound together by more or less elastic pads of cartilage (gristle) and tough, fibrous bands known as ligaments. Bones are dense—like ivory—on

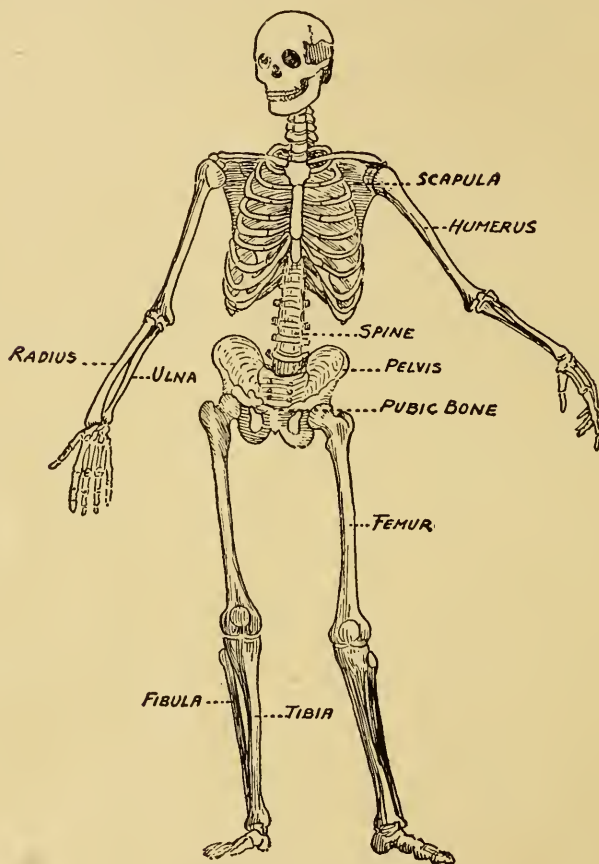


FIG. 1.—The human skeleton (semidiagrammatic)

the outside and have a fine lattice work on the inside. This arrangement makes them light yet very strong and permits the passage of the blood vessels to the innermost parts of the bone. They are covered by a tough, fibrous membrane and contain marrow, a substance which produces blood cells.

The framework is known as the *skeleton* (see fig. 1) and consists, in the human being, of 206 bones¹ as shown in the following list:

¹ Ships' officers should know the names of the bones for convenience and accuracy in sending radiograms about injuries.

THE BONES OF THE BODY

<i>Vertebrae</i> (back bone)-----	26
Cervical (neck)-----	7
Thoracic (chest)-----	12
Lumbar (back)-----	5
Sacral (lower back)-----	² 5
Coccygeal (lower end)-----	² 4
<i>Skull</i> (head)-----	22
Cranium:	
Occipital (back of head)-----	1
Parietal (side of head)-----	2
Frontal (front of head)-----	1
Temporal (sides of head, forward)-----	2
Sphenoidal (base of head)-----	1
Ethmoidal (base of head)-----	1
Face:	
Nasal (nose)-----	2
Maxillæ (jaws)-----	2
Miscellaneous-----	10
<i>Hyoid</i> (neck)-----	1
<i>Ribs</i> -----	24
<i>Sternum</i> (breast bone)-----	1
<i>Upper extremities</i> (shoulders, arms, wrists, hands, and fingers)-----	64
Shoulders:	
Clavicle (collar bone)-----	2
Scapula (shoulder blades)-----	2
Arms:	
Humerus (upper arm)-----	2
Ulna (elbow)-----	2
Radius (forearm)-----	2
Wrists (carpals)-----	16
Hands:	
Metacarpals (hands proper)-----	10
Phalanges (fingers)-----	28
<i>Lower extremities</i> (hips, thigh, legs, ankles, feet, and toes)-----	62
Innominates (haunches)-----	2
Femur (thighs)-----	2
Legs:	
Patella (knee pan)-----	2
Tibia (shin)-----	2
Fibula (calf bone)-----	2
Ankles (tarsal)-----	14
Feet:	
Metatarsal (foot proper)-----	10
Phalanges (toes)-----	28
<i>Auditory ossicles</i> (ear bones)-----	6
Total-----	206

These bones are classed, for purposes of description, according to their size and shape, as long, short, flat and irregular, large or small. A detailed description of each is not necessary here. If the

²Fused into 1.

reader be especially interested in the subject, he is referred to any standard textbook on anatomy. All that is needed here is to state the outstanding features of those bones about which the mariner should have some definite knowledge in order to give intelligent emergency treatment in cases of fractures and dislocations. It is important that he first know something about the normal condition and relations of these in order that he may diagnose (find out what is the matter) in case of injury. This helps a great deal in applying treatment, since, unless one has a fairly definite idea of what is the matter, he is very liable to make a mistake in the selection of a method to relieve the condition.



FIG. 2.—First cervical vertebra (upper) and phalanx (lower)

each of the vertebræ there is placed a pad of yellowish cartilage (gristle), which is tough and elastic at its rim, and soft, pulpy, and highly elastic at its center. These pads act as shock absorbers and assist in permitting movement of the neck and trunk. Further binding down and protecting the spinal column (backbone) are thick layers of muscles behind, and, in the neck, in front of it. Each of the vertebræ, except the first, the *atlas*, consists of a more or less cylinder-shaped bone in front, and behind of an arch of bone inclosing a hole through which runs the spinal cord or large cable of nerves running to and from the brain.

Fractures (breaks) and *dislocations* (out of joint) of the spine are *very rare*, those of the neck and lower back being most frequent. When they do occur, there is usually both a fracture and a dislocation, and they are seldom the result of direct violence, such as a blow.

tion of a method to relieve the condition.

The *back bone* (*spinal column*).—This is placed up and down in the middle line of the back and is the central frame to which all the rest of the body is directly or indirectly attached. From this point of view it may be compared to the keel of a ship. It consists of bones which are bound firmly together by bands of very tough, strong, fibrous material, while between

They may be produced by a fall upon the shoulders, a heavy weight falling upon the shoulders or from a fall upon the buttocks, but more commonly they result from very forced forward or backward bending. In hanging, death may occur from dislocation of the second from the first vertebræ of the neck. In this and in all other injuries of the spinal column harm results from compression and tearing of the spinal cord.

The *skull*.—Placed on top of the spinal column is the skull. It contains the brain, which sends out and receives nerves to and from the various parts of the body. The skull consists of the *cranium* and the *face*. The bones of the cranium are very firmly mortised into one another and, hence, are rarely dislocated. They may be fractured, however, by direct violence, but not as frequently as might be thought. They are typical flat bones. At its base, the cranium has a number of openings, a large one (the *foramen magnum*) for the passage of the spinal cord and a considerable number of smaller ones through which pass nerves, arteries, and veins. In fractures of the base of the skull, the spinal cord or the nerves may be injured. Attached to the cranium are some of the muscles of the face, neck, and trunk.

To assist in sending accurate radiograms describing a head injury, roughly, the occipital bone is at the base of the cranium above the neck; the position of temporal bones corresponds to the area about the ears; above and in front of the occipital bone and above the temporal bones are the parietals, which meet in the mid line at the top of the head; in front of these and forming the forehead is the frontal bone. In sending a radiogram about injuries in these locations, one may say "Occipital region, right or left temporal region, right or left parietal region, frontal region."

The *face* proper begins above at the eyebrows and ends with the lower jaw. Above on either side of the middle line are the *orbits*, deep, pyramid-shaped cavities surrounded by a strong projecting rim of bone. These contain the eyes, protected by the lids, and their muscles, nerves, blood supply, and the tear-producing apparatus. Above each eye is more or less of a bulge which represents the location of the *frontal sinuses*. These are cavities which connect with the nose. They may become infected and produce headache and fever. Occasionally, they are fractured by direct violence. If the nose is blown soon afterward, air is forced upward from the nose under the tissues covering the bone, thus producing a considerable swelling. If this is touched by the examining finger, a crackling sensation is received. This may cause worry, because it feels as though the bones of the forehead were badly shattered, an accident which is very rare.

Below the orbits are the two cheeks, separated by the nose. Beneath the cheeks are the *upper jaws* which meet in the mid line and give attachment to some of the muscles of mastication (chewing) and of expression. Beneath the cheeks and in the interior of the superior maxillae (upper jaw) are two cavities which are connected with the nose and act as sounding boards for the voice. These are sometimes infected, giving rise to fever and neuralgia-like pains on the affected side of the face. In the lower border of this bone are the upper teeth, 16 in number. Fractures of the upper jaw are usually caused by direct violence of great force and are accompanied by great swelling, pain, and inability to chew.

The *nasal bones* form the bridge of the nose. They are two rather thin plates of bone which meet in the mid line somewhat like a roof-tree. They are often broken by a direct blow.

The *lower jaw* is shaped like a horseshoe, from the ends of which rise vertical plates. These are joined to the skull through a movable hinge joint just in front of the ears. In the upper border of the horseshoe-shaped portion are lodged the lower teeth, 16 in number. To the lower jaw are attached the muscles used in chewing. This bone is quite often fractured. These fractures are usually the result of a direct blow and are most often located just below the eyetooth.

Dislocation (getting out of joint) of the lower jaw is not an uncommon accident. It is accompanied by pain in front of the ears and inability to shut the mouth. This latter symptom by itself does not necessarily mean a dislocated jaw.

Man is provided by nature with two sets of *teeth*. The first set are called the *milk teeth*, and are 20 in number. The second teeth are called the *permanent teeth*, of which there are 32. The cutting of the first set ordinarily begins between the sixth and ninth month of life, and at the age of about 2½ years the child should have cut all its milk teeth. The permanent teeth begin to come in about the sixth year, when the milk teeth begin to be shed. This process continues until the 17th to the 25th year, when all the permanent teeth are usually in place. The teeth are designed for the cutting, tearing, and grinding of food. Their function is to prepare food for digestion, in fact, mastication (chewing) is the first step in digestion. Upon the condition of the teeth the health of man depends to a great extent; therefore, the time devoted to the care and attention of the teeth necessary to keep them in good condition is time well spent.

Attached to the backbone on either side through movable joints are the ribs, 24 in number, 12 on either side. These are shaped more or less like an incomplete loop and, with exception of the lower two (floating ribs), are united to the sternum (breastbone) in front by cartilages. These elastic arches of bone are arranged more or less

like a cage inclosing the chest cavity, which contains the heart, its large blood vessels, and the lungs. The ribs are set at varying angles with the spine, and, hence, when they are raised, the front-to-back diameter of the chest is increased. This plays a part in respiration (breathing). There is a groove on the lower border of each rib, in which run nerves and blood vessels. Sometimes these nerves become inflamed, producing great pain. To the ribs are attached numerous muscles. The ribs are not infrequently fractured by direct violence. Such a condition is accompanied by pain on breathing or on pressure at the site of the injury.

The *sternum* (breastbone) is a broad, flat bone and is situated in the mid line of the chest, extending from the root of the neck to the upper part of the abdomen (belly). This bone is not often broken. When it is broken it is usually done by a direct, crushing force.

At the upper part of the chest is attached the *shoulder girdle*, which is the framework whereby the arms are united to the body. This consists of the *clavicle* (collar bone) in front and the *scapula* (shoulder blade) behind.

The *clavicle* is a long bone, somewhat the shape of an old-fashioned letter *f*. It is fastened to the top of the sternum at one end and to the scapula and humerus (arm bone) at



FIG. 3.—Scapula (shoulder blade)

the other. To it are attached numerous muscles which have to do with the movements of the arms and shoulders. This bone is often fractured by indirect violence, such as falls on the point of the shoulder.³ Fractures of this bone are accompanied by pain, particularly on motion of the upper arm on the side of the injury.

The *scapula* is an irregularly shaped bone placed at the back of the shoulder. It is more or less triangular, with the point downward.

³ When a bone is broken by *direct violence*, the force which breaks it acts directly; when it is broken by *indirect violence*, the force travels through another bone to the one which is broken.

Running across its upper portion is a strong plate of bone. Many muscles are attached to it. Fractures of this bone are not common. A joint exists between it and the upper end of the humerus. Dislocation at this point is common.

Running from the shoulder to the elbow is the *humerus*, a long bone having a more or less cylindrical shaft, a globe-shaped knob at the upper end and a somewhat flattened portion at the other. Above it articulates (has a joint) with the scapula, while below it articulates with the ulna (elbow bone). It has numerous muscles attached to it, including those which move the arm, forearm, wrists, hands, and fingers. Fractures of this bone are not at all uncommon and may occur at either end or in the shaft. They will be discussed under the heading "Fractures."

Forming the prominent point of the elbow and extending to the wrist is the *ulna*. It is attached to the humerus by a heavy hook-shaped piece of bone from which it runs as a prism-shaped shaft to end in a rather sharp point. Muscles attached to it move the forearm, wrist, hand, and fingers. Fractures of the upper end of this bone may be due to direct violence, such as a fall on the elbow, or to muscular action; those of the shaft are always due to direct violence.

On the thumb side of the forearm is the *radius*. This bone is cylindrical at its upper end and broadened out and flattened at its lower. These extremities are connected by a shaft which is somewhat triangular on cross section. It may be fractured almost anywhere, either alone or in common with the ulna.

In each wrist there are the eight irregularly shaped *carpal bones*. They are rarely injured. In the hand are five *metacarpal bones*. These make the framework of the hand proper. They are occasionally broken by direct violence.

The fingers consist of 14 bones (2 for the thumb and 3 for each finger), called *phalanges*. These are very frequently fractured or dislocated.

The backbone ends in a large wedge-shaped piece of bone, the *sacrum*, which represents several vertebræ fused together. On the end of this is a small wedge, the *coccyx*. Extending out on either side of the sacrum are two large, heavy, irregular bones, the *innominales* ("nameless," so called by the ancients because they resembled nothing and hence were hard to name). These meet in front in the mid line at the pubis, thus forming a sort of a cylinder which flares at the top and is smaller at the bottom. This extensive framework, the *pelvis*, serves for the attachment of numerous muscles which move the trunk, the thighs, and the legs. It supports the contents of the abdominal cavity; through it pass numerous important blood vessels and nerves to the lower extremities; and it contains the

bladder, the rectum, and the female generative organs. Occasionally, these bones are fractured, but always by a great, usually a crushing, force.

On the outer surface of each innominate bone is a cup-shaped cavity into which fits the globe-shaped head of the *femur* (thigh bone), the longest bone in the body. Its shaft is somewhat cylindrical, with a roughened heavy upper end to which are attached numerous strong muscles. Running inward at an angle of about 125° from the upper end is a strong shaft of bone which ends in a spherical head which articulates with the innominate bone, its shape being such as to permit great freedom and latitude of motion. The lower end is expanded into a broad, smooth, rounded surface which is divided by a notch for articulation with the tibia at the knee joint. Fracture of the femur is a very common injury; either end or the shaft may be broken. Dislocation of the hip joint is also not uncommon.

Below the knee and running to the ankle is the *tibia* (shin). This bone has a more or less prism-shaped shaft which ends above in a broad expanded portion for articulation with the femur at the knee joint; while below, it again expands to enter into the formation of the ankle joint and forms a rounded projection on the inner side of the ankle. This bone may be fractured at either end or in the shaft by direct or indirect force or by twisting.

On the outer side of the leg from just below the knee to the outer side of the ankle, there is a long slender bone, the *fibula*, or calf bone. This bone is more commonly fractured alone than is the tibia. Fracture of both bones is a very common injury.

In front of the knee and situated in the tendon (leader) of the muscle with which man kicks is the *patella*, or knee cap, a more or less rounded triangular bone. It strengthens the tendon and protects the knee joint. While this bone is subjected to many injuries, these are not frequently serious. The bone may be fractured, however, and, infrequently, it may be dislocated.

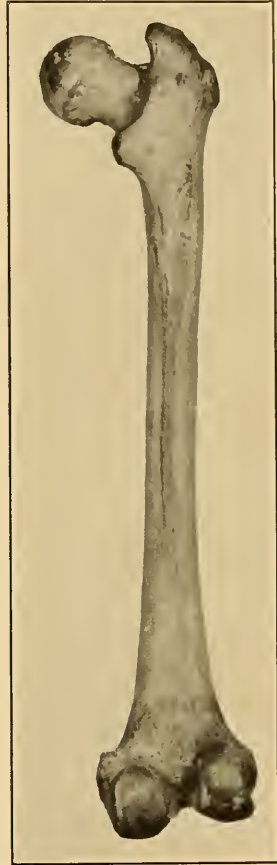


FIG. 4.—The femur (thigh bone)

The tibia and the fibula meet at their lower ends and inclose between them the *talus*, or ankle bone, below and behind which lies the *calcaneus*, or heel bone. The remaining *tarsal bones* lie in front of it. These are firmly bound together by very tough, fibrous bands. In front of them are the *metatarsal bones*, or foot bones proper. Still further forward are the *phalanges*, or bones of the toes. The foot is an elaborate and very strongly built mechanism consisting of a series of elastic arches which serve to spread the force of blows and falls. The heel and the ankle bone are the most often fractured, generally by direct crushing force.

The *functions of bones* are to support the body, to give attachment and leverage to the muscles, and to protect some of the more delicate organs, such as the brain, heart, and lungs.

The bones which form the skeleton are joined to one another by *articulations*, or joints. Some of these, as in the skull, may be immovable; others are only slightly movable, as those between the vertebrae, while some are freely movable, such as the shoulder and the hip joints. In the freely movable joints the bones are further separated than in the less movable and, hence, are more liable to dislocation. The intervening space is taken up by cartilage, which acts as a shock absorber. The cartilage is covered with a glistening white membrane which produces a slippery fluid, and this fluid acts as a lubricant. Thrown about the whole joint is a capsule, or inclosing membrane, of very tough material, the fibers of which run in different directions so as to increase its strength. This capsule, with the aid of the muscle, assists in keeping the ends of the bones together, and, in case of dislocation, it is not infrequently torn. The lining membrane of joints does not have a high degree of resistance to the microbes which cause disease; hence it may easily become infected, with the result that the joint is greatly damaged. The individual joints will be further described in connection with dislocations.

THE MUSCLES

Muscles are contractile, elastic tissue, made up of bundles of fibers bound together by elastic membranes. They compose about half the body weight and are of three kinds. Muscles which are under the control of the will, like the muscles of the arms, consist of long spindle-shaped fibers which are striped crosswise; in the intestine, the muscles are not under voluntary control, and these have no stripes; in the heart the muscle stripes are rather imperfect, and this muscle is also involuntary. Muscles are connected with bones, cartilage (gristle), ligaments (leaders), and the skin. Their function is to perform work, and they are able to do this by contracting and relaxing, using the bones as a lever, or by a squeezing action as in

the heart or the intestine. Muscles respond to nervous force, which may be likened to an electric current. This "current" is brought to them by a nerve, which may be likened to an electric wire. It is believed by some that nervous force actually is an electric current. When it reaches a muscle it causes it to shorten and broaden and to pull upon its two ends.

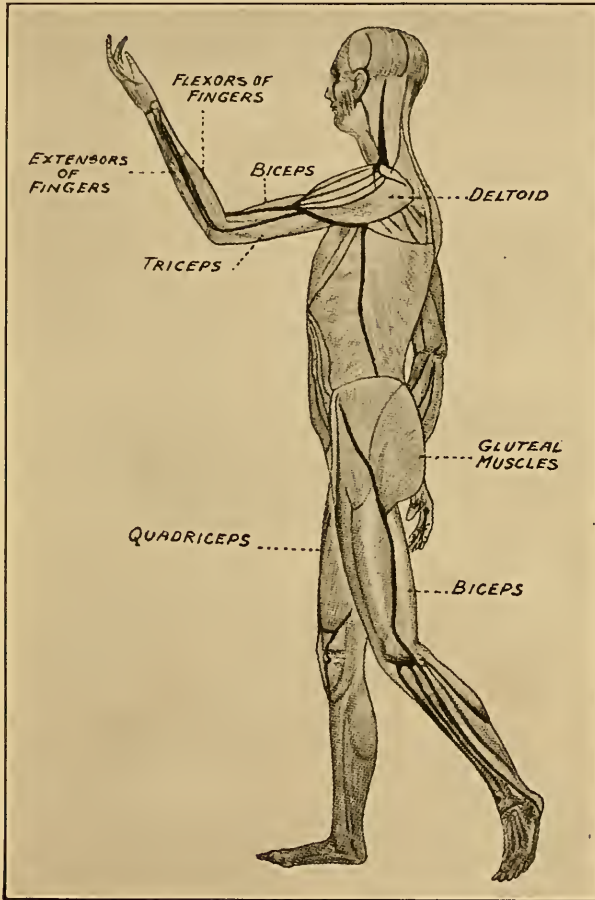


FIG. 5.—External muscles of the body

Muscles generally arise from some fixed point or attachment to a bone. This point is called the *origin*. The point where the muscle applies its force is called the *insertion*. Frequently muscles end in a small, strong, inelastic band, a *tendon*, or leader. Tendons sometimes run through a bearing, or sleeve, of dense, strong tissue which is lined with the same material that lines the joints and here also produces a lubricator. Muscles are always more or less taut; hence,

in case of fractures of the long bones, they may pull the fragments out of alignment.

Muscles are liable to a great variety of injuries. They may be subjected to strains by pulling on their long axis so that some of their small fibers are torn. The muscle then becomes swollen, tender, stiff, weak, and sore, and its use produces sharp pain. Muscles may be bruised, crushed, or wounded with or without breaking the skin. They may rupture from the force of their own action. The mem-

branes lining the sheaths in which the tendons run may become inflamed and more or less stiffness and limitation of motion result.

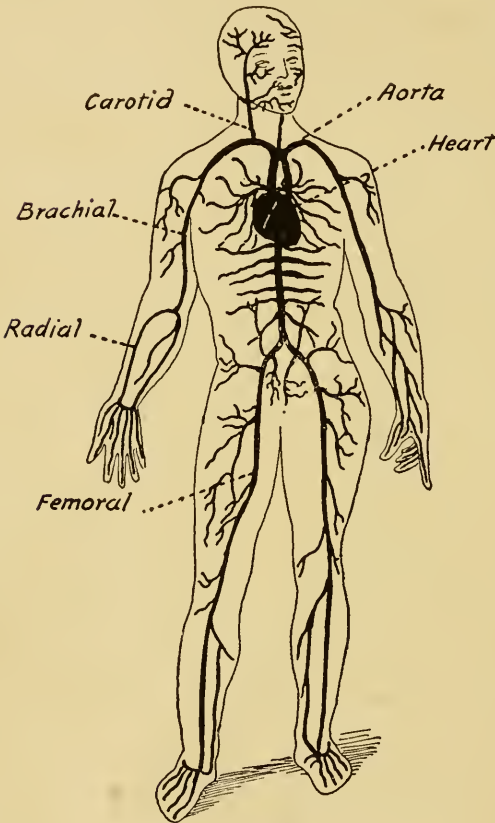


FIG. 6.—Arterial system

THE BLOOD VESSELS

The *circulatory system* consists of the *heart*, or pump, the *arteries*, which carry blood from it, and the *veins*, which bring blood to it. Its function is to send to the tissues foodstuffs which have been prepared for their nourishment by digestion and to remove waste products which are to be thrown off by the lungs, the skin, the bowels, and the kidneys.

The *heart* is a hollow, muscular, cone-shaped organ, situated in the chest between the two lungs, beneath and mostly to the left of the breast bone. It

is divided into a right and left half, each half consisting of two chambers. The heart, therefore, has four chambers, the two upper being called the *auricles* (ears), and the two lower the *ventricles* (bellies). Its openings are guarded by valves, so that when the heart muscle relaxes (slacks off) after contraction (squeezing down), the blood can not reverse its direction. The right half contains the blood which is coming to the heart through the veins—*venous*, or *impure*, *blood*; the left half contains blood which has been returned from the lungs,

where it has undergone purification, and is going out to the various parts of the body—*arterial, or purified, blood*. The heart undergoes a series of rhythmic contractions and relaxations, producing the heartbeat. When it contracts, blood is sent out to the lungs and the body; when it relaxes, blood flows into it from the lungs and the body.

If the ear is applied to the chest over the heart, the *heart sounds* may be heard. The normal heart sounds resemble the sound “lub-dup,” pause, “lub-dup.” These may be greatly changed by disturbance or injury to the heart’s mechanism or change in the character of the blood itself. These changed sounds are usually called *mur-murs*, which may be blowing, harsh, loud, or soft.

The *arteries* consist of hollow, elastic, muscular tubes beginning at the heart as the *aorta*, or large trunk, which gives off branches which divide and subdivide until they can not be seen with the naked eye and reach every portion of the body. When the heart contracts it forces the purified blood into the arteries, causing them to expand. Their muscular fibers then contract, assisting the heart in forcing the blood forward. This alternate expansion and contraction of the arteries produces the *pulse* which may readily be felt if the finger is placed over a point where the artery is near the surface. Usually, the pulse is taken at the wrist. This is for convenience only; the pulse might just as well be taken in the neck or in any other place where an artery may be easily felt.



FIG. 7.—Method of taking the pulse

There are several *reasons for taking the pulse*. It enables one to determine the rate at which the heart is beating. In the sitting adult this is about 70 per minute. It beats faster when a person is standing, and its rate is also increased by muscle work, fever, eating, a warm bath, or a hot drink. A given person’s pulse may be described as slow or fast, quick (if the pulse wave strikes the finger quickly and then promptly recedes), and soft or hard. The degree of the latter gives some indication of the *blood pressure*. A pulse may also be described as large or small, strong, weak, or thrady. The pulse may be bounding or very sluggish. It also indicates the state of the heart’s rhythm; thus the pulse may be regular or irregular and it may intermit—that is, drop a beat from time to time.

The *veins* have thinner walls than the arteries and are provided with valves. They carry venous (impure) blood from the tissues to the heart. They usually accompany the arteries, but have no pulse. Associated with them is the *lymphatic system*, which consists of a network of tubes guarded by a series of filters called glands. The lymphatics from the small intestine contain a milky fluid formed from digested food. They are called lacteals. In the rest of the body they contain lymph, a liquid which is practically the same as the fluid portion of the blood.

The lymph bathes the cells of which the various organs and tissues are made, brings them food, and removes their waste products.

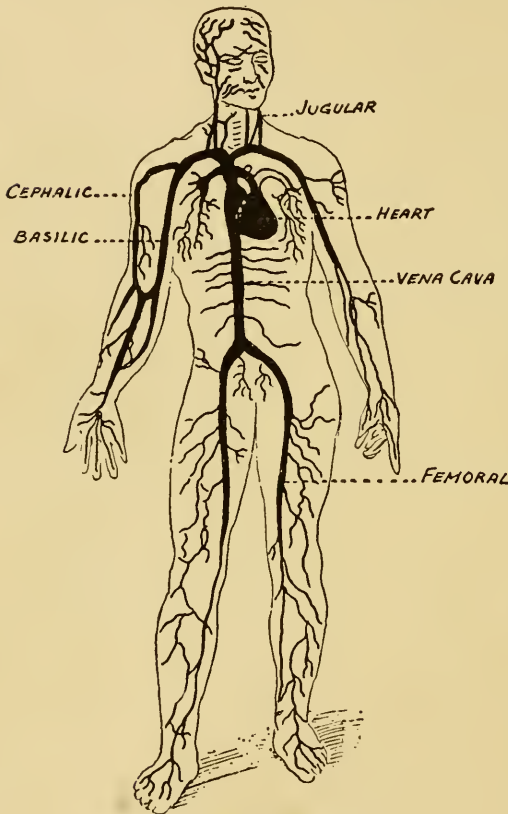


FIG. 8.—The venous system

THE BLOOD

Flowing through the veins and the arteries is a red fluid, the blood. This is from 52 to 60 per cent water containing various dissolved salts and 48 to 40 per cent solids. The latter consists of *red corpuscles* (little bodies or cells), *white corpuscles*, and *platelets* (little plates). These cells can be seen only with the aid of a microscope. The red cells are disk shaped and contain a chemical (hemoglobin) by means of which oxygen is carried from

the lungs to the cells of the body and there exchanged for carbon dioxide which eventually will be thrown off by the lungs. The white corpuscles have an irregular shape and are the policemen of the body. Whenever the germs of disease enter it, the white corpuscles attack them fiercely and try to destroy them, many of these cells being killed in the battle. Pus (matter) consists of their dead bodies.

Blood coagulates, or clots, on exposure to air in order to prevent the further loss of blood through a tear or cut into a blood vessel. This is a complicated process into which the blood platelets enter and consists in the formation of a sticky, jelly-like substance which

soon becomes dry and hard and plugs the opening into the blood vessel. Clotting is hastened by contact with a rough surface. This is why sterile gauze or bandage material is applied to wounds to stop hemorrhage (bleeding).

When hemorrhage takes place from an artery (arterial blood), the blood escapes in spurts and is of a bright red color. When it is from a vein (venous blood), it flows steadily or oozes and is darker in color. To control hemorrhage, it is easy to understand that, since arterial blood comes directly from the heart, the artery should be compressed (squeezed) between the site of bleeding and the heart, and that to stop bleeding from a vein, just the opposite should be done, because the blood is going to the heart.

THE RESPIRATORY SYSTEM

In order that blood shall give up its harmful gases and receive healthful oxygen in return, it must be exposed to air. For this purpose, the heart pumps venous blood to the *lungs*. These are two in number and are located in the chest on either side of the heart. They are of a very light, porous, spongy, elastic structure, being practically nothing but a series of very fine, branching air tubes surrounding equally fine blood vessels. In this way the blood is spread out in a very thin sheet and is separated from the air by an exceedingly thin membrane through which the gases, oxygen, and carbon dioxide, can pass. Air usually enters the body through the nose, but in moments of great exertion it may enter through the mouth. It is warmed in the nose and passes to the *trachea*, a tube of cartilage and membrane in the neck. This branches into the right and the left *bronchus* (plural, *bronchi*), one for each lung. These divide and subdivide until they are very minute and covered only by the thinnest membrane. The *hemoglobin* (red coloring matter) of the blood brings to the lungs carbon dioxide, which is the product of combustion in the tissues. This corresponds to the funnel gases of an engine. Just as an engine requires air to keep its fires going, so does the body to keep itself going. When the hemoglobin brings the carbon dioxide back to the lungs, it exchanges it for the oxygen of the air which it carries back to the tissues.

The lungs are not frequently injured, but they are susceptible to several diseases, especially to tuberculosis (consumption), pneumonia (inflammation of the lungs, lung fever) and bronchitis⁴ (inflammation of the bronchi). They are inclosed in a sack of smooth, glistening membrane, the *pleura*, which serves to protect these delicate organs and to help their movement inside the bony cage of the chest.

⁴ *itis* on the ends of a word means "inflammation of."

This membrane is sometimes inflamed, producing *pleurisy*, in which condition there are fever and pain in the side, particularly on breathing.

Respiration (breathing) is performed by increasing the capacity of the chest. This is done in two ways: Stretched across the chest near the bottom of the ribs is a dome-shaped muscle, the diaphragm. When this contracts, it pulls down and hence increases the up-and-down diameter of the chest. It has already been shown how the ribs may be pulled up, thus increasing the front-to-back diameter of the chest. In this way a vacuum is created and the air rushes in. This is *inspiration*. When the diaphragm and the muscles which raise the ribs relax, the diaphragm rises and the ribs fall. This is *expiration*. This process continues rhythmically at the rate of about 16 per minute in a sitting person. The rate is less when reclining or sleeping and greater when standing or exercising. If the oxygen-carrying power of the blood is decreased, it is more rapid. The ratio of respiration to heartbeat is about 1 to 4 or 5. Hence the respiratory rate bears a definite relation to the pulse rate. Difficult breathing is called *dyspnea*.⁵

THE ABDOMINAL CAVITY

The abdomen (belly) is situated below the diaphragm and above the pelvis. In front it is protected by strong muscles which consist of several layers with fibers running in different directions to add strength. Its weakest point is in the groin, and it is at this point that *hernia* (rupture) most frequently occurs. Sometimes there is a hernia at the umbilicus (navel, belly button); in fact, a hernia may occur at any point where the abdominal wall is weakened. Since there is at times considerable pressure within the abdomen, any weak point in its wall is likely to become enlarged and part of the abdominal contents forced through the opening so made. Sometimes this is a loop of intestine (gut), and should this get caught (strangulated), great harm or even death may follow. Any hernia is likely to give trouble; and since it is a health hazard it should be repaired by a competent surgeon.

The abdomen is lined by an extensive closed sack of membrane, the *peritoneum*. This enfolds all of the abdominal contents and secretes a slippery fluid which acts as a lubricant. This membrane may become inflamed, in which case *peritonitis*, a very serious condition, occurs.

Hanging in front of the abdominal contents is an apron of fibrous tissue containing a layer of fat, which varies with the fatness or

⁵ *Dys* on the front of a word means "bad" or "difficult."

leanness of the individual. This is called the *omentum* (suet) and acts as a reservoir for fats and as a protecting pad against injury.

In this general region is located the stomach and intestines, the liver, the spleen, the pancreas, the kidneys, with their ureters (tubes) leading to the urinary bladder, and, in the female, the generative organs.

The *stomach* is located in the upper left quadrant of this area, partly protected by the ribs and close to the diaphragm. This organ is a somewhat funnel-shaped dilated part of the digestive tube, lying between the *esophagus* (gullet) above and the small intestine (gut) below. The esophagus, which is a tube for carrying food and drink which has been swallowed, pierces the diaphragm and enters the stomach at its upper end. Below, the stomach empties into the first part of the small intestine (bowel), the *duodenum*. The stomach is provided with an extensive set of muscle fibers, which run in various directions and assist in the movements of the organ during the process of digestion. Its interior is thrown into roughened folds to assist in thoroughly mixing food with the digestive juices which it produces.

The *small intestine* is a membranous tube well provided with muscles which serve to move its contents through it. It is about 23 feet in length and gradually diminishes in size from its commencement to the point where it empties into the large intestine. In its first part the food which has been discharged into it from the stomach is mixed with the secretions of the liver (bile) and the pancreas. Its interior is greatly roughened to assist in the process of digestion and the absorption of food products which have been prepared by the action of the digestive juices.

The *large intestine* begins in the right flank, runs upward, crosses the abdomen in its upper part, descends along the left flank, empties into the rectum, which ends at the anus. The arch so formed surrounds the small intestine. It is about 5 feet long. Where it begins, it is pouch shaped and has the appendix, which may become inflamed—*appendicitis*. The large intestine has muscular coats, one of which is in the form of a band which may be seen running along the long diameter of the gut from the appendix.

The entire digestive tube is held in place by folds of peritoneum which are thrown about it. Throughout, it is richly supplied with arteries, which bring nourishment to its cells, and with veins and lacteals which carry away digested products. Some of these are carried to the liver, there to be further changed and stored, but others are carried by the lacteals into the blood stream and distributed to the tissues. Nerves reach the muscles of this tube and stimulate them to action.

The functions of the stomach and intestines are digestion and absorption of foodstuffs and the elimination of waste products. It is remarkably tolerant of the abuses to which man subjects it, but once in a while it retaliates with an attack of constipation, diarrhea, and indigestion. With reasonably intelligent care, it will function throughout life without trouble; but overeating, overdrinking, the selection of a diet which is not well balanced, and the neglect of the bowel functions are bound to disarrange it and cause many of the ailments from which man suffers.

The *liver*, the largest gland of the body, weighing about 4 pounds, is located in the right upper quadrant of the abdomen under the ribs and the diaphragm. It is richly supplied with blood vessels and serves as a storehouse for the digested sugars and starches, the digestion of which it completes. It also secretes bile, which it discharges into the upper part of the small intestine as need arises.

Below the stomach and extending on either side of the middle line, is the *pancreas*, a fish-shaped organ that produces a fluid which assists in digestion. This it empties into the small intestine through an opening through which also passes the bile.

Digestion begins at the mouth with the mastication (chewing) of food. This has a twofold purpose. The first is to reduce the food to small particles so that it may be easily swallowed, may be rendered more soluble, and may more easily come into contact with the digestive juices. Second, the *parotid gland* situated on the outer side of the lower jaw just in front of the ear produces *saliva* (spit), which contains a digestive substance, *ptyalin*, which assists in digesting starches. In mastication this is mixed with the food. If, however, food is bolted without proper chewing a harder task is placed upon the remainder of the digestive tract.

One of the great causes of ill health is the inadequate chewing of food. Good health depends upon the teeth to a considerable extent. The person who neglects his teeth is laying up trouble, pain, and perhaps premature death for himself. He is handicapping his usefulness and interfering with his happiness.

The food which has been ground up by the teeth and made slippery by the saliva is next rolled into a ball by the tongue, pushed backward and swallowed. It enters the esophagus, descends it, and is discharged into the stomach. The stomach secretes (makes) hydrochloric (muriatic) acid and *pepsin*. This latter is called a ferment, because it produces changes in other substances without itself undergoing change. The stomach, by its muscular movements, churns up the food to a certain extent and mixes it with the hydrochloric acid, pepsin, and *rennin*, another ferment, which curdles milk so

that it may be digested by the pepsin. In the stomach, *proteids*—the animal foods—meat, milk, eggs, etc., are digested.

At the lower end of the stomach there is a valve, the *pylorus*. From time to time this valve opens and allows some of the contents of the stomach to pass into the small intestine. Here the partially digested food is mixed with bile and the secretion from the pancreas. *Bile* has a variety of functions, the greatest of which is the aid which it gives in the digestion and absorption of fats. *Fats* are digested by turning them into soaps, with the formation of glycerine as a by-product. This can be done only in the presence of an alkali. The food which has come from the stomach is acid. Bile assists in rendering it alkaline. If the tube which discharges the bile into the small intestine becomes closed, the bile, which contains several pigments, is picked up by the blood stream and deposited in the skin, making it turn yellow, *jaundice*. At the same time the stools, because of the lack of *bile pigment* in them, will become clay-colored.

The secretion of the pancreas contains ferments which act on a great variety of foods and is considered the most important of the digestive fluids. Its *trypsin* acts on the proteids, its *steapsin* on the fats, much as does bile, its *amyllopsin* on the starches, and its *maltase* on the sugars.

The intestines also secrete ferments. These serve to complete the digestive processes. From the intestines, digested food is absorbed. The indigestible portion is more or less dried by the absorption of the water from it, and what remains is discharged from the body as *feces* (dung). A certain amount of indigestible material is a necessary part of the diet. This is called *roughage* and acts as a mechanical stimulant to intestinal action.

Below the stomach and to the left is the *spleen*. This has a rich blood supply and has to do with the destruction of red-blood corpuscles which have outlived their usefulness.

The *kidneys* are located in the back part of the abdomen on either side of the backbone, lying in a pad of fat and supporting tissues. They are complicated glands and are designed to remove from the blood stream waste products which are dissolved in it. They are somewhat bean-shaped with a notch on one side. At this notch is a funnel-shaped sack of membrane out of which runs a small tube, the *ureter*. This tube carries the urine to the bladder, from which it is discharged by another tube the *urethra*. When a person has something wrong with his kidneys, he is sick because of the failure of his body to get rid of the waste products which should be carried off in the urine. These poison him. Infections of the urethra, such as gonorrhoea (clap), are likely to travel up into the bladder and by

the ureters to the kidney, which may thus be badly damaged. In such a process, the *prostate*, a gland which surrounds the neck of the bladder, is usually also infected. This may produce much trouble, particularly in middle-aged men.

THE SKIN

The entire body is covered with *skin*, and its openings with a modified skin, called *mucous membrane*. It acts as a protector against injury of the more delicate structures beneath it and, to assist in this, lodges the special cells of touch, temperature sense and pain. It assists the body in the regulation of its temperature and secretes sweat and an oily material which helps to keep the skin in good condition. Sweating assists in the discharge of waste products brought to the skin by the blood and, by evaporation, lowers the temperature of the body. This aids greatly in maintaining the sense of well-being and explains why frequent baths are so necessary to health and efficiency. This is especially true aboard ship where a dirty man is so objectionable to his fellows. People who are dirty are more susceptible to disease and, hence, may menace the health of others. The hair and nails are a part of the skin. The former should always be kept very clean because it may harbor parasites, such as lice.

THE NERVOUS SYSTEM

The *nervous system* is the apparatus which controls and operates the entire body. It is like the electrical equipment of a gas engine; if it is out of order, the machine works badly or not at all. It consists of the *brain*, the *spinal cord*, and the *nerves*. The latter are of two varieties—the *motor*, which go from the brain, and the *sensory*, which go to the brain. The spinal cord is a cable made up of fibers carrying messages to and from the brain. It also has the ability to intercept a message from a sensory nerve and to relay it to a motor nerve. This is called a *reflex action*. If, for example, the end of a lighted cigar is accidentally touched with the finger tip the hand is jerked away before the sensation of heat has reached the brain. This is a very valuable protective quality and is capable of high development. To be really efficient in any kind of work or sport, the reflexes must be in good order. Much of the discipline of the sea has in view the upbuilding of a proper set of reflexes.

Through the *senses* the brain is kept informed as to what is going on about the body. These consist of *sight*, *hearing*, *touch*, *taste*, *smell*, *pain*, *heat*, and *equilibration* (*balance*). The safeguarding of these is one of the most important duties in life, since these senses are really prolongations of the brain into special organs designed to

keep it in touch with the outside world. Hearing and equilibration, the sense by which we maintain our balance, are associated in the same organ, the ear, a complicated mechanism designed to receive sound waves and transmit the sensations produced by them to the brain. In the ear, there is a balancing apparatus which is connected with the brain in such a manner that if the body gets off center, nervous impulses are automatically sent out to the muscles so that the body will right itself. Touch is associated with the temperature sense and the pain sense. Sight is performed through a complicated camera-like organ which receives waves of light and focuses them upon the retina, a highly sensitive membrane in the interior of the eye. Taste is accomplished by means of sense organs located in the tongue. It is intimately associated with the sense of smell, the organs of which are located in the nose. Nature has a wonderful way of making up for the loss of some of the senses. Thus, the blind hear and feel more keenly and the deaf learn to see more acutely.

The *brain* may be likened to a telephone exchange which receives and sends out messages. It is also an *automatic regulator* for the heart, for respiration, heat control, vomiting, and several other things. For the most part the central stations for these are located in a small area in the upper expanded portion of the spinal cord. Grouped thus, coordination between them is easy and constant; and when some external cause interferes with the operation of one, the remainder respond in an attempt to overcome the untoward condition. To illustrate: Heat is made in the tissues by the union of the oxygen of the air with them, much as happens when coal or some other substance is burned. In this way heat is constantly being made; and unless there was some way of getting rid of it, the body would become greatly overheated. Part of it is carried off in the air exhaled from the lungs, and by the urine, the feces, and in warming the air surrounding the body. The chief way in which heat is lost, however, is by the evaporation of sweat. If, now, something occurs which stops the sweating, the heat regulator in the brain must provide for heat losses in other ways. Until this has been done, the temperature of the body is above normal—there is fever. To get rid of heat in other ways, breathing must be made more rapid, and this requires that the heart speed up, increasing the pulse rate, and the reaction may be so great that vomiting occurs. This is just what happens in sunstroke. These functions are all more or less mechanical. The brain's highest work is to think, to create ideas, and to *reason*. It is this last faculty, the ability to think from the known to the unknown, which distinguishes man from the beast. Just as he strives to upbuild and control his reflexes, so does he try to improve his mental processes, to reason more and more, and consequently to

advance. Thought is what moves the world and man with it. It can readily be imagined how delicate is the adjustment of the entire nervous apparatus; yet, if it is well treated, it is remarkably sturdy. Its greatest enemies are syphilis and alcohol, which seem to have a special affinity for it. If syphilis could be wiped off the face of the earth, most of the insane asylums could be closed. Some people think that they are immune to the effects of alcohol, but no one is. If its immoderate use is continued, it may not directly do the body great harm, but it will surely wreck the nervous system and through it the body also. The hygiene of the nervous system and the mind will be considered in the chapter which follows.

CHAPTER II

HYGIENE AND SANITATION ON SHIPBOARD

As has been stated in the foregoing chapter, *sanitation* has to do with the place, and *hygiene* with the body. *Public hygiene* partakes of the nature of sanitation in that it has to do with the health protection of groups or collections of people. These things are done for the group by persons selected for this purpose. *Personal hygiene* concerns itself with those things which the individual must do for himself to preserve his health. *Public health* aims at sanitation, public hygiene, and the teaching of the truths of the whole science of hygiene so that the individual will acquire health habits as a matter of conviction. There is nothing mysterious about this science, and its application is largely common sense plus knowledge. It must be admitted that there are still many unexplored corners in this vast realm, but great strides have been made in the conquest of disease and in the promotion of health, while all over the world scientists are studiously trying to discover new facts which may lead to fresh victories. All the other sciences are being drawn upon for assistance; even the diseases of the lower animals are being studied in order that the knowledge so gained may be applied to the preservation of human life.

When "colds" and similar common ailments are taken into consideration, it is probably not too much to say that at least half the people in the United States are never at any one time wholly well. They may be able to continue their occupations, but always with a handicap. This is bound to lower national production and, hence, national wealth. This means an enormous loss in which every person living in the nation must share. If this is only 5 cents per day per person, this means \$18.25 annual loss for each inhabitant, or more than \$2,000,000,000 per year. As a matter of fact, sickness costs alone far exceed this amount, without taking into count the losses which are caused by being "half-sick." Therefore, sickness and being below the mark of good health cause a tremendous expense. And what is worse, it is, to a large extent, an unnecessary expense and one which brings no good returns. It is almost wholly a preventable waste, if the people will learn how to prevent disease. Health is an asset, disease is a liability; health saves money, disease wastes money; health makes men useful, disease lowers their usefulness; health brings happiness, disease brings sadness.

Ship sanitation is one of the oldest branches of public health, a book on the subject having been written by Elda the Wise early in

the eleventh century. It was recognized even before that early date that ship cleanliness is essential to health, Homer mentioning it. Fortunately, this idea still prevails; and the first thing an ordinary seaman learns is that he must keep himself and his ship clean:

Dirty ships and dirty men
Bring disaster now and then.

After all, a ship is nothing more than a floating house, and the same sanitary rules apply to both.

This means *mechanical cleanliness*, adequate provision for the disposal of the *waste products* of the ship and her company, and adequate apparatus and opportunity for frequent baths. It demands that *water* for drinking and cooking be from a supply of *known* purity. This is both a moral and a legal duty, and is required by the Federal act approved June 4, 1914. It is not enough that it shall be clear and sparkling. Definite knowledge must be had that the water is wholly safe before it is put into the vessel's tanks. To secure this the health officer of the port should be consulted. In American ports, water should not be purchased from any water boat which does not hold an unrevoked certificate from the United States Public Health Service. Fire hose should not be used to fill tanks. For this purpose it is best to have a special hose which is used for no other purpose.

Sanitation also means sound, wholesome *food* which shall not be spoiled and which shall be sufficiently cooked to kill parasites and disease germs which may be in it.

It also means adequate *ventilation* of forecastles,¹ cabins, galleys, and fire rooms, and complete protection of the passengers and crew against vermin.

One of the great menaces to health aboard ship is *vermin*. Of these, the most prevalent is the *cockroach*, a filthy insect which can be gotten rid of by *frequent fumigations* and *scrupulous cleanliness*. There are on the market various roach sprays, pastes, and powders, but, as a rule, these afford only temporary relief, since they usually kill only the adults and leave the eggs, which are hidden in cracks and other places difficult to get at, to hatch crop after crop. They like to hang around the "heads," and if these are not kept absolutely clean they may eat the discharges of sick men, get into food, and thus carry disease to other persons.

While it has not been proved that *ants* spread disease, they may be a disgusting nuisance aboard ship. The best way to rid a ship of them is thorough fumigation. To keep the vessel clean of them there are several good ant poisons on the market. The efficacy of these depends upon the carriage of the poison to the ant nest, where the entire colony is destroyed. The basis of these poisons is arsenic and

¹ See Appendix, p. 196.

honey. It is put out in small baking-powder tins, the top of which is slightly bent in at one place and the lid applied. The can is tacked in a convenient place and should be recharged (about one-fifth full) at regular intervals.

Lice are of three varieties—the head louse, the body louse, and the pubic louse (crabs)—and when they are on board ship they mean only one thing—dirty men. The infested individual, his clothes, and his surroundings should be deloused, because lice may carry disease from one person to another. The head louse is destroyed by washing the hair with a mixture of equal parts of kerosene and vinegar, care being taken that it does not run down over the face or neck.

Bedbugs mean dirty sleeping quarters. They spread disease. To get rid of them, boiling water or kerosene in cracks, especially around bunks, thorough cleansing, and repainting help a good deal. The bedding should be steam sterilized or boiled, and at the first opportunity the living quarters should be thoroughly fumigated.

In port, *flies* may be a nuisance and a danger, since they have a fondness for manure. They must therefore be kept away from food, and the ship should get rid of them as soon as possible.

Mosquitoes are another menace to comfort and health. In the old sailing ships it was not uncommon for a vessel to breed her own mosquitoes in her tanks. This seldom happens on modern ships; the great danger now is from shore mosquitoes. Mosquitoes are the spreaders of malaria, yellow fever, and dengue (break-bone fever). They do this when they bite, by squirting the tiny animals (parasites) which cause these fevers beneath the skin of the person being bitten. Every endeavor should be made to keep the ship free from them; and when they are on the ship, it is wise to sleep in a screened compartment or under a bed net.

Fleas are a grave danger on board ship because they usually come from rats which suffer from bubonic plague (the black death). Fleas carry the germ of this disease from rats to men.

If there are no *rats* on a ship, she is relatively safe from plague. Rat-proof ships can be built; but if the ship is not so constructed, she should be freed from rats by frequent, complete, routine fumigations. Between these fumigations, rats should be kept off the vessel by breasting off in port, putting rat guards on all mooring lines, and raising the gangplank at night. Should they come aboard, they should be destroyed by poisoning or trapping. A good ship's cat is a great aid in this. Before sailing, the entire ship should be carefully inspected to make sure that she is in a sanitary condition, particular attention being given to cleanliness of quarters, galleys, mess halls, and heads, the presence of vermin being noted and corrected.

Drinking-Water Distributing System

The drinking-water system on a vessel should be independent of all other water systems aboard. Check valves, blind flanges, and all other types of fittings for separating the drinking-water system from other systems aboard should not be tolerated. A physical break in all such connections should be effected by removing a short section of pipe and closing the two ends of the break. There should, moreover, be no by-passes around water treatment apparatus; if any exist, they should be removed or "broken." Preferably the drinking-water system—seacocks, pumps, storage tanks, and piping—should be separate and independent.

These precautions are usually insufficient to insure safe drinking water, and should be supplemented by measures which will kill any disease-producing germs which the water may contain.

Tanks one or more walls of which are formed by the hull should not be used, on account of the danger of leakage into them by the opening of a seam. Water tanks should be thoroughly cleansed and flushed at the beginning of the season and at least every two weeks that the vessel is in service. After mechanical cleansing they should be filled and 1 pound of hypochlorite of lime added for each 5,000 gallons of water. After standing 24 hours, this water should be discharged and the tank filled with water of known safety and then securely locked and sealed.

When fitting out, and monthly afterwards, the piping system for distributing drinking water on a vessel should be sterilized by a solution of hypochlorite of lime. This can be done when the storage tanks are sterilized. Allow the hypochlorite-of-lime solution to fill the pipes for an hour, then open all faucets and other vents and draw off the solution. Flush the pipes with clean, safe water until the chlorine taste has disappeared. Sterilization of tanks and distributing systems by live steam is usually not so satisfactory as the hypochlorite-of-lime method.

In the galley of a vessel only drinking and culinary water should be available. If large quantities of water for scrubbing floors and washing are needed, and the supply of drinking and culinary water is limited, it may be advisable to have a tap from the sanitary system conveniently available; but this tap should not be over 18 inches from the floor, should be painted red, and should be posted with a sign warning against the use of this water for drinking or cooking.

Ice used to cool drinking water should not come in contact with the water. Coolers should have separate ice and water compartments. A satisfactory way to chill drinking water is to pass it through a coil in the ice chest. Lead pipe should not be used for such coils, because the lead might dissolve in the water and cause poisoning. Common drinking cups should not be supplied on vessels.

Disinfection and Sterilization of Drinking Water

(a) *Chlorination*.—Hypochlorite of lime, commonly known as chloride of lime, or bleaching powder, is a very effective agent for sterilizing drinking water. In excessive amounts it may impart a chemical taste to the water, but the quantity necessary for disinfection should not have such an effect. This chemical deteriorates quickly when exposed to the atmosphere and should therefore be purchased in air-tight cans of pound or half-pound size. To be effective for use, the powder should be dry; if it is damp, it has probably lost most of its sterilizing power. Chloride of lime may also be purchased in tablets or in glass ampules, under various trade names. Ordinarily, one-fourth teaspoonful (approximately 1 gram) of the powder to 50 gallons of water will make the water safe to drink without affecting its taste. In small quantities it may be put into the water directly and dissolved by vigorous stirring. In about half an hour the water should be safe to drink.

If used in considerable quantities, the chemical should be made into a paste by covering it with water and mixing. The paste should then be poured into a pail of water, which should be stirred vigorously. Allow the mixture to settle, draw off the solution, and pour this into the water to be sterilized. A white ash will be left in the bottom of the pail. Add more water to this, stir vigorously as before, and draw off the solution into the water. Repeat a second time, and then throw away the ash. Chloride of lime is difficult to keep and not pleasant to make into solution. There have recently been put on the market under various trade names, saturated solutions of sodium hypochlorite which keep very well and are easy to use for disinfecting drinking water. The use of these solutions does away with the troublesome mixing of chloride-of-lime solutions. In purchasing these solutions, it should be made sure that competent authorities indorse them for the purpose for which they are to be used.

If for any reason chloride of lime is not available, drinking water may be disinfected by adding 1 tablespoonful of tincture of iodine to 1 barrel of water (about 55 or 60 gallons) stirring and allowing to stand for half an hour before using. The chloride-of-lime method is better.

(b) *Distillation*.—Distilled water, which is water in the purest form obtainable, is, of course, safe for drinking purposes. It may have a flat taste unless well mixed with air. Distilled water is expensive to produce in quantities. Distillers should not be forced beyond their rated capacity. Coils should be cleansed frequently. It is well to test the distilled water occasionally to see that the apparatus is working properly. To do this, collect about a half glass of water directly from the distiller (before filtering, if charcoal filter is used), and, if sea water is being distilled, drop a small crystal of

silver nitrate into the water collected. A white, cloudy color or turbidity will develop if the distiller is out of order. In this case, overhaul the distiller and examine it to see if there is a leak between the evaporating and condensing compartments. Wash glass thoroughly after making this test, because silver nitrate is a poison.

(c) *Filtration.*—Water filters of various types are offered for sale. These are usually efficient for removing suspended matter from water, but can not be relied upon to rid the water of germs. Ozone or chlorine treatment and filtration is valuable as a preliminary treatment before disinfection by ultra-violet rays. To assist in this process, a chemical coagulant such as alum should be used. Ordinarily, filters should be washed at least once a day.

(d) *Ultra-violet ray process.*—The ultra-violet ray process for disinfecting drinking water is used on most of the large passenger vessels of the Great Lakes fleet. This process is efficient and gives good results if the apparatus is properly designed and carefully operated. The water to be treated must be quite free from suspended matter; for this reason, difficulties in operating the process are likely to arise if the vessel is navigated on highly turbid waters. The maintaining of proper voltage across the mercury vapor lamp and regular cleaning of the quartz tube and lamp are essential for satisfactory results. The equipment used is largely electrical, and should, therefore, be set up in a suitable place by an expert and carefully maintained and operated.

(e) *Ozone.*—Ozone is a powerful sterilizing agent which is used to a limited extent to disinfect drinking water on vessels. As in the ultra-violet ray process, the water to be treated by ozone should be free from suspended matter. A thorough mixing of the ozonized air and water and a sufficiently long period of contact are necessary for good results.

In the navigation of the Great Lakes and rivers, water is frequently taken from outboard. This is dangerous. It is far better to take water for drinking and cooking from a city water supply of known safety, unless the vessel is equipped with adequate purification apparatus. There may be times when it is necessary to use outboard supplies; and since they are usually heavily polluted by sewage, special precautions must be taken in order to prevent an outbreak of diarrhea, dysentery, or typhoid fever on board. Great care must be taken that sea cocks are located forward of sewage outlets and are kept tightly closed so that they can not allow leakage into tanks. It is well to have two valves with a leakage drainpipe between. Water should be taken only while the vessel is under way, and in so doing the whole intake system should be flushed for several minutes before allowing any water to enter the tanks. Tanks should never be filled except under the personal supervision of an officer.

Not only must the ship herself be kept in good condition if she is going to make good voyages, but it is even more important that her crew be maintained in the best of health. A poor ship with a sound crew is far better than a sound ship with a sick crew. The operator is responsible for the condition of the ship, but it is the duty of the master to take every precaution that his crew is kept in the best physical condition. Effort expended in this direction pays dividends in quicker voyages, freedom from hospital expenses in foreign ports, quarantine delays, and shorthandedness.

One of the best ways of accomplishing this is careful *physical examinations* prior to signing on or beginning a voyage. If the ship has a medical officer he should make the inspection. American ships may obtain these examinations free at any United States Public Health Service relief station or marine hospital. If no physician is available, some officer of the ship should inspect the men. Men having severe cough, fever, diarrhea, chills, venereal disease, very defective teeth, hernia, chronic inflammation of the eyes, or who are in a run-down condition or have any disabling condition should be sent to a marine hospital (if they are eligible) and replaced by sound men. Those with venereal diseases and hernia are especially poor risks. It is therefore wise to do a thorough "short-arm" inspection before beginning the voyage. A sick man on board ship is worse than no man at all, because he may require another man to look after him. Furthermore, he may give his disease to some other member of the crew. A shorthanded ship is badly handicapped. It is therefore wise to ship only sound men. Carelessness in the selection of a physically sound crew sometimes affords opportunity for a dishonest person to bring suit for alleged injuries.

A sound crew having been secured, it must be kept so. Since ships sail the globe over and enter many ports whose public health is not good, special knowledge is necessary to do this well. There are, of course, many rule-of-thumb methods to this end, but in the long run better results will be accomplished by following accurate scientific knowledge.

The Maintenance of the Human Body

In the foregoing chapter, the structure of the human body and the functions of its various parts have been considered, because knowledge of how the human machine is constructed and what each part is supposed to do is necessary to its intelligent upkeep and operation. When the human mind and body run smoothly and efficiently, it is in the condition of *health*. This word carries with it the idea of whole or completeness; also, the thought of holy as representing the sacredness of man's body. The opposite of health is *disease*—*dis+ease*, i. e., the state of not being at ease, or, in other words, of being uncomfortable. Disease means, then, the absence of a state of health.

As ordinarily used, it means the existence of a named condition or set of symptoms, as heart disease, pneumonia, appendicitis. *Specific diseases* are those whose cause is definitely known or which have a definite train of symptoms, as tuberculosis, typhoid fever, malaria. It should be borne in mind that between health and disease there is a borderland in which a person is neither in health nor in disease; in this condition people are not really sick and yet are not really well. Such people are sometimes genuinely sick, but, by pride or necessity, carry on; sometimes they imagine themselves ill or enjoy dosing themselves with patent medicines or other nostrums, of which they know little. These are usually people who are not mentally well. It should not be forgotten that the mind may produce conditions which closely resemble sickness of the body and that these conditions may actually do quite as much harm and produce as much suffering as disease itself.

The science of disease is known as *pathology* and has to do with the defects and injuries of the body. *Therapeutics* is the science of the treatment of disease. *Hygiene* has to do with the operation of the human machine as a whole.

While some people can run the human engine for a short time without a knowledge of anatomy (how the machine is built), physiology (how it works), pathology (what may go wrong with it), and therapeutics (how to repair it), the most successful engineer of his own body is he who has learned these things. Also, he has learned not to tinker with his engine.

Hygiene may be positive or negative. In other words, there are some things which one must do if he is to avoid disease and, also, there are things which he must not do if he is to keep well. It is sometimes said that every person knows instinctively what is harmful and what is healthful, that the life of the savage is the only healthy one, in other words, "Let your instinct be your guide." Beautiful as all this "return-to-nature" dream is, unfortunately it is not true. Primitive man was a relatively short-lived animal; but by learning what can not be done with safety and what must be done for safety, the span of life for the average individual has been increased over 50 per cent in modern times, while his efficiency throughout life has been greatly multiplied.

Disease comes from outside the body, unless the wearing out process of old age be considered as disease. It is universally distributed; in fact the struggle against it is the battle of life itself. Scientists are constantly learning more about how to combat it, and many of the plagues which once scourged mankind may now be prevented. It is for the nonscientific person to adopt and use these discoveries if he is to remain well.

Diseases may be classified as follows:

A. Those which may be transmitted from sick persons to well persons—*the communicable diseases*.

B. Those resulting from improper, insufficient, or too great a diet—*the diseases of nutrition*.

C. Those which result from taking poisonous materials into the body—*the poisons*.

D. Those which result from an abnormal mental attitude—*the functional diseases*.

E. Those produced by the growth of abnormal new tissues in the body—*tumors and the cancers*.

In a broad, general way, injuries are diseases, since all diseases produce injury. Usually they are considered in a class by themselves and include the harm done to the body by mechanical, chemical, and thermic (heat) agents. Sometimes they may be due to a combination of these.

The causes of disease vary with the different classes of disease. The communicable diseases are those caused by *parasites*. Parasites are living things which live at the expense of other living things without doing anything for their welfare. They may be vegetable or animal in their nature and do harm by producing poisons in the body or by robbing it of its food supply or mechanically by plugging up important parts of the human system. Other causes of disease have been indicated in the preceding paragraph.

Vegetable parasites are extremely minute plants which grow upon or in the body. They include the *bacteria*, which are of various shapes and grow rapidly, producing poisons which interfere with the operation of the human machine and may destroy it, in whole or in part. They are also called *germs* or *microbes*; those which are rod shaped are called *bacilli*. Some of these produce definite diseases, such as typhoid fever, diphtheria, and gonorrhoea; or they may cause general conditions, such as septicemia (blood poisoning), or they may produce local infections, such as boils or infected wounds.

They may be *transmitted directly from the sick to the well by contact*. This is why persons sick with communicable diseases should always be isolated. They may be spread by *food or drink* into which they have gotten from a sick person. This is why food and drink supplies should be protected against the discharges of the sick. They may be spread by *inanimate objects*, such as cups, handkerchiefs, pipes, harmonicas, etc. As has been stated, insects such as flies and vermin, bedbugs, and rats, also act as disease-distributing agents. The greatest spreader of human disease, however, is man himself.

Bacteria leave the body of the sick through the skin, as from an infected wound which discharges *pus* (matter); or by blood-sucking insects, such as mosquitoes, fleas, bedbugs, or lice. Others leave in the discharges from the nose and mouth, from the bowels, or in urine

or the discharges from the vagina. They *enter the body* through the skin or at any of the body openings, the eye, nose, mouth, anus, urethra, or vagina. As a rule, they do not live very long after they leave the body unless they get into another body quickly; therefore, fairly *close contact* is the great *disease spreader*. In this connection, sneezing, coughing, kissing, and the sexual act are particularly dangerous.

Some of the diseases produce immunity by creating, in the body, substances which will prevent the growth of certain germs. Immunity may be *acquired* by having had a disease or it may be *artificially produced* by injecting into the body small doses of the substance or product of a germ so that the tissues will be stimulated to produce substances antagonistic to that germ. Immunity against typhoid fever may be produced by having the disease or by the injection into the body of a small quantity of the dead bacteria, the typhoid bacilli. Smallpox produces immunity, and vaccination with cowpox, a very mild disease, like smallpox, will protect against it. Every person in the ship's company should be vaccinated against typhoid fever and smallpox.

Sometimes persons who have had a disease continue to pass the bacteria of the disease in their discharges, even though they may be in good health. These are known as *carriers* and may serve to infect many nonimmune persons with whom they come in contact. There are carriers of diphtheria and typhoid fever. Such persons should never be employed in the preparation or serving of food. To detect carriers requires a careful examination by a trained bacteriologist.

The general *measures* to be employed *against the communicable diseases* are (a) the *isolation* (keeping away from the well) of the sick; (b) the *disinfection* (destruction of germs) by heat or chemicals of their discharges and everything with which they have been in contact; (c) the development of the body defenses against disease by keeping it in good health; and (d) protection of the individual by vaccination.

In the final analysis, the way to keep from having a disease is to keep away from the microbe which causes it and to keep the body in such a condition of health that it will resist the infection if exposed to it. The specific measures to be employed in the prevention of disease vary for the different diseases. This depends upon the nature of the *infectious agent* (cause of the disease), the *source of infection* (place the germ comes from), and the *mode of transmission* (route by which it leaves the body of the sick and enters that of the well). The length of the *incubation period*—that is, the length of time which elapses between the receipt of the infection and the appearance of the symptoms—and the *period of communicability* also influence the methods of control.

An outline of these is set forth in the accompanying table:

Information regarding communicable diseases

Disease	Cause	Source of infection	Mode of transmission	Incubation period	Period of communicability
Chicken pox	Unknown	Discharge from eruption, chiefly from early eruption in nose and mouth.	Direct: Siek to well; Indirect: Articles soiled with discharges.	2-3 weeks	Until skin is free from eruption.
Cholera	Cholera vibrio	Bowel discharges and vomited material.	Contact cases or carriers, and soiled articles, food, water, flies.	1-5 days	7-14 days.
Dengue	Unknown	Blood of infected person	Bite of mosquito	3-10 days	To fifth day of disease.
Diphtheria	Bacillus	Discharges from nose and throat of patients and carriers.	Contact cases or carriers, and soiled articles, milk.	2-5 days	2-4 weeks.
Dysentery—					
1. Amebic	Ameba (animal)	Bowel discharges	Water, food, soiled objects, flies.	Unknown	Throughout disease.
2. Bacillary	Bacillus	do	do	2-7 days	Until complete recovery.
Gonorrhoea	Bacteria	Discharges	Contact, and freshly soiled articles	1-8 days	Throughout disease, acute or chronic.
Influenza	Unknown	Discharges from mouth and nose	do	24-72 hours	7 days.
Leprosy	Bacillus	Discharges	Close, prolonged contact, and flies and other insects.	Prolonged	Throughout disease.
Malaria	Animal parasite	Blood of infected person	Bite of mosquito	8 days-3 weeks	Throughout infection.
Measles	Unknown	Discharges from mouth and nose	Contact, and freshly soiled articles	10 days	9 days.
Mumps	do	do	do	12-26 days	Until disappearance of swelling.
Plague	Bacillus	Blood of infected man and rats; sputum.	Contact, and bite of rat flea	3-14 days	Until recovery.
Pneumonia	Bacteria	Discharges from mouth and nose	Contact, and freshly soiled articles	2-3 days	Do.
Scarlet fever	do	do	Contact, and articles freshly soiled, milk	2-7 days	3 weeks.
Smallpox	Unknown	Discharges from eruption, chiefly from early eruption in nose and mouth.	Contact, and soiled articles, flies	8-16 days	Until skin is free from eruption.
Syphilis	Animal parasite	Blood; discharges from the skin and mucous membranes.	Contact, and soiled articles.	3-5 weeks	Until skin and mucous membranes are normal.
Tetanus (lockjaw)	Bacillus	"Dirt"	Wound infection	8-10 days	Rarely.
Traeboma	Unknown	Discharges, chiefly from the eye	Contact, and freshly soiled articles	Unknown	Until cured.
Tuberculosis	Bacillus	Discharges, chiefly sputum	Contact, and soiled articles, food, and flies.	do	Until recovery.
Typhoid	do	Bowel discharges; urine; carriers.	Contact, and food, flies, fingers; carriers; milk and water.	7-23 days	Until recovery; sometimes prolonged thereafter.
Typhus (spotted fever)	Not definite	Blood of infected person	Lice	5-20 days	Until 36 hours after disappearance of fever.
Whooping cough	Bacillus	Discharges from mouth and nose; pets.	Contact, and freshly soiled articles	Within 10 days	Until recovery.
Yellow fever	Animal parasite	Blood of infected person	Bite of mosquito	3-6 days	During first 3 days of fever.

Chicken pox in itself is usually a relatively mild disease. It is of importance because smallpox may be mistaken for it. It is wise, in the absence of a diagnosis by a doctor, to *consider all such cases as smallpox*. This rule should be applied to all pus eruptions of the skin about which there is any doubt.

Cholera cases should be *isolated* in a screened room and all discharges and articles soiled by the patient disinfected by heat or chemicals. Food left by the patient should be burned or thrown overboard. Those attending the sick must be scrupulously clean and scrub their hands carefully every time after touching the sick man or anything that he has touched. They should not eat or drink in the sick room and they must not be allowed to enter the galley or handle food for others while on this duty. When the sick room is vacated, it should be thoroughly scrubbed down and repainted. Dead bodies should be cremated or buried at sea. If it is desired to bring the body home, it should be wrapped in a sheet saturated with a strong solution of bichloride of mercury and sealed in a water-tight coffin, and the quarantine officer should be notified on arrival. When cholera has appeared on board and while the ship is in a port where the disease exists, shore liberty should not be granted; all *water* for drinking, cooking, or washing dishes should be *boiled*; food and drink must be protected against flies and human handling; only hot food and drink should be taken.

Dengue (breakbone fever) cases should be kept in a screened compartment until the fifth day of the disease. The ship should be rendered free from mosquitoes by fumigation and the drainage, emptying, or chemical treatment of all water containers in which mosquitoes may be breeding. (See Yellow fever.)

Against *diphtheria* there is the specific measure of immunization with a mixture of its *toxin* (poison) and *antitoxin*. This is a great preventive. It is called the toxin-antitoxin mixture.

The cause of *typhoid fever* is the *typhoid bacillus*, which is spread chiefly in water and milk, by dirty fingers and flies. Butter, ice, shellfish, and certain vegetables which are eaten raw are known to have carried the germ. The bacillus enters the body through the mouth and for the most part leaves it in the bowel discharges. Any measure which will kill it before it gets in contact with *fingers, flies, and food* will prevent its spread. The disposal of human manure so that it can not get into water and food supplies—that is, the safeguarding of those things which go into the human body—is the way to prevent typhoid fever. To this should be added sterilization of the discharges and everything which has been in contact with the typhoid-fever patient, careful washing of foods which are eaten raw and recognition and treatment of carriers. Water of doubtful purity

should never be drunk. When there is a doubt about the purity of water, it should be boiled.

When in doubt *never eat food that does not come hot off the fire*. Individual protection against typhoid fever is most easily acquired by *antityphoid vaccination*.

What has been said about the prevention of typhoid fever applies, in the main, to *dysentery* and the *diarrheas*. The germs of these diseases enter and leave the body in the same way as they do in typhoid fever; therefore, the same precautions regarding the discharges of the sick, the protection of food and drink against them, and the same rules regarding eating only food which has been sterilized by heat should be followed.

There is a large group of diseases the bacteria of which enter and leave the body through the *respiratory passages* (nose and throat). These are the most difficult of prevention because most people are *careless* about *coughing, sneezing, and spitting*. In these diseases the germs which cause them are thrown off in the sputum. If these germs can be prevented from getting into the bodies of well persons, these diseases will be prevented. In this group are *influenza* (grippe), *tuberculosis*, *pneumonia* (lung fever), *scarlet fever*, *diphtheria*, *measles*, *cerebrospinal meningitis* (brain fever), *whooping cough*, *mumps*, and, possibly, *smallpox*. The general measures to be employed in preventing their spread include rigid *isolation* as soon as there is a hint of their presence, *sterilization* of the discharges, clothing, and bedding of the sick by heat or chemicals, and *thorough cleansing* of the compartment occupied by the sick before it is again used. Persons suffering from these diseases should be sent to a hospital at the first opportunity. Every precaution should be taken to recognize these diseases early in the course of the sickness, because it is at this time that they are most readily communicable. For this purpose, the crew should be inspected daily and temperatures taken of all hands, if there is thought to be any chance that the disease may be on board.

The prevention of influenza is a thing about which there remains a great deal to learn. At the present time practically all that can be said about it with any certainty is that when the disease is prevalent, one should try to keep himself in the best physical condition and avoid crowds. Whisky as a preventive is a failure.

Tuberculosis is a very prevalent disease; in fact, it is so widespread that nearly everybody at some age during life, particularly during childhood, picks up its germ. Happily, the general public has learned a great deal about this disease, and its toll of human life has been materially lessened in recent years. Nevertheless it probably is still the most prevalent disease in the world. While the bacillus which causes it may attack any tissue of the body, the lung form of

the disease (consumption) is the most common. Infants and children are peculiarly susceptible to its infection, the passage of the infection from adult to adult being infrequent. Usually the germ enters the body during childhood and, taking advantage of lowered body resistance produced by disease, dissipation, and overwork, develops and causes the lung, bone, or joint forms of tuberculosis in later life.

To prevent tuberculosis, *adults having it should be kept away from children*. This is the first and great rule. The other rules are simply those having to do with bodily vigor and health, fresh air, adequate food, exercise, cleanliness in body and mind, the avoidance of the strains of overwork and overplay—in other words, the leading of a wholesome, healthy life. Ships nowadays give their crews adequate food and opportunities for cleanliness. The deck force, at least, gets plenty of fresh air. It isn't always overwork that makes seamen break down; dissipation lowers their resistance. Nevertheless, tuberculosis among the beneficiaries of the United States Public Health Service is becoming less frequent. Perhaps this is because the seafarer has learned to take the disease in time and to apply for treatment while there is yet hope for cure. Early recognition, sterilization of the patient's sputum and whatever he has soiled by it, by heat or chemicals, and frequent thorough scrubbing down and repainting of forecastles and living compartments are good preventive methods, as are also good ventilation, adequate food, and attention to those things which keep the body in general health. The sailor who goes on a heavy round of dissipation is undermining nature's greatest defenses against tuberculosis.

It takes time and great patience to arrest or cure tuberculosis. In a large way, the cure of the disease depends upon what there is "above the patient's ears." If he will control himself and make up his mind from the beginning of treatment that he will scrupulously obey the rules of life laid down for him by his physician, his chances of recovery will be greatly increased. Above all, he should not travel around from place to place in the belief that the climate which he is not in is sure to cure him. This is chasing will-o'-the-wisps, and many men have killed themselves in this way. A good many men cease treatment as soon as they begin to show signs of improvement. This is about as sensible as starting a broken-down engine before it has been properly repaired. Tuberculosis should be treated in a sanatorium.

Colds are also spread by sputum; but "colds" is a large, loose term which probably includes a number of different diseases. Most people carry around in their mouths or noses the germs which cause this condition. So long as the body is in good condition to resist them they may do no harm, but if the nose itself is out of order, or if anything happens to lower the body tone, they get in their work. *Lack*

of ventilation, dust, sudden, prolonged chilling, hot, dry rooms, over-clothing, underbathing, overeating, loss of sleep, and lack of physical exercise are the chief causes. Colds are communicable and may be spread from person to person.

Smallpox is a disease of which the method of spread from the sick to the well is not fully understood. Before the discovery of vaccination the disease was so common that it used to be said, "There are three things no man may escape—love, smallpox, and death." Compared with those days, the disease is not so common, but it is still distributed throughout the world, especially in those countries in which vaccination is not rigidly enforced. Vaccination against smallpox has been a routine thing among seamen for many years, with the result that they seldom have the disease, or if they do, in mild form only. It scarcely seems necessary to describe the simple process of vaccination, which consists of giving a person cowpox, a mild disease, to protect him against smallpox, a dangerous disease. If properly done, a sore arm should not result. Whenever possible, vaccination should not be done except by a physician; but if a physician is not available, the master should vaccinate the entire crew if they have been exposed to smallpox. Full description of the method of doing this will be found in Chapter V.

One of the diseases from which seamen commonly suffer is *gonorrhoea*, a very serious ailment. It is not unusual for persons to treat this disease with levity and to regard it as "no worse than a cold." As a matter of fact, it is a serious disease. It is hard to cure; it may spread up the urethra to the bladder and thence to the kidneys; it may get into the blood stream and attack the heart or the joints; it may attack the eyes and produce blindness; and it may produce sterility. In the female, its effects are even more disastrous, and it may produce chronic invalidism and perhaps death. Children born of such mothers may contract the disease in their eyes at birth and become blind. It is not a manly disease to have and its presence means stupidity, ignorance, or willful carelessness. It is contracted by close, *intimate contact*, usually by the sexual act. It is not caught from "water-closet seats, etc." It is best prevented by *continence* (letting the women alone). If a man has exposed himself to this disease, he should urinate (make water) as soon as possible after the act and wash his private parts and hands with plenty of soap and water. At the first symptom of trouble, he should go to a good doctor, *not* to those who advertise. (See also p. 121.)

Acute rheumatic fever is a disease which has ruined many a fine sailorman. Its cause has not been accurately determined, but is probably one of the vegetable parasites (germs). In about 80 per cent of cases tonsillitis plays a very important part. The removal of

diseased *tonsils*, the proper treatment of inflammation of the gums and *teeth* and any infections which may be present in the nose or elsewhere seem to be the best preventive measures.

Of the *animal parasites* the one which is most widely distributed is the spiral-shaped germ which causes *syphilis*. Syphilis attacks any part of the body; it is hard to cure; it is responsible for at least one-sixth of all cases of insanity; it destroys health, homes, and happiness; it wrecks the nervous system; it may ruin the circulatory system; it is transmissible by heredity and hence curses innocent children with feeble-mindedness, idiocy, bone diseases, blindness, and deafness. In the sum total of its effects it is the worst scourge of the human race.

It is contracted by close, intimate *contact*, most frequently by the sexual act, but it may be caught by kissing or by using things which have been smeared with the secretions of a person who has the disease. The parasite which causes it enters the blood through a break in the skin or mucous membrane, and about 10 days or 3 weeks later produces at that point a sore—a *hard chancre*. This sore is generally on the private parts, but it may appear on the lip, the finger, or any other place where there is a break in the skin. This sore is called the first stage of the disease. In the second stage there is a ham-colored inflammation of the throat and soft patches (shallow ulcers) of the mucous membranes of the mouth, a skin eruption, and frequently loss of hair. The third stage may begin in from 2 to 20 years from the first stage—this is a most treacherous disease—with disturbances of any tissue of the body—bones, joints, liver, heart, blood vessels, and, above all, the nervous system. In almost every hospital one may see patients, once fine, upstanding men, riding around in wheel chairs, paralyzed, insane, with ruined hearts, merely shells of their former selves because of syphilis. These men are paying the price for their ignorance, stupidity, or wanton willfulness; but not alone, since for many years they will be a care and a burden to family and friends as well as to themselves.

Venereal prophylaxis (prevention of venereal disease) has received attention elsewhere. (See Gonorrhoea, p. 121.) If every case of syphilis received appropriate *treatment immediately*, much would be accomplished, because *the earlier that treatment is begun the greater the chance of cure*. Syphilis is a hard, slow disease to treat; only the very best doctor should be consulted for it and the patient should make up his mind at the start to stick to the treatment rigidly until it is complete. Quacks are interested only in the money which they can bleed from the unfortunate. A really good physician does not have to advertise. It is equally unwise for the sick man to try to doctor himself; if he does he will have a fool for a patient.

“Blood” medicines, etc., are a waste of money and, what is more valuable in the cure of the disease, of time. Every precaution should be taken by him not to infect other people; he should be particularly careful that no one else use his shaving gear, towels, brushes, or combs; he should not pass pipes, cigars, cigarettes, mouth organs, or anything else from his mouth to that of anyone else; he should use and wash his own mess gear; above all, he must not have sexual intercourse until told by his physician that he may do so without spreading the infection.

Another disease caused by an animal parasite is *malaria*, a widespread sickness which has done much to lower the vitality and productiveness of many peoples. It is said that it caused the downfall of Greece and Rome; certainly in our own time it has hampered the development of many countries. It is widely distributed in the tropics and subtropics between latitudes of 40° south and 60° north. Its distribution corresponds to that of the mosquito which carries and spreads the infection, depending upon a sufficient temperature and the presence of pools of fresh water in which it can breed. There is only one kind of mosquito which spreads malaria—the *Anopheles*. When a female mosquito of this species bites a person who has malaria, she sucks some of his blood into her body and with it some of the malaria parasites. These must undergo a certain regular development in her body before she can infect a person. This requires about 10 or 12 days, at the end of which time she is ready to begin spreading the disease. This is done by biting, usually between sunset and sunrise. This is why it used to be thought that malaria (bad-air) was caused by the night air from swamps.

After a person is so bitten, the malaria parasite undergoes another chain of development before the appearance of any symptoms. This is the period of incubation. The length of this period, depending upon the kind of malaria parasite, varies from eight days to three weeks. The disease is first manifested by a cold stage, a hot stage, and a sweating stage (see p. 99). This is called a *malaria paroxysm*, or chill, and occurs every 48 or 72 hours, depending upon the type of parasite. It is caused by the bursting of those red blood cells in which the parasite has been developing, thus throwing more parasites and the poison which they produce into the blood. When another crop of parasites develops and bursts the red cells, there is another paroxysm. These continue until the infected person recovers. In case there is infection with two sets of parasites or with the most severe form (there are three varieties), there may be a daily paroxysm or the fever may be continuous or very irregular. A microscopic examination is necessary to make sure that such cases are malaria. Malaria, if not fully and intelligently treated, may

become a chronic disease. All cases of malaria should be sent to a skilled physician for *thorough* treatment as early as practicable.

The prevention of malaria depends upon (a) the *protection of infected persons from mosquitoes* and (b) the *protection of mosquitoes from infected persons*. If man is not bitten by mosquitoes, he will not have malaria. If mosquitoes do not bite persons who have malaria, they can not get the parasites into their bodies and, hence, can not spread them to well persons. The taking of quinine daily to prevent the infection has been recommended for persons in a place where the disease is widespread. A far better method is to live in mosquito-proof (well-screened) surroundings and to sleep under a bed net which will prevent mosquitoes from biting the sleeper.

Yellow fever is a disease which, happily for the seafarer, is apparently almost extinct, thanks to the way in which sanitarians have made sanitary the great distribution centers of the disease, such as Panama and Guayaquil, and also in no small measure to the substitution of steam for sail. This disease is spread by a mosquito (the *Aedes aegypti*) which breeds in clean, fresh water and, for the most part, in water in artificial containers, such as tanks, barrels, and the like. This is a black-and-white mosquito, with bands of white on the legs and white markings on the back. The period of incubation in the mosquito is from 12 to 14 days. The yellow-fever patient is able to infect mosquitoes only during the first three days of his sickness. The *prevention of yellow fever* depends upon protecting people who have not had the disease from the *Aedes* mosquitoes and the screening of persons sick of the disease so that mosquitoes can not bite them.

Personal Hygiene

As was indicated in the beginning of this chapter, there are certain things which a person must do for himself in order that he may remain well. Keeping in health is primarily a matter of intelligence, aided and directed by knowledge. The man of real brains takes care of his body, but the fool abuses his. The wise man keeps his body clean, is careful about his eating, and does not dissipate; barring accidents he is likely to live in health a long time. The sub-intelligent does not keep clean, he is not restrained in eating, drinking, or dissipating; his is a short and not a very merry life. The science of these things is *personal hygiene* and concerns itself with what every person should do for himself in order to maintain his health. One of the most important branches of it has to do with food.

The Hygiene of Nutrition

Food is taken into the body for the purposes of growth and repair and as a fuel to provide heat. It really represents a portion of the sun's energy which has been taken up by vegetables. Man eats these vegetables and thus is able to make this energy a part of his body. Animals which are used as foods do the same thing, their stored-up energy being absorbed by man when he eats them. Digestion is the breaking up of these foods in such a way that their energy can best be utilized by the body as food and building material.

Foods contain certain chemical compounds which yield energy (heat units) and build up tissues. These are derived from animals (*proteins and fats*) and vegetables (*carbohydrates*). Proteins are tissue builders, and while chiefly found in animal tissues—meat, milk, eggs, etc.—they also are found in smaller proportions in wheat, rye, barley, corn, peas, and beans. Fats are found in meat, milk, cream, butter, nuts, olive, and other vegetable oils. These are heat producers. Sugars and starches are carbohydrates. They are fat savers, and when eaten in excessive amounts they permit the body to store up fats for future use. This is why people who habitually eat large quantities of potatoes, candy, cereals, and bread get fat. As has been stated in Chapter I, a certain amount of indigestible material is essential to the proper regulation of the body processes. This includes such things as the vegetable fiber of plants and fruits and certain foods, such as cabbage, sauerkraut, and spinach, which are eaten because they contain this material which is called *roughage*. Food likewise contains small amounts of mineral salts and considerable water, since food can not be absorbed unless it is in solution.

It has long been recognized that the absence of certain vital principles from the diet may cause certain disease conditions, for example, scurvy. Within recent years considerable knowledge has been gained by scientists as to the nature and behavior of these things, to which the name *vitamins* has been applied. It has been found that the presence or absence of them from the diet profoundly influences nutrition and growth. Long before any definite knowledge of the vitamins existed, sailors knew that lime juice would prevent scurvy. This it is able to do because it supplies these vitamins which otherwise might be lacking in the diet.

The hygiene of nutrition bears a most important relation to the health of man. Except under very unusual circumstances, this is entirely under the control of the individual. It may be summed up as choosing food wisely, eating correctly, and attending to the bowel functions regularly.

The choice of food depends to a certain extent on its condition when fresh. Most American ships "feed" well and purchase only food of good quality. Refrigeration has done away with the old steady diet of "salt horse" and permits the daily service of fresh meats and vegetables. As a rule, more food is served than is necessary to sustain men at heavy labor, and as a result most people eat too much. The diet should contain meat, vegetables, bread, and sweets, and these should be properly cooked. The amount of food which should be taken depends upon the amount of physical work to be done and the age of the person. A ship's officer does not need as much food as a foremast hand or a fireman who performs heavy physical labor all his waking hours; a child does not need as much nourishment as a man, nor a man of 60 as much as one of 30.

A great deal depends upon the way that food is cooked. Fried foods are coated in fat, and hence the digestive juices have hard work getting into contact with them. Food may be boiled or baked until it is tough and unpalatable. Vegetables may not be cooked enough to break open the starch granules. If food is cooked into messes with much fat in them they are less digestible and more unpalatable. It should be borne in mind that it is not enough to provide proper amounts of food; it must be well prepared and served in a clean place. Monotony in the diet discourages people from eating it until they may not eat enough properly to sustain their strength. In the maintenance of a healthy, happy crew, nothing is so important as clean, well-cooked food.

Not every person who eats at the same table has the same diet. There is a tendency for each person to choose those things which appeal to his appetite. As a result, one man will subsist almost wholly on meat, while another may live largely on bread, potatoes, and sweets. The result is a lopsided diet containing too much of one thing and too little of another. The ideal is to eat some of each food, not too much of each or too much as a whole, *to eat slowly, chew thoroughly, not to wash down the food with fluids, and not to begin the meal with a big drink of ice water.* Incidentally, one should never drink a lot of ice water when one is hot.

Indigestion sometimes comes from improperly cooked food; but rapid eating, overeating, and unwise choice of foods are the great causes. If one is very tired, he should eat very lightly. Food fads and dieting (unless under the orders of a physician) are dangerous. Many fat people spend considerable time and money trying to get thin. Some of them are naturally built that way, and can be no other and remain well. This is not true of the majority, however. As a rule, it is a question of intake and outgo—overeating and under-exercising. The "thickening of middle age" results largely from lessened physical activity without a corresponding decrease in eat-

ing. Many a skipper still eats as heartily as when he was before the mast, and wonders why his waistline is greater than his chest measurement. He notes that the scales show him as weighing perhaps 20 pounds more than ever before, and when he consults a table of weights, heights, and ages he finds that he should be much lighter. Overweight is a handicap; it causes foot and joint troubles; and when a fat man has an acute infection his chances of getting well are not so good. If he tries to reduce according to his own ideas, he may do himself great harm; at any rate, he makes himself very uncomfortable, and his disposition suffers. The principle on which reducing diets are based is abstinence from butter, fat meat, oils, and fried foods, cutting down on bread, rice, sugars, and starches, and, above all, gradually increasing physical exercise. It is not a rapid or a comfortable process, and it never should be undertaken except on a physician's orders and according to his directions. Patent medicines for reducing are usually inefficient, and frequently they are actually harmful.

Next in importance to eating wisely is the disposal of the body wastes. Constipation is a great menace to health, and it may disarrange the entire machinery of the body. Its prevention lies in eating plain, wholesome food with plenty of roughage in it and the cultivation of the habit of having a bowel movement every day. If possible, it should always be at the same hour each day; and when a person goes to the toilet, he should not read but should apply his mind strictly to the business in hand. In this connection it should be noted that dirty, foul-smelling toilets tend to increase constipation. Medicines and other preparations for the cure of constipation should not be habitually taken except on a physician's orders, as they are likely to lower the tone of the bowels to such an extent that they will no longer move without them. Keeping the body in good physical trim, the taking of bending exercises morning and evening, regular habits in going to the toilet, and the eating of foods containing roughage in addition to a limited, well-balanced diet will go far toward preventing and relieving this uncomfortable condition.

Cleanliness

On board ship the man who is not personally clean is an annoyance and danger to himself and others. With water all about and salt-water soap in abundance, uncleanliness is inexcusable. The entire body should be bathed at least once daily for the purpose of removing dried sweat and the dead skin. If this is done, the well-being of the entire body will be increased, and many skin diseases and parasites will be prevented. The hands and face should always be thoroughly washed in soap and water before eating. After going to

the toilet it is specially important to wash the hands. The hair and nails should be kept trimmed and clean. After bathing, clean clothes should be put on, if possible. This is especially true of those engaged in the preparation and serving of food. The common towel has no proper place anywhere, especially on board ship. It is a menace to health because it may carry the germs of disease. Each member of the crew should have his own towels and be responsible for their cleanliness.

Clothing is necessary to the human animal in most climates, because he is not provided with a natural covering of fur or feathers which will serve as a protection against the weather. If anything, most people wear too many clothes. The ideal in clothing is to afford protection from wind, rain, snow, or sun, and at the same time to permit of body ventilation.

Next in importance to cleanliness of the outside of the body is the cleanliness of the mouth. One of the best ways of preventing diseases of the gums is by keeping the mouth clean. One should therefore *brush the teeth* the first thing after sleeping. Tooth powders and pastes are a help in this, but plain water or sea water will do quite as well. The point is to brush the teeth thoroughly with a *clean brush*, care being taken to brush *up and down* so as to clean out all the spaces between the teeth and to clean the *biting surfaces* of the teeth. This should be a matter of regular habit and should be done *at least once daily*. At regular intervals a good dentist should be consulted and any dental defects repaired by him. Keeping the mouth and teeth in good, clean, sound condition is one of the best known ways of maintaining health and efficiency.

Another important factor in the preservation of health is *sleep*. This is nature's way of giving the tissues a chance to build up again and store energy for future use. A good many people believe that they can get along without much sleep, but they are those who are always tired and never quite up to the mark in mind and body. Fatigue plays a great part in undermining the vital forces of the body, and to keep well one must get sufficient rest. Sailors learn to sleep almost anywhere and at almost any time. This is one of the most valuable habits that they can cultivate. It is preferable that one sleep on a clean bed which does not sag. "Sun and air the bedding" should be the order for every fair day.

A good many backaches in middle-aged men come from sleeping on a bed which is not flat. The sleeping compartment should always be well ventilated, and it is preferable that it be cool and darkened during the hours of sleep. When a person has insomnia (inability to sleep), it is a danger signal which should not be disregarded.

Sometimes it comes from improper diet and the drinking of too much strong coffee in the evening. Drinking alcohol after the evening meal sometimes produces this. In this case the person will sleep heavily for an hour or so and then remain awake until early morning, when he may doze off.

Mental Hygiene

It has been recognized for ages that a relationship exists between bodily states and the mind; for example, the word "melancholy" means black bile, because the ancients thought a melancholy mental state resulted from the liver secreting black bile. Not only does the body affect the mind, but the mind also affects the body. The man who has real courage, fortitude, and a cheerful attitude toward life is constantly aiding his physical health. On the contrary, he who is beset by fears, who whines in adversity, and who is always looking on the dismal side of life is bound to lower his physical strength and resistance. Part of this is the result of bad mental training in childhood and much of it is due to the fact that in adult life many people fail to develop the ability to adjust themselves to the difficulties of life. Unless this is met and conquered, it will increase until the person has little power to live happily with others. A homesick boy at sea is a sad spectacle, worthy of every sympathy, for he may be really ill. This is just his mental reaction until he has adjusted himself to ship life. If he conquers this feeling of lonesomeness, he will grow in character and adaptability; if he can not, he has weakened himself. At base, it is a question of developing mental habits; and while so doing, it is not much harder, and far better, to develop good ones.

One of the bad mental habits most frequently met with is that of worrying. *Worry* really is fear, fear of what usually never happens. It is the great enemy of individual efficiency and good teamwork. Worriers fret over what they have done, what they are going to do, and what other people are going to think. The skipper who is forever worrying about his position, the chief engineer who frets about fuel consumption, the purser who is apprehensive for his family—these do themselves much injury and, at the same time, hurt the ship's spirit. This is self-torture of the highest cruelty. Many things that people worry over are none of their business. If the thing is a person's business and requires attention at the immediate time, he should then think it over, choose the plan of action which seems most logical, and then do his best to carry it out. Nine times out of ten he will succeed, and if, on the tenth, he makes a mistake, he should forget it because he has done his best.

The worrier is likely to take life too seriously and to believe that he and his work are the most important things in life. How foolish! The world went on before us and it will after we are gone; the individual is really not so very important in the great scheme of things. These are the people who never play, who are afraid to leave the ship because something might happen while they are ashore. Play, diversion, and recreation are necessary to normal mental health. At any rate, the man who takes life too seriously is headed for a nervous breakdown. Worrying is largely the lack of faith and courage. If a man has faith in himself and faith in the job, why should he worry? If he hasn't faith in himself, no one else will have; if he has no faith in the job, he should quit it. "Life is never as good or as bad as we think it is."

A rather common bad mental habit is that of putting off decisions, of trying to slip around hard situations. This is fear—mental cowardice. Situations met are triumphs won. Another mental habit which is harmful is that of always being critical of others. If other people were as bad as some people think they are, this would be a terrible world. To look for good in others is to add to well-being. People who are so certain that others have faults are very likely to be lenient with their own. This is bad enough, but when it extends to self-pity it harms the entire outlook on life. Self-pitiers are whiners, and by this whining one lowers his mental health. It is morbid. Some people love to wallow in the morbid, to recount their symptoms, to enjoy the details of unwholesome gossip, or the trial of a perverted murderer. This is another way of undermining mental health, because it turns the imagination to unclean things. Clean thoughts make clean minds; clean minds make for health. It is better and far healthier to indulge in the mental suggestion of healthy, wholesome things. Leaving out of question those diseases, such as syphilis, and those poisons, such as alcohol or opium, which produce mental derangements, the great cause of mental troubles is the mind itself. A mind is as it thinks. Lack of self-confidence, lack of optimism, narrow-mindedness, and selfishness are the handicaps which minds impose upon themselves, to their great undoing.

CHAPTER III

THE SHIP'S MEDICINE CHEST AND EQUIPMENT

The navigation laws require certain ships of the United States to carry medicine chests and to provide hospital facilities.

The act of December 21, 1898, states that—

every vessel belonging to a citizen of the United States, bound from a port in the United States to any foreign port, or being of the burden of 75 tons or upward, and bound from a port on the Atlantic to a port on the Pacific, or vice versa, shall be provided with a chest of medicine * * *.

The act of March 4, 1915, states that—

in addition to the space allotment for lodgings hereinbefore provided, on all merchant vessels of the United States which in the ordinary course of their trade make voyages of more than three days' duration between ports, and which carry a crew of 12 or more seamen, there shall be constructed a compartment suitably separated from other spaces, for hospital purposes, and such compartment shall have at least 1 bunk for every 12 seamen constituting her crew, provided that not more than 6 bunks shall be required in any case. * * *.

In case of ships carrying passengers, there are other requirements, which are given in section 5 of the act of August 2, 1882, as follows:

On every such steamship or other vessel there shall be properly built and secured, or divided off from other spaces, two compartments or spaces to be used exclusively as hospitals for such passengers, one for men and the other for women. * * * The hospital spaces shall in no case be less than in the proportions of 18 clear superficial feet for every 50 such passengers who are carried or brought on the vessel, and such hospitals shall be supplied with proper beds, bedding, and utensils, and be kept so supplied throughout the voyage. * * *.

The ship's hospital is usually called the "sick bay," and includes hospital bunks, dispensary, dressing rooms, isolation quarters, and toilet facilities. It should be located in a part of the ship where there is good ventilation—preferably in the after part and in a deck house. The bunks should be so placed that they can be easily reached by an attendant when caring for the sick. The compartment should contain lockers near the bunks so that the patient's clothing and other belongings may be kept near him. There should be ample toilet facilities, a water-closet, a bath with hot and cold water, and a wash bowl. In addition, there should be a dressing table and sufficient locker space for supplies. If there is enough room, there should be a folding cot for the use of the attendant, and it should be separated from the hospital bunks proper by a bulkhead.

The medicine chest should be equipped with drugs and supplies, as listed, and should be kept in the sick bay, but under the care of one of the officers of the ship. Below is given a list of the supplies that should be carried, and following it there is a section explaining



FIG. 9.—The ship's medicine chest (for large ocean-going vessels). (See list A)

the use of the drugs and giving directions for their employment in the treatment of the sick.

The American Marine Standards Committee has cooperated with the United States Public Health Service in standardizing ships' medicine chests and lists of supplies for vessels of different sizes.

Cuts and specifications for constructing medicine chests to accommodate the lists of supplies No. 1, No. 2, and No. 3, respectively, will be forwarded upon request addressed to the Surgeon General, United States Public Health Service, Washington, D. C.

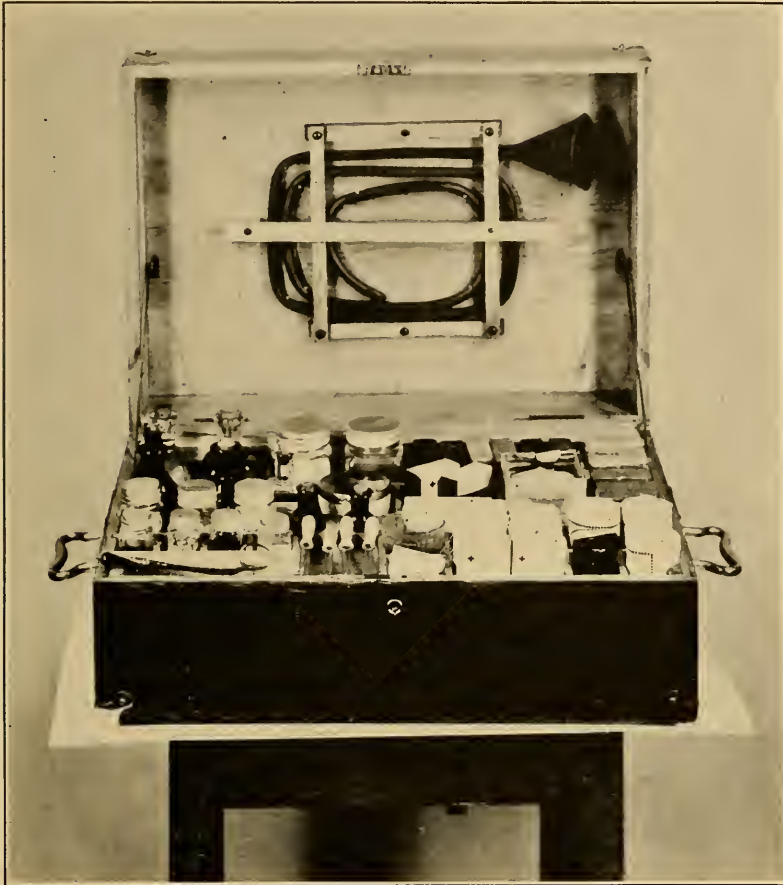


FIG. 10.—Ship's medicine chest for use on board coastwise vessels and lake freighters.
(See list B)

**(A) CONTENTS OF SHIP'S MEDICINE CHEST FOR USE ON BOARD LARGE OCEAN-
GOING VESSELS**

The amounts given are deemed adequate for crews of 25 to 50 persons (passengers and crew). For larger numbers of persons and for very long voyages the amounts should be proportionately increased. Replenishment of supplies should be made as required.

VACCINES AND ANTITOXINS

Vaccines and antitoxins should be kept in a refrigerator and replaced before the period of potency expires; this is indicated by the date marked on each package.

Smallpox vaccine, tubes	25
Diphtheria antitoxin:	
10,000-unit therapeutic syringe package	4
1,000-unit prophylactic syringe package	12
Tetanus antitoxin, 1,500-unit prophylactic syringe package	2

DRUGS AND CHEMICALS

Those supplies marked "one year" or "six months" should be renewed after that interval. Mark containers of all such articles with date of receipt.

Alcohol, grain	pint	1
Alkaline antiseptic tablets		500
Aromatic spirit of ammonia	pint	1
Aspirin tablets, 5-grain		500
Bicarbonate of soda tablets, 5-grain		500
Bichloride of mercury tablets, 7½-grain (POISON)		500
Bismuth subnitrate tablets, 5-grain		500
Boric acid (boracic acid)	pound	1
Boric acid ointment	do	1
Bromide of soda tablets, 5-grain		500
Brown mixture tablets, 20-grain		1,000
Calomel, powdered	ounces	2
Calomel and soda tablets, ½-grain		500
Calomel ointment, collapsible tubes, U. S. Navy formula, V. D. prophylactic package	dozen	2
Castor oil	quart	1
Chlorate of potash tablets, 5-grain		250
Chloride of lime, ¼-pound cans		8
Chloroform, ½-ounce vials		6
Compound cathartic pills, vegetable		1,000
Cresol solution, 1-pound tin (POISON)		1
Dover's powder tablets, 5-grain		500
Eardrops (Formula: Carbolic acid, 1 fluid dram; glycerin, 7 fluid drams, well mixed)	ounce	1
Epsom salt	pound	1
Epsom salt, reserve supply, 4-pound tin		1
Extract of beef, 4-ounce containers		8
Eye solution, 4 per cent solution cocaine hydrochloride (6 months) (POISON) (see p. 59 before using)	ounce	¼
Mercurial ointment (blue ointment)	pound	1
Mercurial ointment (blue ointment) reserve supply	pound	1
Morphine sulphate tablets, ¼-grain (POISON)		50
Mustard (1 year)	pound	½
Oil of cloves	ounce	1
Paregoric (POISON)	pint	1
Permanganate of potash tablets, 1-grain		200
Quinine sulphate capsules, 5-grain		500
Rhinitis tablets, full strength		500
Sirup of ipecac	pint	½
Soap liniment	quart	1
Strychnine sulphate tablets (POISON), ⅛-grain		100
Sulphur ointment	pound	1
Sulphur ointment, reserve supply	do	1
Sun cholera tablets, 5-grain		500
Sweet spirit of niter (1 year)	pint	1
Tincture of iodine (POISON) (1 year)	do	½
Turpentine	do	1
Vaseline, 1-pound tins		2
Zinc oxide ointment	pound	1

SURGICAL AND GENERAL SUPPLIES

Absorbent cotton:		
1-ounce packages, compressed		16
1-pound packages		2
Adhesive plaster:		
1 inch by 10 yards (1 year)	spools	2
2 inches by 10 yards (1 year)	do	2
Applicators, wooden, 6-inch, with cotton	dozen	4
Bandages:		
Compressed, 3 inches by 6 yards		100
Gauze, 2 inches by 10 yards	dozen	1
Muslin, 2 inches by 5 yards	do	1
Muslin, 4 inches by 5 yards	do	1
Triangular, Esmarch's	do	½
Bed pan, regular shape, white enameled steel, with cover		1
Belladonna plaster, 5-yard length, 7 inches wide, in tin (1 year)		1
Bistoury, sharp pointed		1
Catgut No. 1, needle attached, in glass tubes (1 year)	tubes	12
Catgut No. 2, needle attached, in glass tubes (1 year)	do	12
Catheters, soft rubber (20 F., 2; 6 F., 1) (1 year)		3
Corkscrew, steel, nicked, self-puller, hard maple handle		1
Eye cups, blue glass		2
Feeding cups, crystal glass, tilted top		2
Forceps:		
Artery, straight, 5½ inches		3
Dressing		1

Gauze, plain, sterile, 1-yard package	20
Gauze, picric acid, 1 yard each, in glass jar	10
Hot-water bottle and fountain syringe (combination), 2 quarts, good quality rubber (1 year)	3
Ice bags, medium size, good quality rubber (1 year)	2
Ligature, silk, medium size	1
Medicine droppers, curved	6
Medicine glasses, thin glass (graduated up to 4 table and 8 tea spoons)	2
Needles, surgical, threaded with silk, medium size, in glass tube, sterile	0
Safety pins, No. 3	dozen
Scissors, bandage, 7 inches	1
Splints, yucca, sheets, 18 inches long, 3½ inches wide, ¼ inch thick	12
Sputum cups:	
Paper folding, hospital size	12
Paper folding, hand size	12
Thermometers, clinical	2
Tongue depressors, wood, 6 inches	dozen
Tourniquet (1 year)	1
Urinal, male, white enameled steel	1
Book: The Ship's Medicine Chest and First Aid at Sea, United States Public Health Service	1

(B) CONTENTS OF SHIP'S MEDICINE CHEST FOR USE ON BOARD COASTWISE AND LAKE FREIGHTERS

DRUGS

Alkaline antiseptic tablets	50
Aromatic spirit of ammonia	ounces
Aspirin tablets, 5-grain	100
Bicarbonate of soda tablets, 5-grain	500
Boric acid	ounces
Boric-acid ointment (preferably in collapsible tube)	do
Brown mixture tablets, 20-grain	500
Calomel and soda tablets, ½-grain	50
Calomel ointment, collapsible tubes, U. S. Navy formula, V. D. prophylactic package	dozen
Castor oil	ounces
Compound cathartic pills, vegetable	50
Ear drops (Formula: Carbolic acid, 30 drops; glycerin, sufficient to make ½ ounce, well mixed)	ounce
Epsom salt	pound
Oil of cloves	ounce
Paregoric (POISON)	ounces
Quinine sulphate, capsules, 5-grain	50
Rhinitis tablets, full strength	50
Soap liniment	ounces
Sun cholera tablets, 5-grain	50
Tincture of iodine (POISON) (1 year)	ounces
Vaseline	pound

SURGICAL AND GENERAL

FIRST-AID KITS, United States Public Health Service ¹	2
Absorbent cotton:	
1-pound packages	2
1-ounce packages, compressed	6
Adhesive plaster, 1 inch by 10 yards (1 year)	spool
Applicators, wooden, 6 inches	dozen
Bandages:	
Compressed, 3 inches by 6 yards	12
Muslin, 2 inches by 5 yards	3
Triangular, Esmarch's	3
Catgut No. 1, needle attached, in glass tubes (1 year)	tubes
Catgut No. 2, needle attached, in glass tubes (1 year)	do
Eye cup, blue glass	each
Forceps:	
Dressing	1
Artery, straight, 5½-inch	1
Gauze, picric acid, 1 yard each, in glass jar	1
Gauze, plain, sterile, 1-yard packages	6
Hot-water bottle and fountain syringe, combination, 2 quarts, good-quality rubber (1 year)	1
Medicine droppers, curved	4

¹ Contents of first-aid kit:

Applicators, wooden	each	12
Aromatic spirit of ammonia	ounce	1
Bandages, gauze, compressed, sterilized, assorted sizes	each	4
Compress, sterile	do	2
Cotton, absorbent, sterilized, 1 ounce	package	1
Muslin, for sling, 1 yard	piece	1
Tincture of iodine (POISON) (1 year)	ounce	1
Tourniquet (1 year)	each	1
Vaseline, carbolated (for burns), 1 ounce	tube	1

Medicine glass, thin glass (graduated up to 4 table and 8 teaspoons)-----	1
Safety pins, No. 2½-----	dozen 1
Scissors, bandage, 7 inches-----	1
Splints, yucca, sheets 18 inches long, 3½ inches wide, ¼ inch thick-----	set 1
Thermometers, clinical-----	2
Tourniquet (1 year)-----	1
Book: The Ship's Medicine Chest and First Aid at Sea, United States Public Health Service-----	1

(C) CONTENTS OF SHIP'S MEDICINE CHEST FOR USE ON SMALL VESSELS WITH CREWS NOT EXCEEDING 18 MEN

Bicarbonate of soda-----	ounces 8
Calomel ointment, collapsible tubes, U. S. Navy formula, V. D. prophylactic pack- age-----	dozen 1
Epsom salt-----	pound 1
Solution boric acid, 4 per cent (saturated solution) (1 year)-----	ounces 8
Tablets:	
Alkaline antiseptic-----	25
Aspirin, 5-grain-----	100
Brown mixture, 20-grain-----	500
Sun cholera, 5-grain-----	100
Tincture of iodine (POISON) (1 year)-----	ounces 4
Vaseline-----	do 4
FIRST-AID KITS, United States Public Health Service ¹ -----	2
Applicators, wooden-----	dozen 4
Bandages, roller or compressed, 2 inches wide-----	2
Cotton, absorbent, sterilized, 4 ounces to package-----	packages 4
Gauze, sterile, 1 yard-----	do 2
Tourniquet (1 year)-----	1
Book: The Ship's Medicine Chest and First Aid at Sea, United States Public Health Service-----	1

MEDICAL SUPPLIES FOR SHIPS AND STATIONS OF UNITED STATES LIGHTHOUSE SERVICE

Alkaline antiseptic tablets-----	each 50
Aromatic spirit of ammonia-----	ounces 4
Aspirin tablets, 5-grain-----	each 100
Boric acid ointment, preferably in collapsible tube-----	ounces 8
Boric acid, powdered-----	do 8
Brown mixture tablets, 20-grain-----	each 100
Bicarbonate of soda-----	ounces 4
Calomel and soda tablets, ½-grain-----	each 100
Camphorated oil-----	ounces 4
Castor oil-----	do 8
Compound alum ointment (for burns, scalds, etc.) preferably in collapsible tube-----	pound ½
Compound cathartic pills, vegetable-----	each 100
Eardrops (Formula: Carbolic acid, 1 fluid dram; glycerin, 7 fluid drams; well mixed)-----	ounce 1
Epsom salt-----	pound 1
Essence of Jamaica ginger-----	ounces 4
Essence of peppermint-----	do 2
Mustard, powdered (for emetic—to cause vomiting—see p. 60) (1 year)-----	do 4
Oil of cloves-----	do ½
Paregoric (poison)-----	do 4
Quinine sulphate, 5-grain capsules or tablets-----	each 100
Rhinitis tablets, full strength-----	do 100
Soap liniment-----	ounces 8
Sirup of ipecac (for use as emetic—to cause vomiting—see p. 61)-----	do 4
Sun cholera tablets, 5-grain-----	each 100
Sweet spirit of niter, dark-colored bottle (1 year)-----	ounces 4
Tincture of iodine (POISON) (1 year)-----	do 4
Vaseline-----	pound ½
Absorbent cotton, 1-pound packages-----	each 2
Absorbent cotton, 1-ounce packages-----	do 6
Adhesive plaster, 1 inch by 10 yards (1 year)-----	spool 1
Applicators, wooden, 6 inches-----	each 12
Atomizer, de Vilbiss No. 15-----	do 1
Bandages:	
Compressed, 3 inches-----	do 12
Muslin, 2 inches by 5 yards-----	do 3
Triangular, Esmarch's-----	do 3
Catgut No. 1, needle attached, in glass tubes (1 year)-----	tubes 12
Catgut No. 2, needle attached, in glass tubes (1 year)-----	do 12

¹ Contents of first-aid kit:

Applicators, wooden-----	12
Aromatic spirit of ammonia-----	ounce 1
Bandages, gauze, compressed, sterilized, assorted sizes-----	4
Compress, sterile-----	2
Cotton, absorbent, sterilized, 1 ounce-----	package 1
Muslin, for sling, 1 yard-----	piece 1
Tincture of iodine (POISON) (1 year)-----	ounce 1
Tourniquet (1 year)-----	1
Vaseline, carbolated (for burns), 1 ounce-----	tube 1

Catheter, rubber, No. 20 F. (1 year)-----	each--	1
Eye-cup, blue glass-----	do-----	1
Forceps, artery, straight. (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)-----	each--	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)-----	each--	1
Fountain syringe, 2-quart (1 year)-----	do-----	1
Gauze, picric acid, 1 yard each, in glass jar-----	do-----	1
Gauze, plain, sterile, 1-yard packages-----	do-----	6
Hot-water bottle and fountain syringe (combination), 2-quart, good quality rubber (1 year)-----	each--	1
Medicine droppers-----	do-----	6
Medicine glass, thin glass (graduated up to 4 table and 8 teaspoons)-----	do-----	1
Safety pins, No. 2½ or No. 3-----	dozen--	1
Scissors, bandage, 7 inches, for cutting gauze and bandages. (Sterilize by boiling)-----	each--	1
Splints, Yucca, sheets 18 inches long, 3½ inches wide, ¼ inch thick-----	set--	1
Thermometer, clinical-----	each--	1
Tourniquet (1 year)-----	do-----	1
Tooth forceps, incisor-----	do-----	1
Tooth forceps, molar-----	do-----	1
Wire gauze, made of heavy mesh malleable wire. (When well padded can be wrapped around a fracture for temporary dressing)-----	each--	1
Book: The Ship's Medicine Chest and First Aid at Sea, United States Public Health Service-----	each--	1

Those supplies above listed marked "one year" or "six months" should be renewed after that interval. Mark containers of all such articles with date of receipt.

This standard list should be consulted by the master or keeper when preparing requisition for medical supplies. The requisition should be forwarded to the Commissioner of Lighthouses (through the local superintendent) for approval and transmission to the Surgeon General, United States Public Health Service.

Unless otherwise stated, the doses mentioned in this book are intended for adults. To determine the dose for children, add 12 to the age of the child, and divide the age of the child by this sum. The fraction obtained will represent the size of the dose compared with that of an adult. For example, a child of 6 years old will require $\frac{6}{6+12} = 6/18$, or one-third of the adult dose.

CAUTION: Preparations containing opium, such as laudanum, paragoric, camphor, and opium pills, sun cholera mixture tablets, etc., should not be repeatedly used unless it is absolutely necessary to do so, because their frequent use is liable to produce the drug habit.

Alcohol, grain.

As a heart stimulant, alcohol should be given in 2 to 4 teaspoonful doses, well diluted with water. It acts quickly, but its effects are not of long duration, and the dose should be repeated as necessity indicates. Alcohol is used also as a disinfectant when cleaning sores. Alcohol rubs given over the whole body, but especially the back, are much appreciated by sick people.

Alkaline antiseptic tablets.

Useful for making gargles and mouth washes. One tablet dissolved in a glassful of water gives a good proportion. The tablets are not poisonous.

Aromatic spirit of ammonia.

Useful in weakness, faintness, headache, and shock. Dose: One-half teaspoonful in water every half-hour until relieved, or until three doses have been taken.

Aspirin (5-grain tablets).

Aspirin is useful to reduce fever, and to relieve headache, rheumatism, or pain in the joints and muscles. It is given in doses of 1 to 3 tablets (5 to 15 grains), repeated every 4 hours, if necessary. It should not be given in more than 60-grain amounts in 24 hours, and this amount should not be given more than 2 or 3 days consecutively. As soon as the pain is lessened, reduce the amount of the drug. Aspirin sometimes upsets the stomach; if given with small amounts of milk or other food, it will not do so.

Belladonna plasters.

Useful in rheumatism and for pains in the back. Should be worn only long enough to have the desired effect. Many persons have special susceptibility to belladonna, and poisoning may follow the use of a small plaster. Patients should be closely watched; and if the throat becomes noticeably dry or the pupils are dilated, belladonna poisoning is indicated and the plaster should be removed.

Bicarbonate of soda.

Bicarbonate of soda, or baking soda, is very useful for the relief of heartburn or for an uncomfortable feeling of fullness in the stomach after eating. It is best given in dose of three to four tablets of 5 grains each; or a half teaspoonful of the powder may be dissolved in a half glass of cool water and administered. In the acute stages of gonorrhoea, or "clap," three or four tablets taken dissolved in a glassful of water will often help to relieve the pain which occurs with urination.

Bichloride of mercury (POISON. For external use only).

CAUTION: Read directions carefully before using bichloride of mercury, because it is a violent poison, and great care should be exercised in its use. It is supplied in tablet form, each tablet containing $7\frac{1}{2}$ grains of the drug. The tablet contains a blue dye so that the solution will be colored. It is useful as an antiseptic wash for cleansing wounds, and also, in strong solutions, for disinfection of clothing, etc., and for washing floors and walls. For wounds and wet dressings it is useful in dilutions of 1 to 5,000 (one tablet to each $2\frac{1}{2}$ quarts of water). For scrubbing floors and walls, it is used in strengths of 1 to 1,000; for this purpose the bichloride is generally carried in the crude powdered form. *Bichloride of mercury must not be used internally.*

Bismuth subnitrate (5-grain tablets).

Useful in heartburn, dysentery, and diarrhea. In diarrhea or loose bowels it should be given in doses of from 20 to 40 grains (4 to 8 tablets, or, best, in a powdered form) every 3 or 4 hours. For heartburn, 2 to 3 tablets are usually sufficient.

Boric acid (powdered).

Boric acid makes a very good dusting powder for wounds; it is nonirritating to the flesh and may prevent the growth of germs. In solution it is a very good wet dressing, and is especially good as an eye wash. Four level tablespoonfuls of the powder dissolved in 1 pint of boiling water makes a satisfactory eye wash or a good solution for wet dressings for wounds or burns. To dissolve the powder, moisten it first with a few drops of water and break up the lumps, making the powder into a paste, and then add the rest of the water while stirring.

Boric-acid ointment.

This is a mildly antiseptic ointment and is nonirritating, so that it can be used for many purposes, such as dressing chafed skin, chronic sores, etc. It is especially useful as a dressing for burns, because it excludes the air and thus aids in reducing the pain to a considerable degree.

Bromide of soda.

This drug is useful in nervous conditions when there is much restlessness and sleeplessness. It is also of benefit in convulsions and in delirium tremens. It may be given in doses of 20 to 60 grains. The tablets should be dissolved in a half glass of cool water before they are taken.

Brown mixture.

This is a cough mixture put up in tablet form, each tablet equal to 20 grains. It is useful in controlling coughs. A tablet is allowed to dissolve on the tongue and the solution is swallowed. This may be repeated as necessary.

Calomel powder.

This powder may be used as a dressing for ulcers, sores, and wounds—especially those about the private organs. It is useful as a dusting powder for small skin wounds of any nature.

Calomel and soda ($\frac{1}{2}$ -grain tablets).

Calomel is a very valuable cathartic given at the beginning of an illness, where it is desired to clean out the bowels completely. It is especially valuable in so-called "bilious attacks." It is usually given in doses of $\frac{1}{4}$ grain or $\frac{1}{2}$ grain, 20 or 30 minutes apart, until two

or three grains have been taken. It may be given in one dose of $2\frac{1}{2}$ or 3 grains. However given, it should be followed in five or six hours by a dose of castor oil or Epsom salt.

Castor oil.

This oil is very generally used as a cathartic and is a very good one. It should not be given frequently, because it causes more or less constipation. A dose is 2 to 4 tablespoonfuls. The taste may be somewhat disguised by giving it in orange or lemon juice.

Chlorate of potash (5-grain tablets).

These tablets, dissolved in water, make a very good mouth wash and gargle in cases of sore mouth and throat. Dissolve five or six tablets in a wineglass of water. The solution should not be swallowed.

Calcium hypochlorite, or bleaching powder (Chloride of lime).

This drug is used for disinfecting impure drinking water. A fourth of a teaspoonful of bleaching powder, taken from a freshly opened can, should be added to each barrel of water to be treated, and the water should be stirred thoroughly and allowed to stand a half-hour before using it. A 5 per cent solution (about 6 or 7 ounces to a gallon of water) is very effectual for disinfecting bedding, clothes, toilets, urinals, etc., that have come in contact with sick persons.

Chloroform.

Chloroform is one of the most valuable drugs used for rendering persons unconscious when it is necessary to perform surgical operations, or when it is necessary to put a patient to sleep in order to relax his muscles so as to reduce a dislocation or fracture of the bones.

Chloroform should be used with extreme care and should be given only when absolutely necessary.

When putting a patient to sleep, see that he has no food, tobacco, false teeth, nor anything else in his mouth, because such things might find their way into the windpipe and strangle him to death. See that the neckband of his clothing is loosened and turned back. Chloroform often blisters the skin, and so the skin of the face should be lightly covered with vaseline or zinc-oxide salve. Place a chloroform mask (use two or three thicknesses of cloth or gauze, if a regular mask is not available) over the patient's nose and mouth. Drop (do not pour) the chloroform upon the cloth at the rate of about 10 drops a minute. The exact amount of chloroform to drop in a minute necessarily depends upon the patient, some requiring more than others. Do not be in too much of a hurry to put the patient to sleep.

Watch him closely. The person who is giving chloroform should know how to take the pulse. There is a small artery located on the temple just in front of and a little below the upper margin of the ear. By placing the tip of the finger over this artery, the pulse may be felt. The finger should be kept on this pulse all the time; the instant it becomes irregular or stops, take the mask away and begin to revive the patient by giving fresh air, slapping his chest, or giving artificial respiration.

Another danger signal that must be constantly watched for is the cessation of breathing. Often before a patient falls sound asleep he

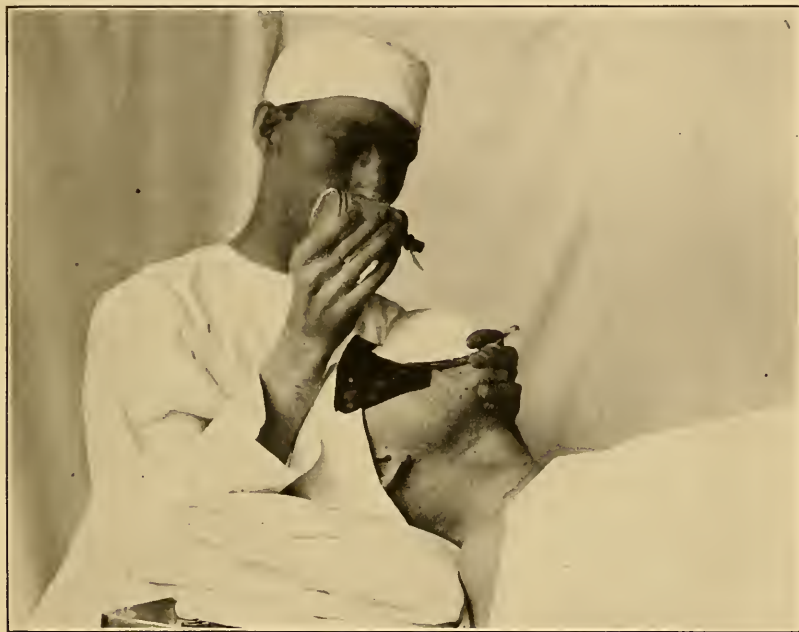


FIG. 11.—Method of administering chloroform

will unconsciously hold his breath. Take the mask away, and as soon as he takes a deep breath put it back again. The next few breaths will be quicker and deeper, and he will very likely get enough chloroform to put him to sleep. When he is asleep, it takes but a drop of chloroform now and then to keep him under its influence. Should he stop breathing and not begin again within a reasonable period, take the mask away and proceed immediately to give artificial respiration (see p. 178).

Watch the patient's pupils. If they enlarge suddenly, take the mask away, since enlargement of the pupils is a sign that too much chloroform is being given.

The person giving the chloroform should constantly watch the patient's face and should not pay any attention to what the first-aid man is doing for the patient.

When the patient is falling asleep, his jaw often drops; hold the jaw up with the little finger and ring finger of one hand. Have a pair of forceps at hand, and if the tongue falls back in the throat and begins to choke the patient, pull it forward with the forceps.

If the patient begins to vomit, turn his head to one side; keep his head low and his mouth open. With a piece of cloth keep mouth and nose free from vomit.

Most people who are being put to sleep will struggle and fight against the operation. It is therefore advisable to have others at hand to hold the patient.

If a patient's color changes, taking on a purplish tinge, something is wrong. Remove the mask and allow him to take one or more breaths of fresh air; as soon as his natural color returns, continue with the chloroform.

After the operation someone should sit by the patient until he has come out from under the influence of the chloroform, because he will need attention in case he should vomit or attempt to get out of the bed.

Chloroform is also used in liniment, and in this form is valuable in cases of rheumatism. Chloroform liniment is made by adding 1 tablespoonful of chloroform to 2 tablespoonfuls of soap liniment. Allow the chloroform liniment to evaporate completely before applying a bandage or covering the skin. If the liniment is confined against the skin, it will make a bad blister.

Internally, chloroform is of use in prolonged attacks of hiccough, and for cramps, or pains in the stomach. The dose for internal use is 8 or 10 drops in half a glass of water.

Compound cathartic pills.

These pills are very effective. A dose is one to three pills; one usually produces a movement of the bowels, while three cause rather violent purgation.

Cresol solution (POISON).

CAUTION: Read directions carefully before using. Cresol solution is used only as a disinfectant. It is excellent for scrubbing floors, etc., and for disinfecting soiled clothing and discharges of those sick with infectious diseases. Its strength may be 1 to 5 per cent. Two teaspoonfuls of the drug added to 1 quart of water will make a 1 per cent solution.

Dover's powder tablets.

Contains powdered opium.

Useful in colds and bronchitis and to stop cough and bronchial irritation. If taken with hot drinks, they often produce sweating. Dose: One tablet every three or four hours.

Ear drops.

Formula: Carbolic acid, 1 fluid dram; glycerin, 7 fluid drams. Mix well by shaking.

The solution should be warmed before it is used, but not made too hot. Two or three drops put in the aching ear are usually sufficient, but may be repeated two or three times during the day if necessary. Shake well before using.

Epsom salt.

This is a very good cathartic and produces a watery stool. It is generally given after a dose of calomel. A dose is 2 to 4 tablespoonfuls dissolved in water. It is less difficult to take if dissolved in a small rather than a large amount of water; but a full glass of water should be drunk immediately after swallowing the dose.

Extract of beef.

Useful when patient can not take solid food. Has some food value, but can not be depended upon to supply all the nourishment required by the patient. It often serves to stimulate the appetite and may be of value in this way. Directions on jar should be followed in preparing the extract for use.

Eye solution (4 per cent cocaine solution) (POISON).

This cocaine solution is to be used to relieve severe pain in the eye, particularly that caused by the presence of a foreign body. It sometimes happens that a particle of steel or some other foreign body becomes lodged in the eye, and that because of the pain and tenderness the patient can not bear to have the particle removed. The cocaine solution may be used to deaden the pain so that the foreign body may be extracted. A few drops (2 to 3) of the solution are placed in the affected eye, and a few minutes are allowed to elapse before attempting the removal of the foreign body. Sometimes it may be necessary to add another drop or so of the solution and to wait a few minutes more until the eye has no further feeling of pain, when the foreign body can probably be removed. But *great care* must be used in this operation not to injure the eye. When irrigating the eye, use either an eyecup or a medicine dropper. Some persons have marked susceptibility to cocaine, and it should be used with great caution. The patient should be closely watched.

Mercurial ointment.

This is commonly known as blue ointment. It is useful in destroying crab lice and is sometimes used as a dressing for chronic ulcers. For crab lice, it should be smeared over the hairy parts and allowed to remain for a day or two. The parts should then be thoroughly washed with soap and water. Repeat the application, if necessary.

Morphine sulphate (POISON).

Morphine is one of the most valuable drugs and also one of the most dangerous. It is habit-forming, and therefore *should be used only when absolutely necessary*. It is the most effective drug we have for the relief of pain, but should never be used until other remedies have been tried. For use by the mouth it is supplied in $\frac{1}{4}$ -grain tablets and should be given in this form, one tablet ($\frac{1}{4}$ -grain) at a dose. If the pain is not relieved within three-quarters of an hour, another dose of $\frac{1}{4}$ grain may be given. Not more than three doses (a total of three-fourths of a grain) should be given within a period of four hours.

Mustard.

Applied externally, this is useful as a counterirritant to the skin. It should be put on as a plaster, or poultice, made as follows: One part of mustard is thoroughly mixed with two to four parts of flour and the mixture is made into a paste with a small amount of tepid water. The paste should be spread on a cloth and applied. Care should be taken that the mustard does not blister the skin. As soon as the skin becomes red, which will be only a few minutes after the application, remove the plaster.

Mustard is sometimes given internally to produce vomiting. The dose for this purpose is one tablespoonful of mustard stirred to a cream with a small amount of tepid water and a cupful of tepid water added.

Oil of cloves (for external use only).

Useful in toothache; one or two drops on a piece of absorbent cotton are introduced into the cavity of the tooth, care being taken that the oil does not get on the gums or tongue. *Do not give oil of cloves internally.*

Paregoric (POISON; contains opium).

Useful to quiet cough, to relieve pain in the stomach and bowels, and to check diarrhea. Dose: 1 to 2 teaspoonfuls in water. It may be repeated in three or four hours; but since paregoric contains opium, it should not be given oftener than is absolutely necessary.

Permanganate of potash.

This is used in solution as an injection in the treatment of gonorrhoea (clap), and as a wash for sores and ulcers of any kind, but especially for those that have a bad odor. In treating gonorrhoea it should be used in proportions of 1 to 4,000 or 1 to 5,000, three or four 1-grain tablets being dissolved in 1 quart of water. For ulcers and wounds it may be as strong as 1 to 1,000, the solution being made by dissolving fifteen 1-grain tablets in 1 quart of water.

Quinine sulphate (capsules or tablets, 5-grain).

This is the one drug that will cure malaria, and which, moreover, if taken in time and properly, will usually prevent the development of the disease. For the treatment of the disease it should be given as follows: 10 grains 3 times a day for the first 3 or 4 days, then 10 grains every night for 8 weeks. When a ship is going to a port where malaria prevails, each member of the crew should take from 5 to 10 grains of quinine each day for at least a week before entering the port and continue taking it until well away from the infected area. Such a precaution will usually prevent the contraction of the disease. In any case the personnel of the ship should be protected against mosquitoes.

Rhinitis tablets (full strength).

These tablets are useful in the early treatment of colds. Dose: One or two tablets every two hours; but not more than four doses a day should be taken. If the throat becomes dry, stop taking the tablets.

Sirup of ipecac.

Useful in bronchitis, cough, and hiccough. Given in doses of 10 drops every three hours. To produce vomiting, it is given in doses of 1 to 2 tablespoonfuls.

Soap liniment (for external use).

This is a good all-round liniment for muscular soreness, bruises, sprains, etc., though perhaps as much benefit is derived from the rubbing used in applying it as from the liniment itself.

Strychnine sulphate (POISON). (Tablets, $\frac{1}{60}$ -grain.)

Strychnine is a stimulant and is sometimes used when the heart action is weak, or in cases of general body weakness. The chief use of strychnine is as a general tonic, for which purpose it should be given in doses of one $\frac{1}{60}$ -grain tablet three times a day.

Sulphur ointment.

The chief use of sulphur ointment is for the treatment of scabies or itch; it is also effective in the treatment of other skin diseases. In treating itch, the ointment should be thoroughly rubbed into the skin for three successive nights, and no baths should be taken until

the fourth day, when the patient should take a warm, cleansing bath and put on fresh clothes. It may be necessary to repeat this treatment, but not for several days. Too frequent use of sulphur ointment may cause an eczema which may be mistaken for itch.

Sun cholera mixture.

The combination of drugs is useful in relieving distress from cramps and diarrhea and in reducing the number of bowel movements. The dose is from 5 to 10 grains (1 or 2 tablets) every 2 or 3 hours.

Sweet spirit of niter.

Useful in fevers, wind colic, and colds, and to increase the secretion of urine and sweat. Dose: From one-half teaspoonful to 1 teaspoonful in water every 3 or 4 hours.

Tincture of iodine (for external use only).

This substance is very generally used as an antiseptic, and is of value because it is not only effective but very simple to apply. It should be painted on the skin around the wound, which should also be swabbed out with it. When it is to be used copiously within wounds it should be diluted with an equal quantity of alcohol. Before opening a boil or an abscess, the skin over the affected area should be painted with iodine. Before a cut is sewed up, the wound should be painted with iodine. In very strong solutions, especially when the area is covered after painting, iodine may blister the skin; therefore do not put a heavy dressing over an area that has been painted. Any excess of iodine may be removed by washing the spot with alcohol. Do not paint any portion of skin with iodine several times in succession, or blistering will follow.

Turpentine (to be used externally).

A counterirritant in pleurisy, colds, bronchitis, and lumbago. Its most important use, however, is for getting rid of the gas which sometimes accumulates in the bowels during the course of pneumonia and typhoid fever, and sometimes from other causes, such as indigestion. In such cases turpentine stupes are often of great assistance. These are prepared by wringing out a cloth, of a double layer of thin flannel, or small towel, soaked in a pint of hot water to which a teaspoonful of turpentine has been added. The flannel, while hot, is applied to the abdomen, covered with a thick towel, and allowed to remain for 10 or 15 minutes. It is then removed, allowing the thick towel to remain, and again soaked, wrung out, and applied as before. This process may be repeated several times if necessary.

Zinc oxide ointment.

Useful in case of inflamed, itching, or irritated skin and for eruptions or breaking out of the skin. It is also of value in cases of sunburn.

CHAPTER IV

MEDICAL FIRST AID AND SYMPTOMATIC TREATMENT

The General Principles of the Treatment of Disease

The object of all treatment is to assist nature to a cure. Violent methods should never be employed; gentleness and great care should be the rule. The restraint of the sick man should be just enough to prevent his doing injury to himself and others. It is not enough that his physical wants shall receive attention; his mind should be kept in as cheerful a condition as possible. No two people react exactly alike to disease or treatment.

Rest may be local or general. Its object is to allow nature a chance to work. Thus, in a broken finger the entire hand should be tied up in such a way as to prevent it being used, since, by motion, the broken ends of bone may be displaced and the new bone tissue injured, with the result that pain, interference with healing, and deformity may follow. A certain amount of shock follows every injury. Rest is the best method of allowing the body to readjust itself.

In the absence of a medical officer, *the treatment of the sick is the responsibility of the master*; while he may detail others to perform this duty, he can not evade the responsibility for their acts; he must see to it that those so detailed perform their duties with judgment and great patience. Knowledge and experience are equally essential.

Before going into a discussion of the treatment of each disease, it will be necessary to take up general principles that should be followed in the handling of sick patients aboard ship. Very often the general care of the patient does more to hasten his recovery than all of the remedies in the Ship's Medicine Chest.

The bed for the sick man should be clean and comfortable. Preferably, the mattress should be made of hair and should have a fairly even and firm surface. A rubber sheet should be spread over the mattress to prevent it from becoming soiled. The rubber sheet should be covered by a blanket and sheet to prevent chafing. The remainder of the bed clothing should be sufficient to retain heat, but not so heavy as to cause restlessness and discomfort. Very weak patients and those with burns or fractures may require protection by a framework so arranged that the bed clothing does not rest upon the patient. Before being put to bed, the patient should be bathed

and put into clean night clothes, pajamas or night shirt, if practicable; at least he should be put into clean underwear. Night clothes should be changed often enough to keep the patient clean.

The sick room should be well ventilated, with plenty of natural light. (See Chapter III: Sick bay.) Simple furnishings that can be scrubbed at the end of the illness are highly desirable and advantageous.

Cleanliness of the patient's body is essential. Baths should be given to cleanse the skin; and in patients with high fever, cold baths have a definite action in lowering the temperature. For cleansing baths, soap, warm water, and a cloth are all that are necessary. If the patient is not too ill, he should be bathed in a tub; if that much exertion is not advisable, he should be bathed in bed. (See p. 70.) It is well to begin with the face, arms, and hands, drying these parts before uncovering the chest and abdomen. In very sick patients and in those who are likely to be bedridden for some time, brisk alcohol rubs over the back and outbacks are very essential procedures for the prevention of bed sores and breaks in the skin.

As has been previously stated, accurate records of all cases of illness should be kept regardless of their nature. These should state the patient's name, age, and previous illnesses, and all the important details of the present complaint. The patient should be examined and the data obtained by the examination should be added to the record. The treatment given the case, the daily temperatures, pulse, and respirations should be recorded, and the daily progress of the case should be noted. Precautions taken to prevent the spread of the disease, if it is communicable, should also be noted on the record.

The information afforded by such records will be of tremendous value to quarantine officers and other physicians who may be consulted when the ship arrives at a port.

EXAMINATION OF THE SICK

The first step in treating a sick person is to make a diagnosis. To repair a machine, one must first know what is wrong with it; therefore, the sick man should be questioned in detail as to his complaint and the duration of his symptoms. He should then be sent to his quarters, if no hospital is maintained aboard ship, where, after he has undressed, the officer will examine him carefully. A good plan is to make a written record first, describing the complaints of the patient and giving all the history it is possible to obtain in respect to those complaints, and then to make the physical examination as follows: Observe the patient's general appearance, the color of his skin, any sores or enlargements and anything else about him that appears to be abnormal, from the top of his head to the

soles of his feet. Examine his mouth, throat, tonsils, etc. Go over his body carefully with the fingers to locate tender or painful parts. This should be done with gentleness and care.

Such a thorough examination often brings out valuable additional information which will enable the officer to make a correct diagnosis. The temperature and pulse and respiratory rates should be counted in all instances, and, if abnormal, should be retaken at least three times a day while the illness lasts.

In every ship's medicine chest there should be a clinical thermometer for measuring the patient's temperature. In taking the temperature, the mercury should be shaken down. To do this, grasp the end opposite the bulb firmly in the hand; the hand and arm then describe a short arc and end abruptly with a sharp snap of the wrist; repeat until the column of mercury is well below the arrow on the scale. The thermometer should then be cleaned with alcohol.

The bulb of the thermometer should then be placed under the patient's tongue and his mouth closed; it should remain for at least two minutes in this position. The Centigrade thermometer graduated from 34° to 44° (37° being normal) is the one most commonly used on board ship. (See illustration.¹) It is very essential that all cases of sickness with temperature above 37° C. should immediately be reported to the quarantine officer upon arrival in port.

In cases of very severe illness, the temperature may be taken in the armpit (axillary temperature) or in the rectum (rectal temperature). The axillary temperature is about half a degree Centigrade below mouth temperature and the rectal temperature is about half a degree above the mouth temperature.

Rest.—A sick person needs rest; and so the patient should undress, go to bed, and stay there. Since rest is one of Nature's best remedies and plays a most important part in all cases of recovery from illness, it should be enforced. Physical rest is best obtained by lying in a comfortable bed. Mental rest, which is of almost equal importance, is promoted by placing the patient amid pleasant surroundings and, as far as possible, relieving him of worry—particularly in respect to the outcome of his illness.



FIG. 12.—A clinical thermometer

¹ To change from Centigrade to Fahrenheit reading: Centigrade reading times 9 divided by 5, plus 32. To change Fahrenheit to Centigrade: Fahrenheit reading minus 32 times 5 divided by 9.

NURSING THE SICK

One of the most essential qualifications for an attendant is experience in handling the sick, which includes giving sponge baths, taking temperatures, pulse, and respiratory rates; preparing the food to be given; administering medicine at regular intervals; giving enemas; and otherwise carrying out the directions of the ship's master or other officer in charge of the case. Another and very important requisite for an attendant is kindness; a sick person should be handled with tact and sympathy, which can do much to help him to secure mental rest.

In cases of suspected communicable disease, the person designated to care for the sick should not be allowed to perform any of the other duties, especially the preparation of food for the remainder of the crew. If possible, he should wear clothes that may be sterilized by boiling. He should help to prevent the spreading of the disease by strictly avoiding contact with the well. In all cases of communicable disease the patient and attendant should be isolated, and contact with other persons on board forbidden.

FOOD FOR THE SICK

A sick person should not be allowed an ordinary or heavy *diet*. If he has fever, his food should consist of liquids or semiliquids, milk, cocoa, egg drinks, buttermilk, fruit juice from canned fruits, such as pineapples, pears, etc. Strained soups may be given. A semisolid diet may consist of oatmeal, custard, soft-poached or soft-boiled eggs, milk toast, jelly, ice cream, cream, butter, etc. When giving a liquid diet, the patient must be fed frequently and at regular intervals—about every two or three hours. The diet should be varied from time to time or from meal to meal, in order to stimulate the appetite. When practicable, the diet tray should be temptingly arranged, because it is often difficult to induce a sick person to take sufficient nourishment.

CARE OF THE BOWELS

When a person reports sick, prompt attention should be invariably given to the question of the excretions. The intestines should be thoroughly emptied by the method best suited to the condition of the patient. If he is suffering from colic or gas and pain in the abdomen, he should be given a rectal injection of soapsuds. If an evacuation is not so urgent, a cathartic may be given by mouth. There are various remedies that will act effectively by this method, such as Epsom salts, compound cathartic pills, calomel, and castor oil. *If appendicitis is suspected, cathartics should never be given.*

In most other conditions the bowels should move at least once a day; in case they do not, one of the above-named remedies should

be given. Remember that one of the first steps in the treatment of the sick is to clean out the bowels so as to remove the poisonous substances they may contain, and that throughout the period of sickness the bowels must be constantly kept open. The severity and the duration of a disease are usually much lessened by keeping up good elimination through the bowels.

ENEMAS

Enemas are used when it is necessary to wash out the lower part of the bowel. Many different preparations or solutions are used for this purpose, according, of course, to the condition of the patient. For example, to simply wash out the bowels, the best solution to use is soapsuds. To make this solution, shave a few pieces of castile soap into a container, add warm water, and mix until enough soap is dissolved to make good suds. Olive oil is sometimes used as an enema. A normal salt enema is made by dissolving 2 level teaspoonfuls of table salt in a quart of warm water. Salt enemas are often given in shock; they should be injected very slowly, so slowly, in fact, that the solution may enter the bowel at the rate of about 30 or 40 drops a minute. Given at this rate, the salt solution can be absorbed by the body so as to stimulate it. Often a turpentine enema—a teaspoonful of turpentine to a quart of water—is given when the intestines become distended with gas. A nutrient enema is used when it is necessary to give food to a patient who can not take it by mouth. By means of nutrient enemas, perhaps in different combinations, such liquid foods as meat broth, milk, and eggs are injected into the intestines.

When giving an enema, have the patient lie on either his back or his left side with the knees drawn up. The rectal tube should be smeared with vaseline. The solution should not be allowed to flow in too rapidly. A quart of solution is usually all that can be taken at one time. The patient should be told to hold the solution as long as he can—at least 10 or 20 minutes, if possible. Sometimes massaging the abdomen increases the effectiveness of the enema. For washing out the bowel, the enema may be repeated until there is reason to believe that the intestines are thoroughly emptied. In case the first injection does not return after waiting a half-hour or an hour, another quart of liquid should be injected.

When a saline (salt) enema is given for stimulation in case of weakness, or when a nutrient enema is given, the solution should enter the bowel very slowly by the drop method, so that absorption may take place.

Should a patient, for any reason, become unable to pass his urine, such as in spasm from a urethral stricture, it will be necessary to *catheterize* him. Before resorting to the catheterization every means

available to make the patient void his urine should be tried. Turning on the faucet and allowing the water to run for a few minutes will often cause relaxation of the bladder sphincters and allow urination to follow. Sometimes after many attempts to use a urinal while lying down in bed, a bed patient can pass urine on standing. Allowing the patient to sit in a tub of warm water will often cause relaxation and allow him to void his urine. If all of these fail, it is necessary to catheterize the patient.

Two kinds of catheters may be used—the rubber catheter, which is soft and pliable, and the metal catheter, firm and bent in a curve to fit the natural curve of the prostatic urethra. It is always best to first try the rubber catheter. It should be boiled each time before using and oiled with sterile vaseline. The mouth of the urethra should be cleansed with soap and water and the catheter gently passed into the opening. If resistance is met, it is probably due to spasm of the neck of the bladder. Continuous gentle pressure will often overcome this, and the catheter will slip into the bladder.

If the rubber catheter can not be passed, the metal one should be tried, but not until every patient and careful attempt has been made with the rubber catheter. Too much pressure with the metal catheter is dangerous, and if resistance is met after prolonged gentle pressure, attempt at catheterization should be abandoned for the time.

Patients with high fever and those obviously ill should not be allowed to get out of bed to move the bowels or pass the urine, but should be made to use the bedpan. This should be washed and disinfected carefully, especially in cases with infectious diseases.

DISINFECTION OF EXCRETIONS

The attendant should be familiar with the use of disinfectants. If the patient has typhoid fever, dysentery, cholera, or a similar communicable disease, certain precautions must be taken to prevent the spreading of the disease to others. Any or all of the excretions—saliva, stools, urine, and sweat, especially the first three—may contain the disease germs. The patient should expectorate in a sputum cup, which should later be burned. The stools and urine should be disinfected in the receptacle in which they are collected. In disinfecting the excretions the germicide (germ killer) best suited for the material to be treated should be used. Formaldehyde, carbolic acid, and cresol are best for disinfecting excretions from the bowels and kidneys. From 2 to 5 per cent is the correct proportion for carbolic acid or cresol; in other words, to a quart of excretion (stool and urine) add not less than 2 teaspoonfuls of either carbolic acid or

cresol, stir the mixture thoroughly, and allow to stand for three or four hours before final disposition is made.²

In using formaldehyde, add enough to the excretions to make a 10 per cent solution; that is, to a quart of excretions add not less than 4 teaspoonfuls of formaldehyde, stir the mixture thoroughly, and allow it to stand for several hours before disposing of it.

Other disinfectants of value for treating the excretions are lime, chloride of lime, or bleaching powder, and bichloride of mercury. Lime is cheap and effective. It destroys organic matter and, in 20 per cent strength, kills practically all germs. To a quart of feces or excretions, add not less than 8 heaping teaspoonfuls of fresh lime, thoroughly mix, and allow mixture to stand from 1 to 2 hours before disposing of it.

Chloride of lime, or bleaching powder, is a good disinfectant, but the presence of organic matter decreases its power; therefore, as with lime, considerable quantities of it have to be used for the disinfection of feces and similar material. With a quart of feces, mix not less than 8 teaspoonfuls of chloride of lime, stir thoroughly, and allow to stand for a few hours before final disposition.

Bichloride of mercury, or corrosive sublimate, is furnished in the medicine chest in $7\frac{1}{2}$ -grain tablets, a convenient form for making solutions of a definite strength. Bichloride of mercury is a very effective germ killer, but the presence of organic matter decreases its power; therefore, in disinfecting feces and urine, it must be used in strong solutions. To a quart of excretion (bowel content and urine) add two to four bichloride tablets, first dissolving these in a small quantity of warm, fresh water or sea water. Mix the bichloride thoroughly with the excretion and allow the mixture to stand from three to four hours before final disposition.

DISINFECTION OF BEDDING, DISHES, ETC.

The attendant caring for a patient with a communicable disease should look after the disinfection of all bed sheets, other bed clothing, and dishes—everything, in fact, that has been handled by the patient or his attendant should be thoroughly disinfected before being handled by others.

When the bedding and clothing, sheets, blankets, pillowcases, night-shirts, etc., are changed, the soiled pieces should be soaked in a solution of bichloride of mercury or carbolic acid. If bichloride of mercury (corrosive sublimate) is used, add two $7\frac{1}{2}$ -grain tablets to a quart of water. If carbolic acid is used, add 2 or 3 teaspoonfuls to a quart of water. Allow the articles to soak for several hours, and

² When at sea, disinfection of stools and urine is not necessary, but in port and on the lakes and rivers it is necessary. The bedpan or bucket should always be sterilized.

then boil them. Several rinsings of clear water should be given to remove the odor of carbolic acid, which is disagreeable to some people.

Dishes and other articles that can be boiled may be sterilized by boiling them in water for at least a half-hour. Any food left on his tray by the patient is best disposed of by burning.

PRECAUTIONS FOR ATTENDANTS

The attendant should know how to protect himself. In handling infections or communicable cases, certain precautions should be taken. After each occasion of handling the patient, the attendant should wash his hands with soap and water, rinse them, and wash again in a solution of bichloride of mercury (two $7\frac{1}{2}$ -grain tablets to a quart of water). It is a good plan to keep a bucket or basin of disinfectant solution by patient's bedside. The attendant should be careful always to keep his hands away from his face, this being the most frequent way of transferring germs to the mouth. The hands should be washed before eating and after going to the toilet.

TERMINAL DISINFECTION OF SICK ROOM

The quarters occupied by the sick should be kept as clean as possible. No one except patients should be allowed to occupy the sick room. The floors, walls, and furniture of sick rooms may become contaminated with disease-producing germs and these disease organisms must be destroyed. Dryness and sunlight will kill the germs in time, but are slow and not absolutely reliable. For prompt and sure results, therefore, it is necessary to employ other means of disinfection.

The floors, walls, and furniture may be washed with a strong solution of bichloride of mercury, one or two $7\frac{1}{2}$ -grain tablets to a quart of water.

Bleaching powder, or chloride of lime, makes an excellent disinfectant for unvarnished walls, floors, etc. It should be used in a strong solution, not less than 6 ounces to a gallon of water. Carbolic acid, cresol, lysol, and formaldehyde may be used, but chloride or bichloride of lime is quite reliable and is easily handled.

Before permitting a patient who has recovered from a contagious disease to associate with other members of the crew, he should be cleansed as thoroughly as possible. He should then be given a warm bath and should put on clean clothing. His head and beard should be well shampooed.

BATHS

Whether or not a patient is confined to bed, he should be given a bath at regular periods—daily, if possible. A warm shower is

best for a patient who is not confined to bed. A patient who is confined to bed must be bathed by the attendant. A rubber sheet should be placed beneath the patient and a sponge bath should then be given, washing one part at a time and keeping the rest covered until the whole body has been gone over. Drying with a towel should be accompanied by brisk rubbing, in order to stimulate the circulation.

To reduce fever, baths are a most important method. If the fever is over 39° C., a sponge bath should be given every four or five hours. The temperature of the water should vary according to the illness of the patient and his physical condition. If extremely ill, a warm bath is used; but if the patient is robust and strong, there is no objection to the use of cold water.

To give the bath in bed, strip the patient and cover him with a sheet or blanket. Using a cloth dipped in the water, rapidly go over the upper portion of the body several times until thoroughly cooled; quickly dry the area sponged and cover with the sheet while the lower area is being sponged. Follow the whole procedure with a quick alcohol rub. Change the sheet or blanket for a dry one and leave the patient covered only lightly for 15 or 20 minutes.

The tongue of a sick person often becomes coated, and there is a collection of foul-looking mucus on the teeth. It is therefore necessary to look after the patient's mouth regularly. If the patient is able to do so, he should brush his teeth and rinse his mouth daily with a solution made by dissolving an alkaline antiseptic tablet in a glass of warm water. The teeth should be cleaned and the mouth rinsed at least twice a day. If the patient is unable to care for his mouth, the nurse should do it for him, swabbing out the mouth and cleaning the teeth with a piece of clean gauze wrapped around the finger and wet with the alkaline antiseptic solution.

Medicines prescribed should be given at regular intervals. The nurse should not guess at the dose, but should measure it, if it is a liquid, with a teaspoon or a medicine dropper.

Relief of pain is often obtained by the application of either heat or cold. If the patient feels cold he should be covered with blankets and hot-water bottles should be placed near him. A warning may be given here in respect to the use of hot-water bottles: A patient who is unconscious or asleep may easily receive a bad burn from a hot-water bottle placed too close or not well wrapped up. Fruit jars or other bottles or jugs filled with hot water may be used.

Hot applications, or wet heat, are applied by wringing a flannel cloth or gauze out of a hot solution and laying it on the spot to be treated. In case of wounds, the hot solution is best made of boracic acid. If there is no wound, the cloth may be wrung out of hot

water in which Epsom salts have been dissolved; this solution is recommended for painful joints, as in rheumatism, or for bruises. Turpentine stupes also afford much relief for painful and swollen joints, as well as for pains in the abdomen. These are prepared by wringing out a towel or cloth which has been soaked in hot water containing a teaspoonful of turpentine to the quart.

Cold applications often help to relieve headaches. An ice bag partly filled with chipped ice or ice-cold water should be applied to the head and left on for 15 to 20 minutes. It should then be removed and kept off for the same length of time. The application should be repeated as often as necessary.

Sometimes there may be a suspicion that a person who says he is sick is only pretending. In such a case caution must be exercised since it sometimes happens that a very sick man does not have the appearance of being sick. It would be much better to have a malingerer succeed in his deception than to be unjust to a really sick man. If malingering is suspected the deception can nearly always be detected by careful watching.

When a patient is recovering from a disease he should not be allowed to resume his work until the ship's master is satisfied that he is able to do so without injuring his health. During the period of recovery, when the patient is able to sit up, he should, whenever the weather permits, be carried on deck and placed where he can get the sun.

In all cases of contagious disease definite steps should be taken to prevent the disease from affecting other members of the crew. The steps that should be taken in this regard will depend upon the way in which the disease is spread from one person to another. If water is the medium by which the disease is spread, the water containers must be cleaned and disinfected and then filled with fresh, clean water which is free from the disease-producing germs. If the disease is spread by mosquitoes, these insects must be destroyed as far as possible, and the patient and crew must be protected by screening. For each disease there are certain precautions to be followed out. These are discussed in Chapter V under the names of the various diseases.

Asthma.

Asthma comes on abruptly, beginning, as a rule, during the afternoon or early evening. Sometimes the attack is preceded by a feeling of constriction in the chest; later there is an intense desire for air and the breathing is labored and accompanied with loud wheezing; the face is flushed—at times even blue. The eyes are staring, the eyeballs protrude, the muscles of the neck stand out. The breathing becomes so difficult that each inspiration is but a gasp; the patient

feels as if death were impending. After some minutes, or perhaps hours, the attack subsides.

Treatment.—The treatment of asthma on board ship should be limited to relieving the acute attack. This can often be done in milder cases by giving 10 to 15 grains of aspirin early in the attack. More severe attacks are nearly always relieved by hypodermic injection³ of from 5 to 10 drops of adrenalin. Either of these medicines can be repeated once or twice after an interval of one hour after the previous dose. Morphine should be used only in the very extreme cases where the above remedies are not effective. It should be given in 1/8-grain dose, repeated once or twice, if necessary, after a half hour. Not more than four doses should be given. The earlier the attack is treated, the easier it is to break it up.

Backache.

Backache may be due to a number of causes. It may result from a strain, the onset of an infectious fever, or from influenza and rheumatism. Severe backache is one of the first symptoms of small-pox and yellow fever. Many backaches result from sleeping on a sagging bed.

If the backache is not severe, it is usually best for the patient to be given a liniment (soap liniment is good) and to have an attendant rub it thoroughly into the back.

A mustard plaster applied to the back often gives relief. The plaster is made by mixing one teaspoonful of mustard with four teaspoonfuls of flour and making this into a thick paste with a small amount of water. Spread the paste on a piece of cloth and apply to the back. In a few minutes, or when the skin becomes quite red, remove the plaster, or it may blister.

Persistent backache may sometimes be relieved by strapping with adhesive plaster, which extends from the front of the hip on one side to a similar point on the opposite side, being very tightly applied. Strips 3 or 4 inches wide should be used and should overlap each other at least an inch. The whole dressing should be about 8 inches wide. The plaster may irritate the skin after being applied several days, causing eczema-like eruption and sometimes little blisters. This condition readily heals after an application of talcum powder.

Chills. (See also Malaria and Pneumonia.)

Chills are usually an indication of the onset of some general disease. They frequently occur either combined with or shortly followed by fever. The chill may be either mild or severe. It may be merely a chilly feeling or the patient may become blue and shake with cold.

³ Every ship's officer should learn the simple operation of hypodermic injection.

Treatment.—During the chill put the patient to bed, give warm drinks, such as hot whisky and water, or hot tea. Cover well with blankets and use hot-water bottles under the blankets, being careful not to burn the patient. When the chill is over, take the temperature, which will usually be elevated. In such case treat as for the fever, trying to find the cause of the chill if possible and then treating the specific disease.

Colic, Abdominal.

An ordinary attack of colic is manifested by sharp pains in the abdomen, which last from a few seconds to several minutes and then subside, only to recur again and again. The pain and distress are at times very severe; the patient is pale and is covered with a cold sweat; vomiting may or may not occur. The application of pressure to the abdomen during an attack may somewhat relieve the pain.

The usual cause of colic is indigestion which has resulted from eating unripe fruit or tainted food. There may be constipation or diarrhea. If the attacks of colic persist and the prostration is great, ptomaine poisoning or lead poisoning should be suspected. *Do not mistake a case of appendicitis for colic.*

Treatment.—If sure that the case is one of colic, begin by giving the patient an ounce or two of castor oil. A hot-water bottle placed on the abdomen or a hot turpentine application by adding a tablespoonful of turpentine to 2 quarts of hot water; wring out cloths in the hot solution and apply to the abdomen, covering them so that they will retain the heat as long as possible. If there is diarrhea, clear the bowels well with castor oil. Then one or two sun cholera tablets or paregoric in 1 or 2 teaspoonful doses may be given every two or three hours.

In all cases of colic the diet should be liquid. Refrain from giving food of any kind, or the tablets, or paregoric, until after the bowels have been thoroughly emptied by a cathartic. If there is profuse diarrhea, give plenty of water by mouth. For several days after an attack of colic, the diet should be light and of easily digestible material.

Colic, Gallstone.

Gallstone colic is caused by the effort of a gallstone to pass from the gall bladder into the bowel. The pain comes on suddenly as an extremely severe, cutting cramp, beginning on the right side of the abdomen just beneath the ribs and travels toward the navel. The paroxysm of pain may last from a few minutes to several hours or may persist for one or more days. Frequently within 24 hours, the whites of the eyes and the skin become yellow—jaundice. Sometimes after such attacks the gallstones may be found in the stools.

There may be a history of previous attacks; and if so, the patient should be advised to consult a surgeon before attempting another voyage.

Treatment.—To relieve the pain, a hot-water bottle or a hot fomentation, as described for colic, may be applied. The pain is often so severe that it is necessary to resort to morphine. In such an instance, give a $\frac{1}{4}$ -grain morphine and atropine tablet, and if pain is not relieved in 45 minutes, give another. (Note: Not more than three doses of morphine should be given in one day.)

Colic, Kidney.

Kidney colic is very painful and caused by the passage of a kidney stone along the narrow tube (the ureter) from the kidney to the bladder. The pain is most intense in the loin, whence it is usually transmitted down to the groin and to the head of the penis. The testicle on the side affected often becomes sore. The urine may contain blood. Kidney colic begins suddenly and stops suddenly when the stone reaches the bladder. Sometimes the stone becomes lodged in the ureter, and unless the patient receives prompt surgical treatment from a competent surgeon he will die.

Treatment.—The medical treatment of kidney colic aims chiefly at relief of the pain. Put the sufferer into a hot bath and keep him there for a while. If this does not relieve the pain, a hot water bottle or hot turpentine fomentations may be applied. The patient's shoulders should be placed low and his hips high. If the application of heat does not afford relief, a $\frac{1}{4}$ -grain tablet of morphine should be given and the dose should be repeated at the end of 45 minutes, if absolutely necessary to do so.

Cold on the Chest.

This very common affection, which is bronchitis, frequently follows exposure to bad weather. Illness may begin with soreness of the throat, the soreness extending down the wind pipe. There is usually a husky cough, and perhaps there is slight fever with headache.

Treatment.—The best treatment is to put the patient to bed, cover him well, and induce sweating with hot water bottles and a hot drink, such as lemonade, or tea. Ten grains of aspirin or 10 grains of Dover's powder may be given. During the sweating process the patient should be kept well covered. The bowels should be evacuated by means of Epsom salts, compound cathartic pills, or castor oil. The diet should be light for two or three days. The patient should avoid exposure when he gets up.

Cold in the Head.

Acute cold in the head is also known as acute rhinitis, or acute coryza. The disease affects the lining membrane of the nose. There

is feverishness, a feeling of fullness and discomfort in the head, a discharge from the nose, headache, a tired feeling, and sneezing.

Five grains of aspirin should be given three or four times a day. A Dover's powder tablet, repeated in two hours, will often serve to stop an attack. It is helpful to take a hot bath and a hot drink upon going to bed. A half teaspoonful of bicarbonate of soda in half a glass of water every two hours for three doses may abort an attack. The bowels should be opened by a dose of Epsom salts, castor oil, or compound cathartic pills. Exposure to bad weather should be avoided.

Constipation.

Constipation is a condition in which the bowels lack sufficient power to empty themselves.

Acute constipation should be treated by the use of cathartics, such as Epsom salts, castor oil, or compound cathartic pills. For quick results, a rectal injection of a quart of soapsuds may be given; but even after the injection, a cathartic should also be given by mouth, because an injection cleans out only the lower portion of the bowels.

Chronic constipation may be best overcome by rearranging the diet to include plenty of fresh fruits and vegetables, particularly cabbage, spinach, and salads. The food should be eaten slowly and chewed thoroughly. Massage of the abdomen helps to tone up the intestines. The habit of routinely taking cathartics should be avoided; but if it has already been acquired, mineral oil is probably the best. The establishment of regular time and habit, as discussed in Chapter II, should be developed.

Convulsions (Fits). (See also Epilepsy and Delirium Tremens.)

The most common cause of fits in adults is epilepsy, though occasionally similar attacks occur in poisoning and kidney disease.

Treatment.—Prevent the patient from injuring himself against hard objects. A handkerchief should be put in his mouth to prevent him from biting his tongue. When inserting the handkerchief or rag, use a blunt piece of wood to avoid having the fingers bitten. After the attack give bromides until the end of the trip, when he should be sent to a physician.

Cough.

Cough is a symptom of diseases of the throat or lungs. It is also induced by irritating dust, fumes, or gases.

Treatment.—Remove the cause of the irritation. Dissolving a brown mixture tablet on the tongue every three or four hours will sometimes give relief. If the cough lasts more than two weeks a physician should be consulted, because it may come from tuberculosis.

The earlier that this disease is discovered and treated, the better are the chances of recovery.

Diarrhea.

Looseness of the bowels may be due to many different causes, such as badly cooked, fermented, or contaminated food, and unripe or overripe fruit; impure water; sudden changes of temperature; radical changes in diet; dysentery; or cholera.

Diarrhea is usually a trivial and transient ailment, and all that is necessary to treat it is to clear the intestinal tract of the irritating substance by means of a dose of castor oil, Epsom salts, or compound cathartic pills and to keep the patient on a light diet for a few days.

Sometimes, however, diarrhœa is a symptom of a very serious disease, such as typhoid fever, dysentery, or cholera. A continued diarrhea of light-colored stools, accompanied by fever, headache, and prostration, should excite a suspicion of one of these diseases.

Treatment.—If the diarrhea does not respond to the measures suggested for simple cases of diarrhea, the treatment should be directed toward lessening the number of stools. For this purpose the patient should be given one or two Sun cholera tablets every three hours. Relief may often be obtained by giving from four to eight bismuth subnitrate tablets every four hours. If there are signs of collapse, give a teaspoonful of aromatic ammonia in a little water; cover patient with blankets and keep him warm by the use of hot-water bottles. Give the patient plenty of water to drink to make up for what he has lost by the bowels.

Dropsy. (See also Heart and Kidney Disease.)

Dropsy is a condition in which the hands, feet, legs, and perhaps other parts of the body become very much swollen. Dropsical swellings have the peculiarity that when the flesh is pressed down by the finger, the depression made remains for some time after the finger has been removed. Dropsy is caused chiefly by heart disease and kidney disease.

Treatment.—Put the patient to bed. Restrict the diet and keep it light. Give two teaspoonfuls of Epsom salts in a glass of water every morning. If his condition is such that he can not be taken to his home port, place the patient in the first convenient hospital. The amount of fluids and table salt taken by the patient should be reduced.

Earache.

Earache often follows or accompanies sore throat but is some times independent of throat conditions. Pain in the ear is often relieved by the ear drops which are provided in the medicine chest. The bottle containing the drops should first be well shaken and should then be

placed in a basin of warm water and warmed before any of the drops are put into the ear, or a few drops may be heated in a spoon. A hot-water bottle placed over the affected ear serves to give some relief from the pain.

Earache is sometimes the sign of a serious inflammation which may extend to the inner ear and perhaps to the brain. It therefore should never be disregarded and at the first opportunity a physician should be consulted.

Fainting. (See also **Apoplexy, Heat Exhaustion, Epilepsy, Sunstroke.**)

Fainting, like many other symptoms, is not a disease but rather an indication that something has gone wrong with the patient. Often it may not be serious, resulting perhaps from hunger, weakness, or a feeling of nausea upon seeing blood; but, on the other hand, it may be very serious, as in the case of heat exhaustion or sunstroke.

Usually preceding a fainting attack the patient will feel weak and nauseated, often he will yawn. Following this his pupils begin to dilate and he lapses into unconsciousness, which rarely lasts long.

Treatment.—Place the patient flat on his back with his head lower than his feet. Loosen any tight clothing, especially about the neck, and apply cold water to the head and back of the neck. Smelling salts or breathing weak ammonia fumes may help revive him.

Fever.

If a patient has fever he should be isolated from the other members of the crew until it is certain that he is not suffering from a contagious disease.

He should be undressed and put to bed. His bowels should be emptied either by the use of a rectal injection of soapsuds or by giving one calomel tablet ($\frac{1}{2}$ -grain) every hour until four tablets have been taken and then giving a tablespoonful of Epsom salts dissolved in a full glass of water. Castor oil or compound cathartic pills may be given instead of the calomel and Epsom salts. The patient should then be given a sponge bath. If his temperature is high, 39° C. or above, the bath should be cold. A cold bath is best given a sick person by covering the patient with a sheet wrung out in cold water or else by sponging a small portion of the body at a time, under the covers, until the whole body has been sponged. The temperature of the cold bath should be regulated according to the feeling expressed by the patient. Friction by rubbing should be kept up constantly while the wet sheet is applied. Sometimes it is advisable to continue the cold application for an hour or more. In such case cold water may be sprinkled upon the sheet from time to time.

If the patient objects to the cold bath, an alcohol and water rub will be very refreshing to him. The application of cold to reduce fever may be accomplished by the use of ice bags or ice packs.

Cold applications or cold baths should not be continued long enough to produce shock. If shock or weakness develops, it will be necessary to apply heat and to give the patient a teaspoonful or two of alcohol well diluted with water, or a teaspoonful of aromatic spirits of ammonia well diluted with water.

Patients with a moderate degree of fever secure most comfort from a mild sponge bath or an alcohol rub, which should be given two or three times a day. The occasional application of an ice bag to the head aids in producing comfort.

The diet for a patient with fever should be liquid or semisolid until the temperature becomes normal.

If the fever is due to indigestion, a cathartic will probably be all that is necessary.

If the fever persists for more than 24 hours, the patient should be kept in bed until the temperature becomes normal. If a diagnosis of an infectious fever is made, the patient should be kept isolated from the crew until recovery.

An aspirin tablet every three or four hours will do much to reduce fever, especially if it is due to a cold. In giving aspirin, it must be borne in mind that some people react unfavorably to this drug; and if the patient does not seem to bear it well, its use should be discontinued. *Quinine should be used only in cases of malaria.*

Foul Breath (Halitosis).

Halitosis, or foul breath, may be due to many different causes, chief among which are neglect of the teeth and gums, indigestion, and chronic constipation.

Treatment.—Find out the cause and remove it. Use a mouth wash several times daily. Keep the teeth clean. An alkaline antiseptic tablet dissolved in a half glass of warm water makes an excellent mouth wash. At the first opportunity, the teeth should be given proper attention by a competent dentist. The stomach and intestinal tract should be kept active by the use of cathartics. The diet should be regulated so as to avoid indigestion.

Headache.

Headache is the most common of all complaints. It usually indicates the retention of poisonous material in the system and often occurs with constipation and with attacks of indigestion, or from eating food that has fermented, etc. Headache is present at times in almost all cases of sickness. It is frequently a warning signal of the onset of an infectious disease.

Treatment.—Give the patient a cathartic to clean out the bowels. Then give him a 5-grain tablet of aspirin. Repeat the aspirin in an hour, if necessary. An ice bag or a hot-water bottle, as the patient prefers, applied to the head, will afford some relief. The patient should lie down and keep quiet until the pain has subsided. His diet for the next day or two should be light and of easily digested material.

Chronic headache is a frequent symptom of eye strain, infected teeth, and a great variety of faulty physical conditions, and should never be neglected. At the first opportunity the sufferer should place himself under the care of a competent physician for the purpose of receiving adequate treatment. Since the object to be attained is the removal of the cause, an accurate diagnosis is necessary before treatment can be intelligently instituted.

Heat Exhaustion.

Heat exhaustion is caused by continued exposure to very high temperature. Firemen, coal passers, and others employed in work in considerable heat are prone to have attacks of heat exhaustion.

An attack develops rapidly, beginning with a feeling of weakness and prostration. The body surface is cool, the face pale, the voice weak, and the pulse rapid and feeble. The breathing is quick. The vision grows dim and imaginary noises are heard. This condition rapidly changes into unconsciousness. Sometimes the prostration is rapid and without warning symptoms, the person falling unconscious, perhaps with tremors or convulsions.

Treatment.—Place the patient in a comfortable position; loosen his clothing; put cold applications on his head; and apply heat to the rest of the body. A dose of whisky in a cup of strong black coffee will be valuable in combating the shock. Aromatic spirits of ammonia, 1 teaspoonful well diluted in water, is also a valuable stimulant. If the patient recovers from the attack, he should be kept quiet for several days. His diet should be light and nutritious, and his bowels should be kept open by the use of cathartics when necessary.

Indigestion.

Indigestion may be due to various causes, such as excessive smoking, drinking, overeating, eating food that is improperly cooked, a poorly balanced diet, and bolting food without proper chewing.

Ordinary indigestion is characterized by pain in the abdomen after eating. There may also be pain in the back, heartburn, and headache. The bowels may be constipated or too loose. The tongue is coated with a dirty white or a brown fur. The breath is usually very foul, and frequently there is much belching of gas or hiccoughs.

Treatment.—The cause should be determined, if possible, and efforts should then be directed toward eliminating it. It is frequently help-

ful to produce vomiting. This may be done by giving warm water to drink and then sticking the finger gently down the throat. The intestines should be thoroughly cleaned out with a cathartic, such as Epsom salts, castor oil, or compound cathartic pills. For three or four days, or longer, if necessary, the patient should be kept on a light but nutritious diet. The use of tobacco or alcoholic liquor should be prohibited.

If there is much gas in the stomach or intestines, considerable relief may be derived from taking a level teaspoonful of baking soda (bicarbonate of soda) in a half glass of water, repeating, if necessary, after a while.

Persistent indigestion may indicate some serious condition in the digestive system and should receive prompt and appropriate treatment.

Itching.

Itching is a very disagreeable symptom which may be associated with various diseases, but is most frequently due to scabies (the itch) or lice. Persons with severe jaundice often complain of itching. Irritation and itching near the opening of the urethra may be associated with diabetes. Sometimes certain foods in certain people cause local swellings in the skin, called "hives," which itch intensely.

In treating itching, bathing the part of the skin involved with a weak solution (1 per cent) of carbolic acid, will usually give temporary relief. Carbolized vaseline will also be helpful. The cause, if it can be determined, should be treated and corrected.

Jaundice.

Jaundice is manifested by a yellow tinge of the whites of the eyes and of the skin of the whole body. The yellow tinge is caused by the presence of bile in the blood. Because of some disorder of the liver, where it is secreted, bile escapes thence into the blood and imparts a yellow color to the skin. Jaundice is seen in yellow fever, in liver-diseases, in inflammations of the gall bladder, in indigestion, and in attacks of gallstones.

Treatment.—A course of calomel is the best treatment. Give one ½-grain tablet every hour until four tablets have been taken, and follow by a tablespoonful of salts. Repeat the course on the second or third day, if necessary. If jaundice persists, a physician should be consulted.

Pain.

Pain in chest (see Pleurisy and Pneumonia).

Pain in extremities (see Neuralgia).

Pain in joints (see Rheumatism).

Pain is a warning signal that something is wrong and that nature wants the painful region put at complete rest. If movement is at-

tempted, the notice is enforced by more severe twinges of pain. The underlying cause of the pain is always to be sought out and treatment directed at it. It is usually some sort of inflammation or injury. Pain can usually be lessened or relieved in part by hot or cold applications locally, and by taking drugs. Aspirin is very valuable in relieving some forms of pains, but many of the more severe types of pain yield only to opiates.

Throat Diseases.

Sore throat is a very common affection. Few people escape occasional attacks of it, but some people are more liable to it than others. There is a certain severe type of sore throat that may be spread by the use of infected milk or water. Sore throat may mean scarlet fever or diphtheria. Exposure to sudden change in temperature, such as occurs so often during the winter months, is a frequent cause of attacks of sore throat. Engine-room workers are quite likely to expose themselves carelessly to sudden changes when leaving the hot workroom to cool off.

Sore throat often begins with a slight shivering, some fever, and depression of spirits; and the throat feels sore, particularly in swallowing. Within a few hours the throat and tonsils become swollen and very red; the pain has increased in intensity and the patient feels very ill, and sometimes the fever runs high. The tongue is coated with a heavy white fur. There is often a general soreness and aching of the muscles. If the tonsils are much swollen, there is likely to be some interference with breathing and with the taking of nourishment. Patients with sore throat should use an individual drinking glass.

Treatment.—The patient should go to bed. A good gargle may be made by dissolving one or two alkaline antiseptic tablets in a glass of hot water. The patient should gargle with the solution as hot as can be borne.

In addition to having him use the gargle, the patient should be given one calomel tablet ($\frac{1}{2}$ grain) every hour until four tablets have been taken; he should then have a tablespoonful of Epsom salts. If, on examining the throat, white patches are seen on either throat or tonsils, these should be carefully swabbed twice a day with tincture of iodine diluted one half with water. Care should be taken not to have the swab too wet with the solution or it may drip or the excess may run down the throat. If it gets into the windpipe it will cause violent spasm and severe cough and possibly serious inflammation. Hot or cold applications to the outside of the neck may afford some relief, and sucking pieces of ice is also helpful. The patient should be given as much liquid and semisolid diet as he can be in-

duced to take and he should be encouraged to drink quantities of water.

Toothache and Gumboils.

Toothache usually occurs when there is a cavity or a decayed area in a tooth or when pus around the root produces pressure. In treating toothache, the cavity or decayed area should first be cleaned out as well as possible. Then a very small piece of cotton should be saturated with oil of cloves and placed in the cavity. Carbolic acid may be used in place of oil of cloves. The piece of cotton that is saturated with carbolic acid should be just large enough to fill the cavity and care should be taken not to allow any of the carbolic acid to come in contact with the gums.

A gumboil is a small, painful abscess, usually connected with the root of a decayed tooth. Ordinarily a gumboil discharges within a few days and soon heals. Sometimes the abscess tends to spread and may cause much discomfort and even high fever. In such a case, the patient should be put to bed and should be restricted to a light diet. A hot-water bottle should be applied to the face. An excellent hot application is made by dissolving five or six of the alkaline antiseptic tablets in a pint of hot water. A soft flannel or woolen cloth is wrung out in the hot solution and applied to the face. A piece of heavy brown paper or of oil cloth may be applied over the cloth to keep it from cooling off quickly or a hot-water bottle may be used for the same purpose. The mouth should be washed out several times daily with a wash made by dissolving one alkaline antiseptic tablet in a glass of hot water. If the hot application fails to reduce the swelling and relieve the pain, it may be necessary to pull the tooth. At the first opportunity a competent dentist should be consulted.

Vomiting.

Vomiting may be due to various causes. Sometimes it is an early symptom of a contagious disease. It is common in cholera, yellow fever, dysentery, and blood poisoning. It is often caused by indigestion, disorder of the liver, eating unripe fruit or tainted meat or fish, or by the presence of some poison in the stomach.

In disorders of the liver and of digestion, the matter vomited may be of a greenish or yellowish color and may contain quantities of partly digested food. The best treatment is to clear out the stomach and intestines by the use of Epsom salts, castor oil, or compound cathartic pills.

There is a serious form of vomiting in which the patient casts up a thick fluid appearing and smelling somewhat like the stools and which is probably due to an obstruction of the intestines. In such a case the patient should be carefully examined for hernia or rupture.

The most frequent location of a rupture is in the groin or the scrotum and the next is at the navel, or umbilicus. Ruptures have a tendency to strangulate and hence are a grave menace to life. Therefore they should be treated by a competent surgeon at the first opportunity.

If there is frequent vomiting of small quantities of blood and the patient has much pain and shows marked loss of weight, ulcers of the stomach should be suspected. The presence of stomach ulcers is indicated also by the stools which resemble tar in color and consistency.

Treatment.—The first requisite is to learn the cause of vomiting. If the diet is at fault, a good cleaning out with a cathartic and restriction to a light diet for a few days is all the treatment that is necessary.

If caused by the presence of a poison, the vomiting is an effort of nature to remove the offending substance. In such a case it is helpful to give a tablespoonful of mustard in a pint of hot water, repeated until the stomach is thoroughly washed out, and to administer a cathartic later to clean out the intestines.

If the vomiting is due to bleeding ulcers, the patient should not be made to vomit. He should fast for 24 or 48 hours, except for taking possibly small quantities of beef tea or coffee. Nutrient enemata may be given by rectal injection. An ice bag placed over the stomach often gives some relief. If the vomiting is profuse, it may be advisable to give the patient a $\frac{1}{4}$ -grain table of morphine. In cases of ulcers and of hernia the patient should be put ashore as soon as possible. *If a strangulated hernia is suspected, cathartics should not be given.*

CHAPTER V

SPECIFIC DISEASES AND THEIR TREATMENT

In the pages which follow, the subject matter has been arranged alphabetically to assist in ready reference. Many diseases have been omitted and many of the descriptions and directions have been reduced to the minimum because it is not necessary or desirable that ship's officers be instructed in all the intricacies of medical knowledge. It is again emphasized that this book should be read as a whole in time of leisure so that emergencies may be promptly and efficiently met as they arise.

Anthrax.

Anthrax is sometimes known as malignant pustule, or wool-sorter's disease. It is due to a germ which may find its way into the body through a wound in the skin, or which may be inhaled, in which case the disease develops in the lungs. Persons engaged in handling hides are most likely to contract this disease. When the disease develops on the skin it is manifest by very angry-looking boils; there is fever, the breathing is rapid, and the patient suffers from thirst. Death may occur within a few days from the blood poisoning induced by the germs. The lung type of the disease resembles a severe attack of pneumonia and usually results in death within three or four days.

Treatment.—For prevention, gloves should be worn in handling hides, and every wound, regardless of its nature, should be cleaned and painted with tincture of iodine. The boils should be opened and cleaned out and painted with tincture of iodine.

Apoplexy, or Cerebral Hemorrhage.

A "stroke" is the result of the sudden rupture of a blood vessel in the brain (cerebral hemorrhage), and is followed by the escape of blood into the brain tissue. There are sudden unconsciousness, irregular, noisy respirations, and complete relaxation of the body.

This disease seldom occurs until after middle age. Its principal cause is disease of the blood vessels; and its contributing causes are syphilis, Bright's disease, chronic alcoholism, and hardening of the arteries.

A stroke may be preceded by headache, dizziness, irritability, and transient deafness or blindness. The attack is, as a rule, sudden in

onset. Occasionally it begins with vomiting, followed immediately by unconsciousness. There may be convulsive movements; the breathing is noisy, slow, and labored; the cheeks are drawn in during inspiration and blown out during expiration; the pulse is slow and full, and the face is flushed; the eyes are inflamed or congested. The temperature is subnormal during the first 24 hours; later it rises perhaps 1 or 2 degrees.

The extent of the paralysis following a stroke depends upon the amount of blood which escapes from the ruptured vessel, upon the location of the ruptured vessel in the brain, and upon the extent to which the brain tissue is damaged.

A stroke always indicates a serious condition; and though the first attack may be very light, sooner or later another is bound to occur. A seaman who has had one attack should not go to sea again.

Treatment.—The patient should be undressed and put to bed. An ice bag should be placed on his head, and a hot mustard foot bath should be given. When the patient becomes conscious, the bowels should be emptied by a dose of Epsom salts. The diet should be liquid for a few days, after which there should be a gradual change to a semisolid diet. After recovery, overeating, overexertion, and excitement should be carefully avoided.

Beriberi.

Beriberi is a disease sometimes called multiple neuritis. It occurs most frequently in China and Japan, where people live chiefly on rice, but is not infrequent in fishermen on the Banks of New Foundland. It has been proved that the disease is due to eating almost exclusively polished rice, or rice from which the shell has been removed. The shell of rice contains elements called vitamins, which are essential for the welfare of the body.

The disease is characterized by pain in the inflamed nerves and paralysis of the muscles. The heart action is weak, and often the feet and hands swell greatly.

Treatment.—Treatment is limited chiefly to correcting the diet by giving milk, fresh vegetables and uncooked fruits. Careful attention to sanitary and hygienic conditions, together with the proper kind of diet, will prevent the occurrence of this disease. The patient should be put to bed and kept there on account of the liability of damage to the heart.

Bladder, Inflammation of.

Inflammation of the bladder, also known as cystitis, is an inflammation of the lining membrane of the bladder. The symptoms are a chill, moderate fever, and pain over the region of the bladder. The urine may contain pus; the quantity of urine is often reduced, although there is a frequent desire to void urine.

Treatment.—The patient should be placed upon liquid diet, with no high seasoning, for a few days. He should drink large quantities of water every day, but should take no alcoholic liquors, tea, or coffee. One teaspoonful of bicarbonate of soda (baking soda) given every three hours in water will do much to relieve the condition.

Bronchitis.

Bronchitis begins like a cold on the chest. It occurs most frequently among firemen and stokers, because they are most often exposed to sudden changes of temperature. The symptoms are fever, pain over the front of the chest, and more or less cough. The matter coughed up is at first thin, but later it becomes thick and puslike. Breathing is rather short and rapid and is painful. It may be accompanied with wheezing.

Treatment.—Put the patient to bed. Clean out the bowels with Epsom salts or castor oil and give 5 grains of aspirin every 4 hours. If the pain in the chest is severe, apply heat by means of either hot-water bottles or a turpentine stupe. Rub the chest with camphorated oil or olive oil containing a teaspoonful of turpentine to the pint. The diet should be light and nutritious. Urge the patient to drink plenty of water.

Bronchitis, Acute.

This disease, which is also known as bronchial catarrh, acute bronchial catarrh, or cold on the chest, is an acute catarrhal inflammation of the lining membrane of the lungs, characterized by fever, pain in the chest, labored breathing, and more or less profuse expectoration.

The disease is most frequently the result of exposure to inclement weather, or to irritating dusts, smoke, or fumes. It may follow any of the acute diseases or precede measles or typhoid fever.

The onset is often accompanied with a cold in the head or throat. There is generally a feeling of chilliness, at first followed by flushes of heat. The muscles of the limbs, joints, and trunk may ache. There is loss of strength, the tongue is furred, and as a rule, the bowels are constipated. The pain in the chest increases as the disease progresses, and is often described by the patient as a burning or tearing pain located beneath the breastbone, and made worse by deep breathing. At first the cough is hard, hoarse, and accompanied with little expectoration, but later it is loose, with free expectoration. The disease lasts about two weeks.

Treatment.—The patient should be confined to a warm but well-ventilated room and should be kept on a soft diet. Free movement of the bowels should be produced by administering calomel, a half-grain tablet every hour until four tablets have been taken, followed

by a dose of Epsom salts. A Dover's powder tablet may be given three or four times a day, and quinine, 5 grains, three times a day. A daily sponge bath will be very refreshing to the patient. The mouth should be cleaned every day with a solution made with an alkaline antiseptic tablet.

Broncho-pneumonia.

Broncho-pneumonia differs from lobar pneumonia, or lung fever. In broncho-pneumonia the small bronchial tubes of both lungs are, as a rule, affected, while in lobar pneumonia, usually one or more lobes of one side are affected, although both sides may be involved.

Broncho-pneumonia may result from downward extension of a sore throat. The disease may follow or accompany any of the infectious diseases, or it may be due to the inhalation of irritating substances, such as dust, smoke, ammonia, paints, or gases.

The disease begins with a slow rise of temperature. The breathing is rapid, laborious, and shallow. The pulse is more rapid than in normal condition. The cough is usually loose, but may be dry and hacking. The appetite is poor; the bowels are somewhat free. The duration of the disease varies; it usually lasts one or two weeks, but may become chronic and continue for several weeks.

Treatment.—Confinement to bed is important. The diet should be nutritious. A mustard plaster to the chest may relieve pain. A 5-grain aspirin tablet should be given two or three times a day and a cathartic when necessary. The patient should not resume work too soon after recovery.

Cerebrospinal Fever.

Epidemic cerebrospinal fever is a severe infectious, communicable disease that may be recognized by the following symptoms: Rapid onset, headache, vomiting, painful contractions of the muscles of the back of the neck, retraction of the head, delirium, stupor, and coma. Sometimes there is a skin eruption of dark red spots. The disease is due to a number of different kinds of germs and spreads from the sick to the well.

Treatment.—The patient should be carefully isolated and all precautions taken against the spread of the disease. Treatment requires, in addition to careful nursing in a quiet, dark room, the evacuation of the bowels with either Epsom salts or castor oil and the application of either heat or cold to the head and spine to help to reduce the pain. Cold sponge baths will assist in reducing the fever. This is a very difficult disease to treat under the very best conditions, and about all that the mariner can do is to make the unfortunate patient comfortable and to prevent his disease from spreading to others.

Chancroid. (See p. 126.)

Chicken pox.

Chicken pox is a mild, contagious affection. An eruption of small blisters usually appears after a few hours of moderate fever, thirst, loss of appetite, and constipation. The eruption first appears as red spots, which soon turn to small blisters, or elevations containing a clear or cloudy fluid; sometimes pus forms in these vesicles. There is intense itching. The eruption dries up after a few days and the scabs fall off. Sometimes there is pitting which somewhat resembles that of smallpox.

Treatment.—The disease is self-limited. Treatment consists of rest in bed, isolation, cathartics, and a light diet. An ointment consisting of two drops of carbolic acid rubbed into a tablespoonful of vaseline will do much to allay the itching.

Cholera.

Cholera is an acute specific and infectious disease caused by the cholera germ. Stools from persons suffering with the disease are the principal, if not the only, medium of infection, the germs being conveyed from the infected stools to water used for drinking purposes, or perhaps to food and milk, which may also become vehicles for the spread of the disease. Flies and other insects may mechanically carry the germs on their feet and bodies.

The disease sets in suddenly with severe and persistent diarrhea, accompanied by pain, nausea, vomiting, and depression of spirits. Stools are frequent and watery and contain a wheylike substance. As the disease progresses, the number of stools rapidly increases. There is great thirst. The temperature is below normal; the skin is cold and covered with perspiration. There is rapid loss of body weight. Prostration is marked, and death may occur at any time during this stage. In a case that is likely to recover, the number of stools begins to lessen, the temperature gradually returns to normal, and the general condition of the patient rapidly improves.

Treatment.—The patient should be put to bed and isolated. All excretions—stools, urine, sputum—should be thoroughly disinfected. All bedding, clothes, dishes, etc., used in the sick room should be thoroughly disinfected. The attendant must exercise great care as to the cleanliness of his hands, washing them in an antiseptic solution each time after contact with patient.

In event of death, the body should be wrapped in sheets soaked in bichloride of mercury solution (two 7½-grain tablets to a quart of water). All water on board ship should be thoroughly boiled before it is used and all food should be thoroughly cooked before it is eaten. All persons who have anything to do with preparing food should be examined and, if they appear sick, they should not be allowed to handle food or cooking utensils.

Medical treatment should begin with clearing out the bowels with Epsom salts or castor oil. To reduce the number of stools, one or two Sun cholera tablets should be given every two or four hours. Bismuth should be given three times a day in half-teaspoonful doses. The patient should be kept warm and given large quantities of water to make up for that lost by the running off of the bowels. Vomiting may be relieved by sucking small pieces of ice. Some writers recommend the internal administration of sodium bicarbonate (baking soda). Black coffee may be given during the cold stage of the disease. Morphine will control the colic. Hot applications to the abdomen, using either hot-water bottles or turpentine stupes, will help to relieve abdominal pain. It is essential for the patient to be kept warm by means of hot-water bottles; jugs filled with hot water may also be used as extra means for supplying heat. No food should be given during the acute attack; and during convalescence the diet of a cholera patient should be light and nutritious, arrow root, diluted milk and rice water. Meat extract should be avoided.

Delirium Tremens.

Delirium tremens is sometimes called "the horrors." As a rule, this disease attacks only seasoned or chronic drinkers. It may follow a bout of heavy drinking or the sudden and complete withdrawal of liquor. The latter condition may occur when a drinker becomes ill either from a disease or as the result of an accident.

An attack of delirium tremens usually begins with muscular trembling; the patient is excitable, talkative, and at times very noisy. His hands and tongue are kept in more or less meaningless motion. As the attack develops, there are extreme restlessness and wild excitement. The patient imagines that he sees horrible objects; he can not sleep and has no desire for food; he often begs for a drink of liquor. He may die from severe exhaustion. A patient suffering from this disease must be carefully guarded as he is temporarily insane and, hence, not responsible for his actions and may harm himself or others.

Five or six sodium bromide tablets and sodium bicarbonate, half a teaspoonful, dissolved in a glass of water, should be given every three or four hours. Some physicians are in favor of giving alcoholic liquor in the treatment of persons in this condition, as also to persons known to be chronic drinkers, in case of accident or illness, with the idea that the liquor may prevent an attack of the tremens. Every effort should be made to induce the patient to take nourishment. Red pepper given in hot milk stimulates the appetite. Ginger ale and lemonade are usually acceptable to the patient. In case of extreme exhaustion, a half teaspoonful of aromatic spirits of am-

monia in a glass of water will stimulate the heart; the dose may be repeated, if necessary. The patient should be kept warm with hot water bottles and plenty of covers.

Diabetes Mellitus (Sugar in the Urine).

Diabetes mellitus is chronic in its course and is characterized by the presence of sugar in the urine, an excessive thirst, an increase in the quantity of urine voided, and a progressive loss of both flesh and of strength.

Treatment.—It is not likely that a ship's officer will be called upon to treat diabetes, but there are certain complications of this disease which he may have to take care of. These complications include skin changes, involving boils, carbuncles, eczema, and even gangrene, lung troubles, as tuberculosis, pneumonia, and gangrene of the lungs and affections of the eye, such as cataract, palsies, and occasionally blindness.

Diabetic coma or acidosis is a complication characterized by unconsciousness, dyspnea, pain in the head, delirium, rapid and feeble pulse. The breath has a sweetish odor.

Simple remedies for the relief of pain and the free use of sodium bicarbonate are about all an officer can prescribe in these cases. The diet should be altered so as to reduce to the minimum foods which contain sugar and starches. The intestines should be kept open by cathartics. Boils should be opened and painted with tincture of iodine. At the first opportunity the diabetic should enter a hospital for treatment at the hands of a competent physician.

Dysentery (Bloody Flux).

Dysentery is an acute disease of the intestines caused by either a germ or a very small organism called an ameba. The germs or the amebas find their way into drinking water, and through it as a medium, gain entrance into the intestines of human beings. The disease is manifested by fever, griping pains, and a persistent inclination to have bowel movements; the stools are frequent, small, contain much mucous and, in many cases, blood and pus. The symptoms last about a week. The patient loses much weight. In the type of dysentery that is caused by a germ, there is often persistent vomiting; the prostration is great, and death may occur on the third or fourth day. Recovery is slow and may not be completed for three or four weeks. The amebic type of the disease often becomes chronic.

Treatment.—When a case of dysentery appears, attention must at once be directed toward prevention of the spread of the disease among the other members of the crew; this can be done best by boiling all the water used for drinking and cooking, and thoroughly

cooking all food before it is eaten. The discharges from the patient must be carefully disinfected before they are disposed of. The sick should be isolated. Flies and roaches and all vermin should be destroyed because they may play a part in transmitting the germs of the disease.

The patient should be kept in bed. His treatment should begin with a course of calomel— $\frac{1}{4}$ -grain tablet every hour until four tablets have been taken, when a tablespoonful of Epsom salts should follow. Useful remedies for lessening the number of bowel movements are Dover's powder, a 5-grain tablet every two or three hours, or a Sun cholera tablet every two or three hours. The diet should be liquid or semisolid and should not contain eggs. In case of collapse, keep the patient warm with hot-water bottles and plenty of covers; give either aromatic spirits of ammonia or a tablespoonful of alcohol, well diluted in water. Strychnine (amount in tablet, one tablet three times a day) is an excellent stimulant. Chronic dysentery requires thorough treatment at the hands of a competent physician.

Diphtheria.

Diphtheria is an acute specific infectious disease. It is localized in the throat, sometimes in the nose, but produces a general blood poisoning. The onset of the disease may be mild, resembling an ordinary sore throat, or it may be indicated by a chill. Headache and some fever are almost always present. The most prominent symptom is the sore throat. The appetite is poor; the tongue is slightly coated. Examination of the throat discloses patches of false membrane which appear as a white or dirty white coating. At first these patches are confined to small areas of the tonsils or throat, but the membrane spreads rapidly and soon covers a considerable part of these. The patient becomes weak from general poisoning of the blood which is caused by absorption of toxins from the throat lesion.

Treatment.—All sore throats should receive immediate attention. Dissolve one to three alkaline antiseptic tablets in a glass of hot water and have the patient gargle every hour or two. Give 5 grains of quinine three or four times a day. The sore throat may be swabbed with tincture of iodine, diluted one-half with water. Care should be taken not to have the swab too wet with the solution. If it gets into the windpipe it will cause severe cough and possibly serious inflammation. A person with a sore throat that shows patches, as described above, should be isolated, because if the case proves to be diphtheria, the disease is likely to spread.

Diphtheria antitoxin is a specific remedy for this disease and, if practicable to do so, the patient should be landed at the nearest port so that the antitoxin may be given as soon as possible.

Epilepsy.

Epilepsy is sometimes called "fits." It is a chronic disease. The specific cause of it can not always be determined. Injuries to the head are sometimes followed by epileptic fits.

The attack sets in suddenly, the patient falling with a peculiar cry. There is loss of consciousness, the face is pale. The body is rigid, but in a few moments is shaken by more or less pronounced convulsions. Often the patient bites his tongue and makes it bleed. The pupils of the eyes are dilated.

Treatment.—Means should be taken to prevent the patient from injuring his tongue by biting it deeply. To this end a portion of a towel, a handkerchief, a long piece of wood, or the handle of a toothbrush should be inserted between his teeth. Whatever is placed in his mouth for this purpose should be fastened with a string or held so that the patient can not swallow it. The attack is self-limiting and lasts but a short time. A person subject to epilepsy would be much better engaged at work on shore.

Attacks of epilepsy are likely to recur at any time, so that it is advisable, because of the danger to himself and others, not to include in a crew anyone subject to such attacks.

Between attacks, an epileptic should live on a moderate diet and his bowels should be kept free by the use of cathartics.

Erysipelas.

Erysipelas, a common and acute infectious disease, is caused by a specific germ. Its onset is marked by a chill, nausea, vomiting, tired feeling, headache, pains in the limbs, and rise of temperature. The pulse rate is increased; the tongue is coated. There may be either constipation or diarrhea. Delirium may occur, especially if the patient is an alcoholic. The disease manifests itself externally as a tense, shining, crimson, or violet-hued area of the skin, most frequently of the face. This area is swollen and firm, feels hot, and is tender to the touch. The borders of it are sharply outlined. The patient complains of the swelling which, at times, may be severe; heat, pain, and itching are constant. The affection of the skin usually subsides in from five to seven days and later the skin over the affected area scales.

Treatment.—Isolate the patient. The disease is self-limited. Keep the bowels in good condition. Put on a wet dressing of alcohol, water, and glycerine, each one cup, and two bichloride of mercury tablets dissolved therein. Keep the dressing constantly saturated with this mixture. The diet should be light and nutritious.

The Eyes.

The most common affection of the eye is irritation, due to the presence of some foreign substance such as a chip of paint, or a

piece of dirt, sand, coal, etc. When anything gets into the eye, it should be removed immediately before the patient has had time to rub the eye, for rubbing only produces more injury. If the foreign body is allowed to remain, it may bury itself in the eye and cause an ulcer.

The proper way to remove a foreign particle from the eye is as follows: First, have ready a wooden applicator with a small amount of cotton tightly wound around one end. (A toothpick or a match may be used as an applicator.) The cotton should be slightly dampened so that the foreign object will adhere to it more easily. The next step is to examine the eye. Pull down the lower lid and look carefully; if the foreign substance is on the lower lid, it can be removed easily. Usually it will be found on the under surface of the upper lid, and the lid should be folded back by placing a match against the lid, then picking up the lid by the lashes and folding the lid back over the match. The folding is facilitated by slightly pressing downward with the match. With a little practice this operation becomes quite easy. The under surface of the upper eyelid is thus brought into plain view. If the object is on the upper lid, it may easily be removed with the dampened applicator. If the object is on the eyeball and not firmly attached, it may be removed by a light, swift, flicking motion. If the object is embedded in the eyeball, it is necessary to deaden the sensibility of the eye before removing the object. A few drops of a solution of cocaine (eye solution) dropped in the eye and allowed to remain for five minutes will so deaden sensation that the object may be taken out without pain. The eyeball is very delicate, and too much care can not be used in working with it. After the foreign object has been removed, the eye should be thoroughly washed with boracic-acid solution, warm, but not too hot. The eyecup should be filled with the boracic-acid solution and placed over the eye; then the head should be thrown back and the eye should be opened and closed at least a dozen times. The eye should be washed in this way at least two or three times a day. The issuance of goggles to men detailed to chip and scrape paint will prevent many eye injuries.

Other Conditions Affecting the Eyes.

Sudden blindness, if not due to an accident, is due to internal causes and can not be treated by a ship's master.

A cold in the eye or any condition in which the eye is inflamed or discharges pus requires irrigation with warm boracic-acid solution as described above. Whenever there is a discharge from the eyes they should be washed as indicated above several times daily. If, as occasionally happens, substances are spattered into the eyes, prompt action must be taken to keep the eyes from being damaged. In the

use of lye, for instance, some of it may accidentally get into the eye, and this condition should be treated immediately. Castor oil will quickly stop the burning, and enough of the oil should be poured into the eyes from time to time to keep them constantly bathed with it. After an hour or two, the oil may be washed away with boracic-acid solution used in the eyecup, and a small amount of boracic-acid salve may then be applied to the inner surfaces of the eyelids.

Other irritating substances splashed into the eye should be washed out with either clear water or boracic-acid solution.

Gonorrhœa. (See p. 121.)

Gout.

Gout often resembles rheumatism, and in many instances it is difficult to tell the difference between the two affections. Gout affects chiefly the small joints; a frequent site for it is the great-toe joint. Even more pain, redness, and swelling may occur in gout than in rheumatism. There is moderate fever. Sweating is not profuse. Small nodules in the lobes of the ears are frequently seen in this disease. The attacks recur frequently and at fairly regular intervals.

Treatment.—The treatment of acute gout is similar to that recommended for rheumatism—rest, light nutritious diet, and cathartics, when necessary. Consult a physician at the first opportunity to secure an accurate diagnosis and careful treatment.

Heart Disease.

There are various types of heart disease, but a seaman will not be able to recognize the different types. Suffice it to say that if a man has distress in the region of his heart with spitting of a thick fluid sometimes stained with blood; marked shortness of breath upon the least exertion or exercise; a dusky or livid color of the face; swelling or dropsy in any part of the body; pain in the region of the heart and extending down the little-finger side of the left arm, it is probable that he is suffering from an acute attack of heart disease.

Treatment.—Place the patient in bed and keep him quiet. It may be necessary to prop him up with pillows. His diet should be liquid or semisolid for a few days and should be gradually increased as he improves. The pain and the rapid heart action may often be controlled by placing an ice bag over the heart. If there is severe collapse, give a tablespoonful of alcohol or whisky well diluted with water, or a teaspoonful of aromatic spirits of ammonia well diluted with water.

In case there is dropsy it is a good plan to give a teaspoonful of sweet spirits of niter two or three times a day to stimulate the kidneys. A cup of black coffee will usually accomplish the same result. Two teaspoonfuls of Epsom salts in a glass of water every morning before breakfast will help to reduce the dropsy.

A person suffering from an acute attack should not be allowed to continue at work, but should be put ashore if it is practicable for him to reach his home by a land route. A seaman whose heart is liable to cause trouble is not able to endure the rigors of his occupation and should not be employed at arduous tasks.

Heart Neuralgia (Angina Pectoris).

Neuralgia of the heart is manifested by an intense, agonizing pain, mainly in the region of the heart, but extending to the neck and down the left arm. The breathing is short and there is a sense of compression over the heart. The chest is rigid and the action of the heart is weak and feeble. The face has an ashen gray color and the facial expression is anxious, the patient being apprehensive of death. The pain usually lasts a few minutes and then quickly disappears.

Treatment.—During the acute attack allow the patient to inhale a little chloroform, or give a tablet of morphine ($\frac{1}{4}$ -grain). In a mild attack, a mustard plaster, applied over the region of the heart, will sometimes afford sufficient relief. A person subject to angina pectoris should not engage in an occupation that requires heavy work, either mental or physical, nor should he follow the sea, unless on a ship which carries a physician.

Intestinal Worms.

Tape worms and round worms sometimes infest the intestinal tract of man. Tape worms are of three kinds—pork, beef, and fish tape worms. These worms are very long and are made up of many small, flat, white, ribbonlike segments, which are constantly being passed off with the stools. Tape worms are usually conveyed into the stomach of man in infected meat. Thorough cooking of meat will destroy any tape worm eggs contained in it.

The round worms that infest man are of various kinds and sizes. Those of the largest type look very much like common earthworms. There is a very small round worm which infests the flesh of hogs, and persons who eat meat so infested when it is not thoroughly cooked are likely to become infested also. The hookworm is also very small. This parasite is common in tropical and subtropical countries. The tiny worms and their eggs are passed with the bowel discharges of infested persons and infest the soil. The worms in the soil work their way through the skin of the feet of persons who go barefooted, causing a condition of the feet called "ground itch"; or they may be taken into the body in the drinking water. Infestation with intestinal worms is very prevalent in the Orient. The people who live there should never eat uncooked vegetables.

Treatment.—Infestation with such worms as are mentioned in this section can not very well be treated on board ship. Mention is made of them in order to stress the importance of wearing shoes and of

thoroughly cooking all food before it is eaten. If a cook or messboy is the sufferer, he should be relieved from duty, if practicable. A large dose of Epsom salts will often give temporary relief in cases of worm trouble; but any members of a ship's crew who are infested with worms should consult a physician at the first opportunity.

Itch (Scabies).

This skin disease is caused by a very small animal parasite which burrows beneath the skin and which is transferred from one person to another by direct contact, by common use of towels, rags, and clothing.

The rash produced by these minute creatures appears as small blisters and red pimples which are very itchy and cause the patient to scratch. They break out most frequently on the sides of the fingers and between them and on the wrists, the elbows, and the lower part of the belly. The face and head are seldom affected.

Treatment.—The patient should take a warm bath at night, and after drying the skin, he should rub sulphur ointment thoroughly over the parts affected. The next night he should take a bath and rub in more salve. This treatment should be repeated every night for three or four nights. The morning following the last treatment, take warm bath and put on clean clothing. The clothing and bedding should be thoroughly disinfected. This treatment should not be repeated for several days, as too frequent use of sulphur ointment may cause an eczema that may be mistaken for itch.

Itch, Dhobie.

This type of itch is caused by a minute vegetable parasite and is common in the hot countries. It is really a ringworm.

Treatment.—Sulphur as prescribed for itch, except that it may have to be repeated oftener.

Itch, Barber's.

Barber's itch is a disease of the skin or the face caused by a fungus. The disease is easily transmitted from one person to another by the common use of towels and shaving and toilet articles.

The fungus first invades the roots of the hair. Reddish, scaly patches first appear and the hairs soon become dry, brittle, and loosened. The skin becomes distinctly nodular and lumpy; pustules develop and discharge a purulent matter, which accumulates and forms crusts. Itching, burning, and pain of varying severity are always present. The disease is chronic and very persistent and requires continuous treatment to effect a cure.

Treatment.—Dissolve the crusts and scales by the use of warm olive oil or sweet oil, then apply sulphur ointment. The treatment must be continued faithfully if a cure is to be effected. The patient should

not use towels, rags, toilet articles, etc., in common with other persons. The towels and other articles used by the patient should be sterilized, preferably by boiling, in order to prevent reinfection.

Lice.

Head lice.—If these parasites are present on any member of the crew, they may soon infest the other members. The eggs, or nits, as they are called, can often be found attached to the hair, especially behind the ears. They are also found on any part of the body where there is hair, as the eyebrows, the armpits, the chest, etc.

Body lice.—Body lice feed upon the body, but when not feeding they secrete themselves in the folds and seams of the clothing.

Pubic lice.—Pubic, or crab lice, are found chiefly among the pubic hairs, but sometimes under the arms, in the eyebrows, and even on the scalp.

To prevent lousiness, strict cleanliness is necessary. This means clean men, clean forecastles, and clean "heads."

To get rid of lice, first clip off all the hair and then apply kerosene and vinegar as directed elsewhere in this book (p. 25). Mercury ointment will kill crab lice. The ointment should be applied after the subject has taken a good bath, and should be washed off on the following day. The treatment should be repeated within a few days.

To destroy body lice, fumigate the clothes with either sulphur or steam. A hot flatiron pressed over the clothes may be used if sulphur or steam is not available. Cleanliness is the best means for keeping free from lice. Every effort should be put forth to exterminate these parasites, not only because they cause discomfort and are loathsome and filthy, but because they sometimes convey the deadly disease called typhus fever.

Malaria.

Malaria is variously called ague, fever and ague, chills and fever, marsh fever, and swamp fever. The disease is caused by protozoa, a low form of animal life a little higher in the scale than germs or bacteria. These protozoa are taken up with the blood of malaria patients by mosquitoes which bite them. In the body of the mosquito the protozoa undergo a certain part of their development; and when the mosquito afterwards bites another person some of the protozoa are injected into the new victim and he falls ill with malaria. The disease is thus transmitted from one person to another by mosquitoes.

There are three types of malaria, but only one type of mosquito which carries the protozoa—the *Anopheles* mosquito.

An attack may occur daily, every other day, or two days in succession; then there is a day or perhaps a greater interval of intermission before the next attack comes on.

The symptoms usually appear in three stages—the stages of chill, fever, and sweating. The chill begins with yawning, a tired feeling, headache, and perhaps nausea, or a desire to vomit. The patient is very chilly, his teeth chatter, and he can not get warm. He is also very thirsty. This stage of the attack lasts about a half hour or an hour, when it gradually merges into the second stage, the stage of fever. The patient now becomes hot, feels as if he is burning up. The temperature may rise as high as 106° F. There are intense headache, backache, nausea, and a great desire to drink cold water. This stage lasts from 1 to 10 hours, when the patient passes into the third stage, that of sweating, during which the whole body is bathed in a profuse sweat. With the sweating stage, which usually lasts from one to four hours, the symptoms subside and the patient feels more comfortable and finally falls asleep.

Treatment.—The prevention of malaria is far easier than its treatment. A person must be bitten by an infected mosquito before the disease can be transmitted to him. For prevention, 5 to 10 grains of quinine should be taken daily by all aboard for about 10 or 14 days before entering a malarial section and until well out of the malarial district. Sleeping quarters should be thoroughly screened. Mosquitoes do not fly any great distance from shore; therefore, when in a malarial country, the ship should, if possible, anchor at some distance from shore. Buckets and all water containers on board ship should be tightly covered so as to prevent mosquitoes from breeding in them. Mosquitoes on board may be killed with sulphur fumes and by swatting them. Seamen should remain on board at night, for if they go ashore, they run the risk of being bitten by mosquitoes.

When the disease has been contracted, the only specific remedy is quinine. Five to ten grains of quinine should be given from three to five hours before an attack is due and the patient should continue to take quinine until he is proved free from malaria parasites by an examination of his blood by a physician. The bowels should be kept open by giving a cathartic.

Malta Fever (Undulant Fever).

The onset of this disease frequently follows the drinking of infected cow's or goat's milk, a medium through which the germ is conveyed to man. The symptoms, which develop slowly, are headache, tired feeling, restlessness, prostration, and gradual rise of temperature. There may be bleeding of the nose. The tongue is coated. There are

profuse night sweats. The temperature gradually returns to normal in two or three weeks, but relapses are common.

Treatment.—The disease must run its course, and so treatment must consist chiefly of good nursing. The bowels should be kept free by the use of cathartics. Five grains of quinine may be given three or four times a day. The diet should be light and nutritious. The crew should be cautioned against drinking raw milk unless it is certain that the milk came from a healthy animal.

Measles.

Measles is a disease of children or young adults, probably because most children have an opportunity to contract the disease from others. Adults may, however, contract it at any time during life. One attack usually confers immunity.

The disease ordinarily begins with a cold, chill, or chilliness, and a fever ranging from 101° to 102° F. The muscles of the body are sore and tender. There are headache, intense nasal and throat catarrh, sneezing and coughing, and the eyes are red and watery. On the second day the fever declines but rises again on the fourth day, when a small dark-red eruption appears on the face and rapidly spreads over the entire body. Even before the skin eruption appears, small irregular bright red spots with white or bluish centers are often seen on the lining membrane of the lips and cheeks. These spots are called Koplik's spots, and their presence aids in making an early diagnosis of measles.

Treatment.—Measles is a self-limited disease. The patient should be isolated in a dark, well-ventilated room. The bowels should be kept regular by the use of castor oil, Epsom salts, or compound cathartic pills. The patient must be prevented from catching cold. The diet should be light. The chief danger from measles is that the patient may develop bronchial pneumonia.

German Measles.

This disease is also called Liberty measles, French measles, roseola, or rubella.

It is an acute, self-limited, contagious disease. Onset occurs with a mild fever, suffused eyes, little or no cold or sore throat. The glands of the neck are somewhat enlarged. An eruption appears at some time between the first and fourth day of the illness. Symptoms last about a week and then gradually disappear.

Treatment.—There is no special treatment. Keep the patient in bed and isolated. Give a cathartic. The diet should be light and nutritious.

Mental Diseases, Insanity.

Insanity is a mental disease which affects people so that their actions seem unnatural as compared with those of other people. On

account of his mental disorder, an insane person forms unusual ideas and opinions, and these impel him to do things which he would not do under normal conditions.

There are many people who, while not actually mentally unbalanced, are different from the average individual by reason of some defect in their personality. Some of these are mentally defective by reason of a bad heredity; others have disorders of memory, attention, ideas, or judgment; they may have alternate periods of melancholy or exaltation; they may have morbid imaginations or they may commit unusual and disgusting sexual acts, or they may be chronic, wanton liars. Such persons do not make good sailors; they are trouble makers and upset the discipline of the ship; they may be positively dangerous because of their lack of judgment and irresponsibility. The chronic criminal and those who commit crimes of violence fall in this class. In choosing a crew, "queer" people should never be shipped.

Insanity may be acute or chronic and may develop suddenly or slowly. There are many types of insanity, so that special knowledge and training are necessary in order to be able to name the class to which any certain case belongs.

Treatment.—A person who shows signs of insanity while on board ship should be closely watched in order that he may harm neither himself nor anyone else. Not much can be done in the way of treatment. Bromide, three or four tablets three times a day, may be of some benefit in quieting the patient. The diet should be light. The bowels should be kept free by the use of cathartics. At the first opportunity, such persons should be sent to a hospital.

Mumps.

This is an acute, specific, infectious disease, affecting one or both parotid glands and other salivary glands, which are located in front of the ears and beneath the jaws. There is a tendency for the testicles to become involved also. There should be no difficulty in recognizing mumps by the swelling of the face in front of the ear and on and beneath the jaw. If only one side is affected, the other side usually begins to swell as the first begins to subside.

Treatment.—Isolation, light diet, and cathartics. If the testicles become involved, they should be supported by a suspensory or by a handkerchief or towel and the patient kept in bed. Since the disease is spread by the sputum, great care should be taken lest the patient's sputum gets on the hands of other people or articles which are in common use.

Neuralgia.

Neuralgia is a disease affecting the nerves. It is characterized by sudden sharp and darting pains which extend along the course of

the nerve affected. The usual cause of this affection is exposure to cold, damp weather.

Neuralgia may affect any nerve of the body. It may be centralized in the face, the arm, the leg, or any other part of the body.

Treatment.—Hot applications are effective for relieving the pain. The bowels should be emptied by cathartics, preferably castor oil. The diet should be light and nutritious. Sometimes relief from the pain may be obtained by applying a mustard plaster to the affected part or by painting it with tincture of iodine; if persistent, a physician should be consulted.

The Nose.

An offensive discharge from the nose such as often accompanies a cold is best treated by gently washing out the nose with a solution prepared by dissolving one alkaline antiseptic tablet in a glass of warm water. This solution should be used three times a day or oftener, if necessary.

Bleeding from the nose is sometimes difficult to stop. The application to the nose of a cloth wrung out in cold water will suffice to stop a mild bleeding. If the bleeding persists, a pledget of cotton should be packed into the nose and left there for two hours or more. When removing the cotton be sure that all of it is out. The patient should be warned not to blow the nose when it bleeds, but to allow the blood to collect and clot.

Paralysis, Facial.

Facial paralysis is an acute paralysis of one of the cranial nerves called the facial nerve, which controls the muscles of the face. The condition is caused by exposure to cold, but sometimes follows diseases of the ear.

Its onset is sudden, beginning with a tingling of the lips and tongue. The paralyzed side of the face takes on a blank expression; the corner of the mouth is depressed; the eyelids are open; the face is drawn toward the side that is not affected. The patient is unable to spit or to whistle.

Treatment.—The bowels should be opened by the use of a cathartic. After the acute symptoms subside, the affected parts should be massaged. The prognosis of this disease depends upon its cause. Many cases of it clear up within a short time.

Plague.

Plague (black death, oriental plague, bubonic or pneumonic plague) is a specific infectious disease caused by the plague germ.

The disease begins with extreme prostration; there is a rapid rise of temperature and the pulse beats much faster than usual. There may be hemorrhages (bleeding) into the skin. The lymphatic glands

of the groin, armpit, or neck enlarge, and on the second or third day buboes (swellings) appear on the groin, neck, or armpit; the temperature drops when the buboes appear and profuse sweating occurs. In the beginning the buboes may be very small, but are very painful and tender. When touched with the hand they feel as if matted together.

The pneumonic type of this disease resembles an acute pneumonia and is almost always fatal.

Treatment.—The best preventive measure is to kill all the rats on board and to keep others from taking their places. This requires the complete periodic fumigation of ships. The disease is transmitted to man by the bite of rat fleas. Therefore it is of vital importance to exterminate rats and their fleas. Measures for their destruction have been suggested elsewhere in this book.

The patient should be isolated, given a cathartic, and kept on a light nutritious diet. The buboes should be painted with tincture of iodine and covered with sterile gauze.

The body discharges—sputum, stools, urine, and discharges from buboes—should be thoroughly disinfected. Burning is the best and safest means of disposing of them. The members of the crew should be frequently and thoroughly examined. Clothing and quarters should be thoroughly disinfected in order to destroy fleas. When plague appears on board, the ship should proceed to the nearest port for quarantine treatment.

Pleurisy.

Pleurisy is an inflammation of the pleura, the sac which surrounds the lungs. The disease is manifested by severe pains in the chest on both sides or on one side only. There is also rise of temperature.

Treatment.—Treatment must be directed mainly toward the relief of pain. Keep the patient in bed. Give a tablespoonful of Epsom salts. Apply strips of adhesive plaster from the backbone to the middle of the chest. Attach an adhesive strip first over the backbone, bring it forward and during a deep exhalation, or breathing out of air from the lungs, fasten the strip over the center of the breastbone; let the next strip just overlap the preceding one and so on until the side is covered with adhesive strips from above the nipple to the lower border of the ribs. The strapping prevents the full expansion of the chest on the side afflicted and thus helps to relieve the pain. A hot-water bottle also gives some relief. Sometimes the application of cold, as in an ice bag, will lessen the pain. The patient should be given aspirin three or four times daily. The diet should be light and nutritious. Sweating is a favorite treatment for pleurisy, but care should be taken to avoid exposure afterwards. The sweating should not be continued until the patient is exhausted.

Pneumonia (lung fever).

The onset of pneumonia, or lung fever, is rather sudden. It begins with a chill, which lasts from a few minutes to an hour or more. Sometimes the disease follows an acute cold. The fever remains high, the breathing becomes rapid, and there are usually pains in the chest and headache. The cough may not be distressing at first, but grows very troublesome. Soon the sputum becomes thicker and brown or rusty in color, and sometimes frothy and bloodstained. Quite often the cheeks are flushed. The patient lies upon the affected side of the chest. A chill, followed by high temperature, rapid and painful breathing, rapid pulse and rusty sputum, furnishes a sufficient basis for a fairly accurate diagnosis of pneumonia.

Treatment.—Put the patient to bed. Give one calomel tablet ($\frac{1}{4}$ -grain) every hour for four doses; follow this course by a dose of either Epsom salts or castor oil. Cover the patient well with blankets and, regardless of cold weather, have all doors, windows, and other apertures opened to their maximum capacity. The patient can be kept comfortably warm with covers. In emphasizing the need of fresh air for the patient, it is not intended that he should be exposed to drafts, but one of his great needs is an abundance of fresh air. The diet should be liquid or semisolid and the patient should be fed every two hours. Give him all the water he will drink. Lemonade, ginger ale, and other such drinks are good for getting fluid into the body in order to wash out the poisons caused by the pneumonia germs. On the fifth, seventh, ninth, or eleventh day the disease usually subsides suddenly and passes through what is called the crisis. As just mentioned, the crisis generally occurs during the night hours of an odd day, but may occur on an even day. The occurrence of the crisis means that the disease has spent its force and that the patient will probably recover. The period of crisis is critical, since at this time the vital forces are at their lowest and the patient hovers between life and death and may pass one way or the other. At this stage it is often necessary to stimulate the patient. Hot-water bottles should be placed around him, because he becomes cold and his heart action is very weak. For the weak heart give two $\frac{1}{60}$ -grain tablets of strychnine. Sometimes stimulation may be effected by giving the patient a tablespoonful of whisky well diluted in water. Aromatic spirits of ammonia, a half teaspoonful to a teaspoonful in a glass of water, is also a heart stimulant. A patient who is recovering from pneumonia must have his diet carefully and gradually increased in order to hasten the return of his strength. If at any time during the disease the cough becomes distressing, it may be allayed somewhat by a Brown mixture tablet, dissolved on the tongue; one of these tablets may be given quite often unless it is found that they irritate the stomach.

A person who is recuperating from pneumonia must be warned not to expose himself to inclement weather, for there is always danger that the disease may recur.

Poisoning.

While poisoning may be self-inflicted in the effort to commit suicide, accidental poisoning is much more frequent. Poison should be suspected if (1) severe and alarming symptoms suddenly attack a person who has been in good health; (2) if severe symptoms develop shortly after taking food or drink, or after taking medicine; (3) or if several persons become ill in the same way at the same time.

Some poisons are corrosive when swallowed and may be readily detected because they burn or corrode the lining membrane of the mouth and throat. Examples of such poisons are carbolic acid, corrosive sublimate, lye, and cresol.

Some poisons do not burn nor destroy the lining membrane of the mouth and throat, but have, nevertheless, a very severe effect upon the stomach and intestines. In this class of poisons are included the ptomaines, present in tainted fish and meat and other animal foods. Another class of poisons includes opium, morphine, and alcohol when taken in overdoses.

Treatment of poisoning.—In the treatment of poisoning, the general plan is (1) to help the patient rid himself of the poison by vomiting; (2) to counteract the poison by its proper antidote; (3) to stimulate the patient, if there are signs of collapse; (4) to relieve suffering as far as possible.

Vomiting, or Emetics.

One of the best and quickest means of helping the patient to rid himself of the poison is to induce vomiting. This may be done by (1) placing the finger far back in the throat or (2) by giving a tablespoonful of either mustard or common table salt in a tumblerful of warm water. Warm sea water makes an excellent emetic.

The various types of poisoning which are liable to occur on board ship are those named below:

Alcohol Poisoning.

Any strong alcoholic liquor taken in excess is likely to produce acute poisoning. The diagnosis of alcoholic poisoning is made by noting the odor of the breath and the symptoms, which are giddiness, reeling, stupor, insensibility, and the other symptoms of drunkenness. The face is flushed and the eyes are bloodshot.

Treatment.—Loosen the clothing about the neck and waist. Give an emetic, such as mustard (a tablespoonful in a glass of warm

water) or warm sea water until vomiting occurs. Three drops of a solution of carbolic acid in a glass of warm water is a good antidote. After the stomach has been emptied, place the patient in bed and give him a teaspoonful of aromatic spirits of ammonia in a half glass of water. Keep him warm by placing hot-water bottles around him. On recovery from the acute attack give him a cathartic. Keep him on a light diet. For the first 24 to 48 hours hot milk, made hotter still with pepper, should be given; this is usually very acceptable to the patient.

Wood-Alcohol Poisoning.

Wood-alcohol poisoning has become a frequent occurrence since the advent of prohibition. Seamen should be warned of the danger of drinking so-called bootleg liquor. Even a small quantity of wood alcohol may cause blindness, mental disease, or death.

The symptoms of this poisoning are somewhat similar to those which follow the use of grain alcohol, but with certain differences. In case of poisoning by wood alcohol the symptoms, which may not appear for some hours after drinking the alcohol, are marked blueness of skin, labored breathing, and subnormal temperature. There is often permanent, complete, or partial loss of vision, which may occur within a few hours or may be delayed for some days.

Treatment.—There is no specific treatment for wood-alcohol poisoning. Blindness produced by it can neither be prevented nor cured. Death frequently results from the poison. The patient should be stimulated with aromatic spirits of ammonia and should be kept warm, and the bowels should be kept open by cathartics. Very dilute carbolic-acid solution may be used as an antidote. Get the patient into a hospital.

Ammonia Poisoning.

Ammonia poisoning produces burning pain in the mouth and throat. The lips and tongue are inflamed and swollen. There is often difficulty in breathing. The eyes are bloodshot. There is usually vomiting and the matter vomited may contain a small amount of blood. The odor of ammonia can be readily detected.

Poisoning from ammonia fumes such as may occur around refrigerating apparatus using ammonia is manifested by violent affection of the lungs and eyes. Death from it may be sudden. Pneumonia is quite likely to set in as a result of the irritation of the lungs.

Treatment.—When ammonia has been swallowed, give lime juice or lemon juice or white of egg in small and repeated doses. The irritation of the lungs may be relieved by inhaling steam from boiling water.

Arsenic Poisoning.

Arsenic poisoning may occur from the accidental ingestion of rat poisoning or poisoned fly paper. Symptoms usually appear in about a half-hour; they are nausea, and vomiting of a brown or bloodstained matter; faintness and much thirst, with dryness of the throat and perhaps diarrhea and cramps in the abdomen and legs. If a large quantity of the poison has been ingested, stupor and slight convulsions follow.

Treatment.—If patient is not unconscious, give whites of eggs, induce vomiting by giving either mustard or salt water, and, after vomiting, large drafts of fresh water. Give a large dose of castor oil in order to empty the intestines quickly. Keep the patient warm with covers and hot-water bottles. Stimulate, if necessary, by giving dilute whisky or aromatic spirits of ammonia, in teaspoonful doses, well diluted with water.

Carbolic-Acid Poisoning.

Carbolic acid is a very active and dangerous poison. If it is spilled on the skin, immediate destruction of the tissue takes place. Taken internally in sufficient quantity, it quickly causes death.

Carbolic acid produces, when swallowed, a white and swollen appearance of the lining membrane of the mouth and throat. There is intense pain along the under surface of the breastbone and in the stomach. Delirium and collapse soon follow.

Treatment.—If spilled upon the skin, carbolic acid should be washed off with water, and a wet alcohol compress should be applied and left on at least an hour; this should be followed by an application of boracic-acid salve. If carbolic acid has been swallowed, give a large tablespoonful of Epsom salts in a glass of warm water and also give whisky diluted with water. Olive oil, castor oil, the white of an egg, or a thin flour paste may be given to counteract the corrosive action of the acid. After a few minutes the stomach should be emptied by means of an emetic (a tablespoonful of mustard in a glass of warm water). Keep the patient warm with covers and hot-water bottles. He should be kept on liquid diet for a few days.

Iodine Poisoning.

Iodine, when swallowed, produces intense scalding pain in throat and stomach. It often induces vomiting. If it is taken in large quantity, unconsciousness and early collapse follow.

Treatment.—Make a thin paste of starch (corn starch) or flour and give the patient as much as his stomach will hold. After a few minutes or a half-hour, empty the stomach by inducing vomiting by giving a tablespoonful of mustard to a glass of hot water. Warm sea water also makes a good emetic.

Morphine Poisoning.

Shortly after taking an overdose of morphine or opium, a stage of mental excitement sets in. This is followed by drowsiness and later by complete insensibility. The face is flushed or livid. The lower jaw falls, the pupil of the eye is extremely small, being reduced often to the size of a pin point. The pulse gradually falls and breathing is noisy and slow.

Treatment.—Give a mustard emetic (1 tablespoonful of mustard to a glass of hot water) or sea water in order to empty the stomach. Irritating the throat with the finger will also induce vomiting. Give plenty of black coffee at repeated intervals. Pour sea water over the face and chest. It is important to keep the patient awake by walking him about the deck, slapping him with a cold, wet towel, etc. Should the patient become cold and show signs of collapse, give a teaspoonful of aromatic spirits of ammonia in half a glass of water.

Strychnine Poisoning.

Strychnine is an ingredient of many of the preparations used to kill rats and other vermin. If a person accidentally ingests a sufficient quantity of any of these preparations, poisoning results.

The symptoms of strychnine poisoning are painful and rigid spasms of the trunk, limbs, and body. The body is often curved backwards until it rests on the back of the head and the heels. The spasms recur every few minutes. The breathing is labored. The face is drawn into a fixed grin by spasms of the facial muscles. Quite often the patient is unable even to open his mouth or to swallow.

Treatment.—Give an emetic to cause vomiting (mustard, 1 tablespoonful to a glass of hot water). Keep the patient as quiet as possible. A morphine tablet may be given to reduce the convulsions and may be repeated in an hour, if necessary. (Do not give more than three morphine tablets during any one day and give as many as three only when absolutely necessary.)

Tobacco Poisoning.

Beginners in either smoking or chewing are often made sick by the effect of tobacco. As a rule, the illness is not serious. There is violent vomiting and the patient is pale and feels very sick.

Treatment.—Have the patient lie down and apply a hot-water bottle to the stomach. Within a short time the symptoms will begin to subside. A cathartic should be given and the patient should be put on light diet for a few days.

Bichloride of Mercury (or Corrosive Sublimate) Poisoning.

Bichloride of mercury, or corrosive sublimate, produces a violent disturbance of the stomach and intestines. There is a sense of constriction in the throat and there is a burning pain beneath the breast-

bone and in the stomach with colicky pains also and diarrhea; vomiting is frequent and the matter vomited contains much mucus, which is often bloodstained. The breath is foul. The pulse is weak, rapid, and irregular. The face is pinched and has an anxious expression. The hands and feet are cold. Convulsions and unconsciousness may occur.

Treatment.—Fill the patient's stomach with whites of eggs. In half an hour give an emetic of 1 tablespoonful of mustard in a glass of hot water. Apply heat to the body by means of hot-water bottles and extra covers.

Formaldehyde Poisoning.

Formaldehyde poisoning is marked by pain and vomiting, the vomited matter containing mucus and blood. The heart is very much depressed.

Treatment.—Give mustard in hot water as an emetic. Allow the patient to inhale ammonia. Give a hot bath. If prostration is great, give a teaspoonful of aromatic ammonia in half a glass of water. Cover patient well and place hot-water bottles around him.

Lye Poisoning.

If lye comes in contact with the flesh it corrodes and destroys the tissues. If lye is swallowed, intense burning pain is felt immediately in the mouth and throat, beneath the breastbone and in the stomach. There is early collapse if the dose is of sufficient quantity.

Treatment.—The object is to neutralize the lye with an acid. This can be done by giving the victim dilute vinegar, lemon juice, or lime juice. If there are signs of collapse, give a teaspoonful of aromatic ammonia in hot water. Cover the patient with blankets and surround him with hot-water bottles.

Food Poisoning.

Unless properly cared for, certain foods, such as meat, cheese, and particularly fish, will spoil and are likely to poison those who eat them. Decayed fruits will also cause poisoning, as is indicated by marked digestive disturbances after eating them. Meat should be obtained from reliable sources, because, if it has been taken from a diseased animal, disease is liable to be transmitted to those who eat it. Shellfish, such as mussels and crabs, sometimes produce serious symptoms when eaten; this is believed to be due to a diseased condition of the flesh rather than to putrefaction. It is well known that sea food undergoes putrefaction very readily; therefore, when a ship is cruising in a tropical climate, all fish and sea food should be cooked as soon as possible after being taken from the water and should be kept on ice until they are cooked.

It sometimes happens that the flesh of animals and birds becomes poisoned, as when game birds eat poisoned grain or when sheep feed upon poison weeds or plants.

Canned vegetables should be thoroughly cooked, since it is possible otherwise for them to cause serious poisoning, botulism, by the poison of the *Bacillus botulinus*.

Poisonous mushrooms eaten by mistake for edible mushrooms, cause dangerous poisoning. Certain tropical sea fish are very poisonous.

The symptoms produced by food poisoning resemble those of an irritant poison, which are violent vomiting, colic, and severe prostration.

Treatment.—To make the patient vomit, give an emetic, such as a tablespoonful of mustard in a glass of hot water; repeat, if necessary. After the stomach has been thoroughly emptied, give an ounce of castor oil. Keep the patient warm with blankets and hot-water bottles. Combat the shock by giving a teaspoonful of aromatic ammonia in half a glass of water.

Prickly Heat.

This skin rash often occurs among seamen when they pass from a cold to a warm climate. It results in most cases from the excessive sweating induced by the sudden change in temperature and the fact that the men are dressed for cold weather. Failure to take daily shower baths and the wearing of dirty underclothes are contributing causes of this distressing rash.

Prickly heat rash may be recognized by crops of minute hard pimples which are most numerous between the shoulders, on the forehead, on the back of the wrists and forearms, and over the front of the chest. The chief complaint made of this rash is that it itches intensely.

Treatment.—Have the patient take a bath and change his clothing to suit the climate. A sponge bath with water containing 10 or 15 drops of carbolic acid to a quart often helps to relieve the itching, as also an application of zinc oxide salve in which carbolic acid, 10 drops to 1 ounce, has been thoroughly mixed. Be careful not to get the carbolic acid in the eyes. Sodium bicarbonate, 1 teaspoonful in a glass of water thrice daily, is very helpful.

Relapsing Fever.

This is an acute infectious and contagious disease which is self-limited in its course and is characterized by a period of fever lasting about six days to be succeeded by an intermission of about six days, when there is a relapse, or return, of the symptoms. The disease is due to an organism called the *Spirocheta obermeieri*. Bedbugs,

body lice, and ticks, are believed to be the carriers which transmit this disease from one person to another.

Treatment.—This disease may be prevented by destroying bedbugs, lice, and ticks by the methods already described in another section of this book (see p. 25).

Aspirin may be given when the fever is high. The diet should be light and nutritious. The bowels should be kept open by cathartics.

Rheumatism, Acute Articular.

Acute articular rheumatism is also known as inflammatory rheumatism or simply as acute rheumatism.

It is an acute infectious disease characterized by fever, inflammation and swelling of the joints, acid sweats, and a tendency to complications involving the heart.

The disease usually follows exposure to severe weather. It may follow other sickness. Diseased teeth and tonsils contribute largely in the production of the disease.

The onset is abrupt, occurring generally at night with a chill and pain and stiffness of the joints. There is loss of appetite and sometimes the stomach is upset by nausea and vomiting. The temperature is raised, ranging perhaps from 102° to 104° F. Profuse sweating, great thirst, and constipation are additional symptoms, and there is much loss of sleep, due to the pain and the profuse sweating.

The disease is extremely irregular as to the number of joints affected. The affected joints are usually those that are analogous, the knee and elbow, wrist and ankle, hip and shoulder being attacked together, either on one side of the body only, or on both sides. The pain may leave one joint or joints and affect others. The joints that swell most are those of the knee, wrist, elbow, and ankle, or those joints that are not thickly covered with muscle tissue. Serious damage is often done to the heart by repeated attacks of rheumatism.

An attack of this disease usually lasts from four to six weeks. Relapses are frequent.

Treatment.—In all cases the patient should be placed at absolute rest in bed. He should wear woolen garments, and blankets should be used instead of sheets. A frame made of slate or barrel staves may be used to keep the bedclothes from coming in contact with the painful joints. The diet should consist of easily digested food. The patient should drink plenty of water and lemonade; alkaline mineral waters should be given, if possible to obtain them. Give a teaspoonful of bicarbonate of soda (baking soda) in a half glass or a full glass of water two or three times a day, and aspirin, in 5-grain doses (5-grain tablets), four times a day. The bowels should be thoroughly evacuated by cathartics. Chloroform liniment may be applied to the affected joints, and they may be protected from sudden

changes in temperature by wrapping them in cotton. At the first opportunity the patient should be put in a hospital.

Rheumatism, Muscular.

Muscular rheumatism is an inflammatory affection of the muscles characterized by pain, tenderness, and stiffness in them. The disease may be either acute or chronic. One attack of rheumatism predisposes to another. Exposure to cold, damp weather or to sudden changes in temperature will induce an attack. Infected teeth or tonsils and gonorrhoea are also causes. The onset of the disease is usually sudden; the symptoms are pain, slight tenderness and stiffness of the muscles. As a rule there is no fever. An attack lasts about a week or 10 days. When affecting the muscles of the neck, rheumatism is called wry neck or stiff neck. When affecting the muscles of the back or lumbar regions it is called lumbago.

Treatment.—The patient should rest in bed. Hot applications are soothing to the affected muscles. The applications should be changed frequently so as to maintain constant heat about the affected parts. Aspirin, given in 5-grain doses, three or four times a day, will help to relieve the pain. The bowels should be kept open by giving Epsom salts.

Rheumatism, Arthritic (Joint).

This type of rheumatism is a destructive disease of the joints, resulting in more or less deformity. The cause of this disease is not definitely known. Heredity, disregard of hygiene, exposure, grief, mental anxiety, tuberculosis, and any other debilitating diseases may play a part in causing the condition.

The disease may be acute or chronic. Several joints are usually attacked at the same time. There may or may not be fever. The affected joints are swollen and painful. As a rule, the attacks last only a short time, but recur at varying intervals. The repeated attacks increase the destructive process in the joint and gradually result in deformity. Sometimes there are hard nodules or outgrowths of bone on the sides and ends of the fingers and toes.

Treatment.—The general health should be improved by the maintenance of personal hygiene. Decayed teeth, abscessed gums, chronically inflamed tonsils, and disorders of digestion play a part in this disease and should be corrected if cure is to follow. The food should be nutritious and properly balanced. The bowels should be regulated by the use of cathartics whenever necessary. Hot applications during acute attacks will relieve the pain, and chloroform liniment is also helpful.

Scarlet Fever.

Scarlet fever usually occurs in children and young adults. The disease is self-limited and very contagious. It is marked by a high

fever, a rapid pulse, and a diffuse scarlet eruption. The eruption is followed by a peeling of the skin, which occurs about two or three weeks after the rash has disappeared. The throat is usually sore, and the tongue has a peculiar redness which has given rise to the expression "strawberry tongue," heard only in connection with scarlet fever.

The disease is not common among adults, and tests show that most people have it in relatively mild form in childhood. It is now possible to immunize children and adults against it. In many cases there is no skin rash, the symptoms being merely a rather severe sore throat. For this reason, all severe sore throats occurring in persons who have not had scarlet fever should be looked upon with suspicion.

Treatment.—The disease is self-limited and treatment is therefore confined to good nursing. The patient should be isolated and all evacuations should be disinfected. The bowels should be kept free by cathartics. The diet should be light.

Sciatica.

This disease, sometimes called sciatic rheumatism, affects the sciatic nerve, which is located in the back part of the hip and leg. The disease is a true neuralgia and, therefore, the treatment for neuralgia is applicable for it.

Scurvy.

Scurvy is caused by a diet lacking in fresh vegetables and citrus fruits. The disease is manifested by loss of weight and strength and hemorrhages (bleeding) into the skin. The gums become swollen and spongy and bleed from the slightest irritation. The onset of the disease is slow, with a general weakness and loss of strength. The gums may become so badly involved that the teeth loosen and fall out. Because of the great improvement in the seaman's diet, the disease, once the scourge of the sea, is now relatively rare.

Treatment.—Scurvy may be prevented by including vegetables in the diet. Fresh vegetables and fresh and cooked fruits and fresh meats should be eaten. When it is impossible to obtain such food, then men should be given lime juice and vinegar.

Seasickness.

The symptoms of seasickness are so well known by every mariner that it seems scarcely necessary to describe them. They vary from slight chilliness and dizziness to the most profound physical depression. In such cases the performance of labor is not possible and life may even be endangered. Fortunately, this is very rarely the case and the sufferer soon gains his "sea legs" and is able to carry on.

It is believed that the condition results from interference with the balancing and stabilizing apparatus of the body. Dietary and other indiscretions and, in some cases, imagination, also play a part.

Treatment.—The treatment for seasickness is directed mainly toward prevention, because when an attack begins there is not much that can be done to shorten the illness; apparently it must run its course. Before setting out on a voyage, it is a good plan to live on a light but nutritious diet, taking care not to overload the stomach for a few days before sailing. This precaution will do much to prevent seasickness, or at least to lessen the severity of an attack. If an attack comes on, the patient should be kept quiet, either in bed or in a deck chair on deck. He should be warmly clad. Three to four bromide of soda tablets dissolved in a glass of water will help to relieve him. If vomiting is persistent, he may suck chips of ice, or sip ginger ale or lemonade. Hot milk with enough red pepper in it to give it a hot taste will provide a nourishment that will often be retained in the stomach even in severe cases of seasickness. Liquids often keep up the vomiting. An excellent treatment is to give only dry food; dry toast or crackers, a bit of lean ham, grilled or cold boiled, etc. To swallow such food it is necessary to chew it a long time and the act of chewing has a quieting effect upon the stomach. Such food provides nourishment without great bulk and will be kept down in cases when bulky liquids will be vomited. Sometimes it is necessary to apply hot fomentations or a hot-water bottle to the abdomen in order to relieve the pain. Sun cholera tablets sometimes give relief. A 5 or 10 grain tablet of aspirin may relieve the headache.

Shingles.

This is a disease of the skin caused by an inflammation of the nerve supplying the part involved. It appears as bright red patches covered by clusters of small watery blisters which, in a few days, become yellow and then break down and discharge. They finally dry up and form scabs.

The disease is painful and pain may continue even after the scabs have fallen off. As a rule, only one side of the body is affected; the eruptions are most frequently seen on the chest, but sometimes extend from the backbone around to the center of the breast. They may occur upon one arm or leg or even over the eyebrow, but are rarely found in these locations.

Treatment.—Protect the sores by dusting them with bismuth subnitrate or anoint them with boracic-acid salve. A piece of gauze should be laid over the sores and fastened in place by means of adhesive plaster. The general health of the patient should be built up. It is best that patient go to bed.

Smallpox.

Smallpox is sometimes called variola. It is an acute communicable epidemic disease. Its onset is sudden, with a violent chill, vomiting, intense headache, and agonizing pains in the back which seem to dart thence down the limbs. In small children a convulsion may occur instead of a chill. The temperature may be 103° to 104° F. The pulse is full, strong, and rapid. The face is red and the eyes are injected. There may be delirium or convulsions. On the third day the characteristic eruptions, which may be described as coarse red spots, appear, breaking out first on the forehead and wrists. Within 24 hours the eruptions have acquired a shot-like hardness. With the appearance of the eruption the severe headache and high temperature decrease. By the sixth day the eruption has changed into little blisters with flat or depressed tops containing a cloudy fluid, and on the ninth day these have become converted into blisters containing pus. At this time the temperature and other symptoms reappear. The patients have an offensive and characteristic odor. Sometimes, especially in the severe forms of the disease, the eruptions fuse and may show hemorrhage or bleeding into the pocks. This type is often called black smallpox. Mild cases of smallpox are dangerous factors in the spread and continuance of the disease. These are not at all uncommon; and while an epidemic may be characterized by great mildness, there is no telling when it may turn into the very severe fatal form.

The answer to smallpox is vaccination, a very simple and harmless procedure when properly executed. There is no excuse for having an unvaccinated man in a ship's crew. Attention to this detail will prevent quarantine delays and the expense incident thereto.

Treatment.—A smallpox patient should be isolated for six weeks. Persons who have been in close contact with the patient just before he fell ill should be kept apart from others for about two weeks. Everybody on board should be vaccinated.

The patient should be kept in a darkened room. The eruption should be covered with a salve such as zinc oxide ointment. Sometimes hot dressings are used in place of the ointment. Painting with dilute tincture of iodine has been recommended.

The bowels should be kept free by the use of cathartics. The diet should be light and nutritious. If the patient becomes weak, it will be necessary to stimulate with internal doses of whisky or the administration of one strychnine tablet ($\frac{1}{60}$ -grain) three or four times daily.

Sunstroke.

Exposure to the extreme heat of the sun may produce an attack of illness called sunstroke. The condition develops suddenly, usually

without any warning signs or indications. There may be and usually is insensibility with perhaps delirium, convulsions, or paralysis. The body is flushed and hot. The eyes are injected and red. The breathing is rapid, shallow, and labored. The pulse is either bounding or weak. The temperature is very high—sometimes reaching 110° F.

Treatment.—Treatment is directed mainly toward reducing the high temperature. Remove all clothing. Give a cold bath, cold rectal injections, or an ice rub to reduce the temperature. The cold applications should be discontinued as soon as the skin becomes cool, or if there are any indications of convulsions. If the patient becomes too cool or the pulse becomes too weak, it is well to stimulate him by whisky well diluted with water; it should be given by mouth, *but only if patient is conscious*. Good results may also be obtained by giving a teaspoonful of aromatic spirits of ammonia well diluted with water. Never give any medicine by mouth when a patient is unconscious.

When consciousness has returned, the patient should have a large dose of Epsom salts. He should be kept quiet for at least a week after the attack and should be warned to be careful when resuming work, because he will be more sensitive than before to the effects of the sun.

Syphilis. (See p. 123.)

Tetanus, or Lockjaw.

Lockjaw may occur on board ships that carry domestic animals. The disease is caused by a germ which enters the body through a wound in the skin. The wound involved may be very slight, but usually it is a puncture or fairly deep wound, such as would be produced by a nail, a tack, or a splinter of wood.

The disease attacks suddenly; there is first a stiffness of the jaw, neck, and tongue, with a difficulty in swallowing, which increases in extent, the stiffness passing down the spinal (back) muscles to the legs. Gradually spasms develop, which involve especially the muscles of the jaw and face. The fever is usually moderate, the pulse rapid, and the breathing rate slightly increased.

Treatment.—Treatment consists chiefly of prevention. For this purpose every wound, no matter how slight, should be treated by cleaning and applying tincture of iodine.

During the convulsions have the patient inhale a little chloroform or ether. Place a few drops of chloroform on a handkerchief or piece of cloth and hold it within a few inches of the nose; add chloroform, a drop at a time, until the spasm begins to lessen. When giving chloroform, be careful not to give enough to put the patient to sleep,

as there is danger of doing. The bowels should be kept open by the use of soapsuds injections. The food should be liquid. It may be necessary to inject it slowly into the bowels.

Tonsillitis, Acute.

Tonsillitis, sometimes known as quinsy, is an acute inflammatory infection of the tonsils which often ends in pus formation. Acute tonsillitis is easily contracted; exposure to inclement weather and weakness from other conditions favor its contraction. The disease is sometimes epidemic.

The onset of tonsillitis is more or less sudden. There may be chilliness or an actual chill followed by a rise of temperature. The pulse is increased. There are headache, thirst, pain, and swelling of the tonsils, general muscular aching, pain on swallowing, and perhaps some difficulty in breathing. The saliva may be increased in quantity. Sometimes there is earache. These symptoms being present, if a look at the throat shows that the tonsils are enlarged and inflamed, a diagnosis may be promptly made.

Treatment.—The patient must rest in bed. Give a calomel tablet ($\frac{1}{4}$ -grain) every hour until eight doses have been taken; then give a tablespoonful of Epsom salts dissolved in a glass of water. An aspirin tablet three or four times a day will give considerable relief. Either hot or cold applications may be placed over the throat. A gargle made by dissolving one or two alkaline antiseptic tablets in a glass of hot water should be used every hour or two. Have patient use the gargle as hot as he can stand it.

Persons having repeated attacks of tonsillitis should consult a physician with the view of having the tonsils removed. Diseased tonsils are the cause of many bodily ills.

The Tongue.

Swelling of the tongue may result from taking food into the mouth too hot or from an insect bite or perhaps from an injury. A swollen tongue is best treated by using the mouth wash freely and by sucking pellets of ice or sipping cold water. If the swelling becomes so alarming as to interfere with breathing, several small cuts should be made on top of the tongue to make it bleed freely.

The tongue may become sore from excessive smoking, from the irritation caused by a ragged tooth, or as a result of syphilis.

Before treating the tongue condition the cause of it should first be ascertained. If it is due to tobacco, the use of tobacco should be stopped; if it is due to syphilis or cancer, the patient should be placed in a hospital at the first port visited unless conditions are such that he can be sent to his home. A simple ulceration or inflammation of

the tongue should be treated by the use of a mouth wash. It is often advisable to clean out the intestines with Epsom salts or compound cathartic pills.

Tuberculosis.

Tuberculosis may affect any part of the body, but most frequently affects the lungs. Persistent cough, gradual loss of weight, weakness, and an afternoon or evening fever of about 1° together with heavy night sweats, are symptoms that should arouse a suspicion of tuberculosis. Officers or members of the crew with a chronic or persistent cough should be sent to a medical officer of the United States Public Health Service for physical examination.

Tuberculosis may be chronic or acute. Sometimes an acute lung tuberculosis resembles pneumonia. The so-called galloping, or quick, tuberculosis (consumption) is an acute form of the disease which affects practically the entire body. Chronic tuberculosis may last for years. By the modern methods of treatment many cases are arrested.

A sudden bleeding from the mouth of bright red, frothy blood indicates hemorrhage from the lungs, and in most instances such a hemorrhage is due to tuberculosis.

Treatment.—The main factors in the treatment of tuberculosis are rest, fresh air, abundance of nourishing food, and measures to prevent the spread of the disease. A seaman showing signs of tuberculosis should be placed at complete rest in bed until his temperature is normal. His bowels should be kept open by the use of cathartics, such as Epsom salts, castor oil, or compound cathartic pills. His food should be nutritious; every effort should be made to induce the patient to eat heartily. The quarters occupied by the patient should be well ventilated. Excretions—sputum, stools, and urine—should be thoroughly disinfected before being disposed of. Dishes, clothing, and all articles handled by a tuberculous patient should also be thoroughly sterilized. A tuberculous patient should be instructed as to the danger to which he exposes others when he spits or sneezes carelessly. All sputum should be collected, best in a paper cup, and burned. In sneezing or coughing the patient should place a handkerchief or cloth before his nose and mouth.

Permanent arrest and cure of tuberculosis is largely a matter of self-control. If the patient will place himself under the care of a competent physician and obey his instructions fully, the chances of recovery are greatly improved. On the contrary, the patient who is impatient, who will not follow the directions given for him, who wanders from place to place, greatly handicaps his opportunity for recovery.

Typhoid Fever.

Typhoid fever is an acute infectious disease caused by a special germ. The typhoid-fever germs get into the drinking water and food and are thence transferred to man. No one can contract typhoid fever unless some of these germs enter his body. Persons sick with the disease, and occasionally persons who are not sick but who have the germs in their body, are constantly passing them from the bowels and with the urine. From these excretions some of the germs, if precautions are not taken, find their way to the water or food supply, often through the agency of flies and perhaps other insects which carry them mechanically.

The disease begins slowly. The patient complains of a constant and severe headache and perhaps he has bleeding from the nose; he feels tired, listless, and exhausted upon exertion. During the first few days he has some fever, higher at night than in the morning. After a few more days his temperature becomes quite high and remains so. The patient's face indicates mental dullness. The tongue is heavily coated. The abdomen becomes painful and tender, distended, and full of gas. There is usually a rash which appears as small red spots on the abdomen. During the third week there may be bleeding from the bowels. Ulceration of the intestines may occur. One of the most serious complications is presented when an intestinal ulcer eats through the intestines and causes death from bleeding, or peritonitis.

In mild cases the patient begins to improve at the end of the second or the beginning of the third week, but sometimes the disease persists for six, eight, or more weeks before convalescence sets in.

Treatment.—The patient should be placed in a hospital at the earliest possible moment. Good nursing is the chief treatment of typhoid. The disease must run its course, and medicines do not shorten it. The patient should be kept in bed on a liquid or semi-solid diet. He should drink plenty of water. The mouth and teeth should be cleansed daily. The patient should not be allowed to exert himself or to get up. He should use a bedpan and urinal. An ice bag applied to the head will relieve the headache somewhat. Turpentine stupes on the abdomen will help to relieve the pain. A large catheter inserted in the rectum will often enable gas to escape and thus relieve abdominal distress. A few drops of turpentine on a lump of sugar taken by mouth will sometimes reduce or prevent gas. Cold baths should be given when the temperature is above 102°. Excretion from bowels and bladder should be thoroughly disinfected before they are disposed of. Bedding, clothes, dishes, and everything handled by either patient or nurse should be disinfected.

When the patient is well again, the quarters should be thoroughly cleaned and disinfected.

Antityphoid Prophylaxis (Prevention of Typhoid Fever).

Typhoid fever is a preventable disease. Sanitary precautions and vaccination have greatly reduced its prevalence. Every possible sanitary precaution should be taken against it, and every seaman should be vaccinated against it before sailing.

Typhus Fever.

Common names for typhus fever are ship fever, jail fever, and spotted fever.

The disease is an acute infectious and epidemic fever characterized by sudden onset, profound depression of the vital powers, a sickening odor, and a peculiar mottled eruption. The disease terminates suddenly about the fourteenth day.

The disease is caused by a germ which is carried by body lice and bedbugs. A person becoming ill with typhus is taken with a sudden chill and has pains in the head, back, and limbs. There is high fever, ranging from 105° to 106°. About the third or fourth day a skin eruption appears. The eyes are red and injected; there is muscular soreness and tenderness, particularly over the shin bone. There is often severe headache and there may or may not be delirium. Constipation is the rule.

Treatment.—Isolate the patient. Keep him in bed. Evacuate the bowels with Epsom salts or castor oil. Disinfect all feces and urine. Boil all dishes and all bedclothes used by the patient. Disinfect his clothes to kill any lice that may be in them. Examine all members of the crew for lice and disinfect their clothing. A thorough cleaning should be given the sleeping quarters in an effort to destroy all bedbugs and fleas. The diet should be light and nutritious. Sponging the body with cold water helps to reduce the fever. Good nursing is the most essential part of the treatment, medicine having little or no effect upon the course of the disease. Should the patient become weak, he should be stimulated by giving him a teaspoonful of aromatic spirits of ammonia in half a glass of water. A good stimulant is a strychnine tablet ($\frac{1}{60}$ -grain) three times daily.

The Venereal Diseases.

This group of diseases, of which the most important are gonorrhoea, syphilis, and chancroid, are called venereal because they are spread chiefly by sex contact. They are caught by healthy persons from persons who are diseased. Most prostitutes (90 per cent), are infected, and any "loose" woman is likely to have the disease.

Each of the venereal diseases is caused by a different germ and has different symptoms, but they have one feature in common—they are passed from men to women and from women to men through

contact of the sex organs. Occasionally they may be acquired by other forms of close contact, such as by kissing or by using common drinking cups or other articles freshly soiled with the infection. This applies chiefly to syphilis, which also may be inherited.

Gonorrhœa (Clap).—The germ that causes gonorrhœa grows in the sex organs of men and women. The first sign of the disease in the male is usually a burning pain in the penis on urination (passing water). This happens about 3 to 10 days after the man has gone with a diseased woman. A day or two later a yellowish white discharge comes from the penis. This discharge is loaded with germs, and unless every precaution is taken they may be transferred to the eyes and cause an inflammation which may result in blindness. If gonorrhœa is not treated early, the germs may spread to other organs, such as the bladder and testicles. The germs also may get into the blood stream and cause swollen joints or fatal heart disease. Frequently gonorrhœa causes the inside of the tube of the penis to “pull together,” causing a stricture.

After the acute stage of gonorrhœa has passed, a man may be free from symptoms except for a slight burning on urination and an occasional drop of pus. In this stage the disease still is infectious and can cause as much damage as a fresh case.

The effect of gonorrhœa in a woman is even more serious than in men. It often causes disease of her internal sex organs which may prevent her from bearing children. Many serious abdominal operations on women are necessitated by this disease. Also the germs may enter the eyes of the child of an infected mother during birth and cause an inflammation likely to result in blindness.

Early treatment is important.—Although gonorrhœa is a serious disease, it can be cured if treatment is started at once. If it is treated promptly, it is less likely to end in complications or produce after-effects which cripple the joints, cause stricture, or attack the heart or other organs. If treatment is neglected or stopped too soon, the disease may go on for a long time, often showing itself for years as a slight discharge called the “morning drop” or “gleet.” When the discharge stops, it does not always mean that the disease is entirely cured. Gonorrhœa may be present even when there is no discharge and the person seems to be well; during this time it is possible to give the disease to others. Therefore the infected person must not have sexual intercourse nor stop treatment until a doctor finds out whether or not the disease is cured.

Instructions for patients with gonorrhœa.—If you think you have gonorrhœa and are a beneficiary of the Public Health Service, go immediately to a marine hospital out-patient office for examination and treatment by a Government doctor.

FIRST AID FOR PATIENTS WITH ACUTE GONORRHEA

1. Rest in bed the first week of the disease, if possible. Avoid all heavy work or active exercise. By doing this you will be cured sooner and avoid complications.
2. Apply a clean gauze dressing to the penis. Change the dressing frequently. Keep the parts clean by sponging with an antiseptic solution, such as bichloride of mercury, 1-4000.
3. Always wash your hands thoroughly after touching the diseased parts or after handling gauze, bandage, or underwear that has been soiled by the discharge. If you fail to wash your soiled hands, you are likely to carry the disease germs to your eyes and infect them.
4. Always burn pieces of gauze or other dressings that have been soiled with the discharge of pus or matter or dispose of them so they will never be touched or handled by others.
5. Have separate towels, wash cloths, soap, and all other toilet articles, and never allow anyone to use those used by you, because such articles may have been soiled by germs from your diseased parts and may give the disease to others.
6. Your bowels should move every day; if they do not, take a laxative medicine.
7. Drink plenty of water during the day (six or eight glasses).
8. Don't take spicy food or drinks, such as smoked meats or delicatessen, pickles, mustard, pepper, horseradish, salt, ginger ale, or other carbonated soft drinks until your doctor tells you that you may. They irritate the inflamed parts.
9. Don't drink alcohol in any form. It aggravates the disease and makes the cure slower and more difficult.
10. In order to avoid chordee while the disease is acute, drink no water after supper, urinate before going to bed, and sleep on your side. Never "break" a chordee. To get rid of it, wrap the penis in cold wet cloths or pour cold water on it.

If the disease develops while you are at sea and no doctor is on board ship, observe the accompanying first-aid measures listed here.

As soon as possible place yourself under a doctor's care and follow the advice he gives you. Stay under the care of a reputable doctor. Keep under treatment until the doctor tells you that you are cured. Remember that some cases have to be treated for a long time. Do not become discouraged no matter how long it takes.

Remember that reputable doctors don't advertise; therefore keep away from the advertising "specialist." Don't go to a druggist for treatment. Don't use patent medicines or other self-treatment.

Stay away from women. Don't have sexual relations. Intercourse will bring your disease back to its acute stage, and you are almost certain to infect the woman. Sexual intercourse, while you have gonorrhoea, is a criminal act.

Do not marry until your doctor, by careful tests and examinations, finds out whether it is safe for you to do so. If you marry before you are cured, you are almost sure to infect your wife and make her dangerously sick.

Syphilis.—Syphilis is one of the most serious diseases which affect the human race. It attacks any part of the body, is difficult to cure, and many cases, especially if not treated early and thoroughly, result in insanity or in damaged heart and blood vessels. The chief danger lies in the fact that the obvious symptoms of the disease may disappear, although it may be steadily undermining health and causing permanent damage to important organs and structures.

The germ that causes syphilis enters the blood through the skin or mucous membrane. Usually there is no visible break in the skin at the point of entrance. After from 10 days to 3 weeks a sore develops which is called a *chancre*. The chancre may be so small or so slightly inflamed that no attention is paid to it. It usually appears on the penis, but may appear on the lips, tongue, or other part of the body which has been in contact with the infection. Later, the disease may show itself by a skin rash, sore mouth and throat, swollen glands, headache, bone pains, fever. All of these signs may appear at one time or only one or two of them at a time. In some cases the symptoms may be so slight that they are not noticed and the disease may not be discovered until years later when it has damaged the body beyond repair.

Prompt treatment necessary.—If the right treatment is started as soon as the disease is recognized, and if it is kept up long enough, such serious results may be avoided. Therefore be on the lookout for any sign of a syphilitic sore which may appear on the sex organs or any other part of the body. If you have been with a "loose"

woman, do not wait for the signs to appear, but go to a marine hospital for early treatment and advice.

Syphilis is curable.—The disease is generally curable, especially if treatment is begun early. Therefore it is important that treatment be started promptly and be continued for a long enough period.

The modern and most successful treatment of syphilis includes the use of arsphenamine ("606") given into a vein, mercury given by injection or by rubbing into the skin, and bismuth injections. To be successful a full course of treatment must be repeated several times. Not less than one year of treatment and another year of observation is necessary before any assurance of cure can be given. More often three years of treatment and observation are necessary.

Keep up treatment until you are cured.—Soon after treatment is begun, and often when no treatment has been given, all external signs of the disease may disappear and the patient may think himself well again. Herein lies the great danger of syphilis. The disease often is still present in the body without showing any signs, and it may appear again in some dangerous form even after some years of what seems to be good health. For this reason the patient must remain under the care of a doctor for a long time and must not stop treatment until the doctor says it is safe.

The doctor can tell when treatment should stop by making thorough physical examinations and by careful special laboratory tests of the blood or spinal fluid. Such physical examinations and laboratory tests are used to find out how successful the treatment has been and to know when the disease is cured. One or more tests of blood or spinal fluid which fail to show evidence of the disease—so-called "negative" tests—do not prove that the disease is cured unless repeated laboratory tests and examinations of the entire body show no sign of the disease.

Instructions for patients with syphilis.—If you think you have syphilis and are a beneficiary of the Public Health Service, go immediately to a marine hospital out-patient office for examination and treatment by a Government doctor. Every day's delay in treatment will make your cure more difficult.

If the disease develops while you are at sea and no doctor is on board ship, observe the first-aid measures listed here.

There is very little to be done for a patient who develops a chancre except to get him under a doctor's care as soon as possible and prevent him from spreading the disease to others.

Stay under the care of a reputable doctor. Keep under treatment until the doctor tells you that you are cured. Remember that some cases have to be treated a long time. Do not become discouraged no matter how long it takes.

FIRST AID FOR PATIENTS WITH PRIMARY SYPHILIS

1. Apply no local treatment to the sore. It is only by use of a microscope to examine the discharge that the difference between the chancre of syphilis and soft chancre (or other infection) can be detected; therefore to apply strong antiseptics will make the diagnosis difficult. Dress the penis with dry gauze or a piece of gauze moistened with a solution of boric acid.

2. Always sleep alone in order to avoid giving the disease to others; especially if you are in the infectious stage with "open" signs, such as rash on the skin, sores on the body, or sore mouth.

3. Always wash your hands thoroughly after touching the diseased parts or after handling gauze, bandage, or underwear that has come in contact with the open sores.

4. Always burn pieces of gauze or other dressings that have been soiled with the discharge of pus or matter, or dispose of them so they will never be touched or handled by others.

5. Have separate towels, wash cloths, soap, and all other toilet articles, and never allow anyone to use those used by you, because they may have been soiled by germs from your diseased parts and may give the disease to others.

6. Don't kiss anyone; don't handle food that other people have to eat; don't get drinks at soda fountains or other public drinking or eating places until your doctor tells you that it is not longer dangerous to others for you to do so.

7. Don't take any alcoholic drinks, such as beer, gin, whisky, brandy, etc. Avoid the use of tobacco.

Remember that reputable doctors don't advertise; therefore keep away from the advertising "specialist." Don't go to druggists for treatment. Don't use patent medicines. Don't follow your own judgment or the advice of a friend about treatment.

Stay away from women. Do not have sexual relations until your doctor tells you that you are no longer in the infectious stage of the disease.

Go to a dentist to have your teeth put in good condition, but be sure to tell him that you have syphilis before he examines you. The dentist will then sterilize his instruments with special care in order to protect others. The teeth should be brushed at least once a day. Use a soft toothbrush.

If you go to a doctor for any ailment, be sure to tell him you have had syphilis. This may help him to find out what your disease is.

Do not marry until your doctor, by careful tests and examinations, finds out whether it is safe for you to do so. If you marry before you are cured, you are almost sure to infect your wife and make her dangerously sick. A child born of syphilitic parents usually is infected. This is called "congenital syphilis."

Chancroid.—Chancroid is also called "soft chancre." It is a contagious germ disease. The germs do not get into the blood, but the disease may eat away the flesh and cause ulcers and buboes ("blue balls"). The soft chancre is a sore on or near the penis. It may occur along with syphilis and hide a syphilitic chancre. Even doctors can not always tell the difference between a chancre and a chancroid or soft chancre except by repeated examinations. Go to a marine hospital out-patient office for examination and treatment.

If a sore develops on your penis while you are at sea and no doctor is available, follow the first-aid direction given for syphilis, since it is impossible for you to know from which disease you are suffering.

Prevention of the Venereal Diseases.—The most certain method of preventing a venereal disease is to keep away from prostitutes and other "loose" women. These diseases are kept alive and spread by promiscuous intercourse. Every sex contact outside of marriage is likely to be the beginning of a venereal infection; therefore, preventive or first-aid treatment should be applied immediately after each sex act.

When no doctor is available, this preventive treatment should be applied by the exposed person as follows:

1. Urinate immediately.
2. Wash the sex organs thoroughly with soap and water. Soap is a disinfectant against the germs of syphilis and chancroid. The

use of this treatment will prevent many cases, but to be effective it must be applied within an hour after exposure—the sooner the better. It may do some good up to six hours after exposure.

3. The soap should be thoroughly rubbed into the folds of the skin of the penis and scrotum and adjacent parts of the abdomen and thighs. Ordinary laundry or hand soap is suitable.

4. Dry the parts thoroughly so that no moisture remains.

5. An additional means of prevention of syphilis both before and after intercourse is to rub calomel ointment thoroughly into the penis and on the scrotum and adjacent parts of the abdomen and thighs. The calomel ointment can be procured in a collapsible tube.

6. For the prevention of gonorrhœa an injection of argyrol (10 per cent solution) or protargol (2 per cent solution) should be used if available. If the protargol solution is not at hand, insert the tip of the tube of calomel ointment into the penis and inject part of the contents.

This first-aid treatment is of no value in treating cases which have already developed. It may then do more harm than good.

Yellow Fever.

Yellow fever is transmitted from a sick to a well person by the bite of a mosquito as is malaria. A certain kind of mosquito, known as the *Aedes* mosquito, bites a person suffering from yellow fever and takes into its body the yellow-fever germ along with the blood it sucks; it later bites another person and so infects him with this disease.

Yellow fever is ushered in by a tired feeling, pain in the head, back, limbs, and joints, loss of appetite, and a chill which is quickly followed by a high fever. The attack usually begins at night or in the early morning. The pulse is rapid, the face is flushed, the eyes are bright, and there may be some disturbance of the stomach, such as nausea or vomiting. As the fever continues to rise, the pulse rate becomes slower, the patient becomes restless, and a peculiar odor becomes noticeable about him that some regard as characteristic of the disease. In from two to four days the skin of the body becomes yellowish in color. In severe cases there may be delirium. After a few days the symptoms subside, but may return from one to four days later, usually in severer form. The jaundiced or yellow color of the skin becomes more intense and the patient vomits black or "coffee-ground" matter. There is great prostration, the skin is cold and clammy, and the pulse is feeble. The patient may die during this stage or may gradually recover. If the vomiting of "coffee-ground" matter occurs, the case is always serious.

Treatment.—As with malaria, yellow fever may be prevented by destroying all mosquitoes. Shore liberty should not be granted at

yellow-fever-infected ports. A yellow-fever patient must be strictly protected from mosquitoes in order that these may not obtain from his blood any germs with which to inoculate other persons. During the stage of pain, great relief may be obtained by giving a foot bath according to the following method: Cover the patient with a sheet and one or more blankets; place a small tub half full of hot water under the covers at the foot of the bed and put the patient's feet in it; add two tablespoonfuls of mustard tied up in a piece of thin cloth and keep adding hot water—just as hot as the patient can bear. Continue this until the patient breaks into a profuse sweat. This generally relieves the pain. Keep the patient absolutely quiet in bed and *give nothing by mouth except water*. Use cold sponge baths or ice packs for reducing the fever. The bowels should be evacuated with Epsom salts, castor oil, or compound cathartic pills. It may be necessary to catheterize the patient. The vomiting may be relieved by sucking pellets of ice or by placing a mustard plaster over the stomach. If prostration is great, stimulate with alcohol or with strychnine, one tablet ($\frac{1}{60}$ grain) every three or four hours.

Let it be repeated that the patient must be kept *absolutely quiet in bed* and must be given plenty of water to drink and absolutely no food of any description until one week after the disappearance of the fever. After recovery, the patient will feel like returning to work at once; this should not be permitted for some time.

CHAPTER VI

SURGICAL CONDITIONS AND THEIR TREATMENT

Most of the accidents that occur at sea are of a minor character and require only simple first-aid treatment; but sometimes serious accidents occur on board ship, and in such cases the ship's master, or some other licensed officer, is called upon to care for those who are injured.

A glance at an injured man will often show how badly he is hurt. His position will often suggest whether there has been a fracture or dislocation of a limb; bleeding, pallor, the character of the breathing, all are helpful in forming a decision. An injury sufficient to produce unconsciousness should always be regarded as serious.

In case of a minor accident, no matter what its nature, any wound or scratch, or any injury that has been received should be given prompt and careful treatment, because even a slight break in the skin may become infected and give trouble, and blood poisoning and perhaps death may result.

If an accident is of a serious nature, examination should be immediately made for bleeding, for broken bones, for dislocation of bones and for symptoms of shock.

The ship's medicine chest and sick bay should always be in readiness.

Accident Prevention.

Ships should be inspected at regular periods in order to detect and to correct conditions which might lead to the occurrence of accidents. Such a safety inspection might very well be made in conjunction with the sanitary inspection.

In making the safety inspection the examiner should be keen to detect not only such conditions as are immediately dangerous but also those that may be remotely so. Sometimes a seaman falls through an unguarded hatch or gangway because the hatch covers are short or badly in need of repair; the gangways may be in a deteriorated condition or tackle may be defective; staging may be unstable. Since accident prevention is of the utmost importance in the successful operation of ships and the protection of their personnel, all apparatus should be carefully inspected before it is used, and hatches and similar openings safeguarded. A little care and effort expended in this

way will result in the saving of human lives, the prevention of suffering, and the avoidance of tedious and expensive lawsuits.

Fire at sea is one of the most terrible marine hazards; sometimes the character of the cargo makes the risk of fire unusually great. As required by law, the crew should be given boat and fire drills periodically at irregular intervals. All fire apparatus should be kept in good condition and ready for use at a moment's notice. The apparatus should be inspected regularly, because valves may become corroded, hose may rot, or some of the equipment may not be in its proper place when it is needed. Lifeboats, rafts, and life preservers should be carefully inspected at regular intervals. It is of importance for all members of the crew to be familiar with the location and proper use of all life-saving apparatus. There should be gas masks on board all tank ships, and special precautions in respect to fires and smoking should be observed on those ships which carry inflammable or explosive cargoes.

Disinfection of Wounds.

In examining or treating a wound of any sort the operator should wash his hands thoroughly, clean and trim his finger nails, and then carefully wash his hands again. He should not touch the wound with his fingers if he can possibly avoid so doing; instruments which have been sterilized by boiling or sterile gauze should be used for the purpose.

It is best not to wash a wound unless it is necessary to do so in order to remove dirt or foreign particles from it. If the wound is reasonably clean, tincture of iodine should be applied to it, and it should be covered with a piece of sterile gauze, held in place by either a bandage or strips of adhesive plaster. The tincture of iodine may destroy some of the harmful germs. If the skin surrounding the wound is dirty, a piece of sterile gauze should be placed over the wound, and another piece of gauze should be used to wash the surrounding skin with an antiseptic solution, such as a teaspoonful of cresol to a quart of water. In wiping off the skin, do not use a motion toward the wound but away from it; and take care to avoid touching the wound or getting any of the washing fluid into it. Since tincture of iodine is a strong antiseptic, it would be best to dilute it one-half with boiled water before using it in redressing wounds. A swab for applying iodine is made by twisting a small amount of cotton around one end of a wooden applicator, a clean match, or a toothpick.

Wounds Which Are Soiled with Dirt or Foreign Bodies.

In the foregoing paragraph it is remarked that wounds should preferably not be washed or irrigated; however, when they contain dirt or foreign particles, these may be best removed by irrigation.

Large particles may be picked out with forceps; under no circumstances should the fingers be put into a wound or even touch a wound, unless they are covered with gloves which have been thoroughly sterilized.

For washing out dirt and foreign particles, the best solution is one of boracic acid, made by dissolving a tablespoonful of boracic acid in a pint of boiling water. To dissolve the powder, moisten it first with a few drops of water and break up the lumps, making the powder into a paste; then add the rest of the water while stirring. Turpentine is also excellent for cleaning greasy wounds. Other anti-septic solutions that may be used are a 1 to 2,000 strength solution of bichloride of mercury and a 1 per cent solution of cresol. In irrigating a wound, care should be used not to cause any further injury to the tissues. The irrigator should be boiled immediately before use. It is well to allow the wound to dry naturally after it is cleaned, or to dry it by dabbing it with a piece of sterile gauze or cotton; do not wipe or rub. It should then be swabbed with tincture of iodine, using this first in the wound, then around the edges of it for a distance of 2 to 3 inches. After the swabbing, apply a sterile gauze dressing. Be careful about disturbing blood clots in a wound; disturbing them may induce bleeding. If, however, a blood clot contains foreign particles, it must be removed.

Surgical Cleanliness.

Surgical cleanliness does not mean ordinary cleanliness, but "germ-free" cleanliness. A wound may not contain any dirt or foreign particles so far as may be seen with the eye, yet it may contain the most virulent germs, such as are capable of producing blood poisoning.

In treating wounds, it should constantly be kept in mind that everything, including the hands, that is used in the process of treatment should be sterile. Surgical instruments are sterilized by boiling them for 15 or 20 minutes. A very small quantity of bicarbonate of soda added to the water will prevent them from rusting. After boiling the instruments, pour off the water, and turn the instruments out upon a piece of sterile gauze. In handling them, pick the instruments up and hold them by the handles; never touch that part of the instrument that is to come in contact with a wound; furthermore, be careful that the instrument does not, just before it is used, come in contact with anything except the wound. Unless care is observed, the instrument may accidentally touch the skin surrounding a wound, or may come in contact with the clothing, or some other object.

The gauze supplied in the medicine chest is sterile and need not be further sterilized. When using the gauze, cut off a piece of

the desired size with sterilized scissors; when unfolding the gauze, take hold of the edges; and always apply the inner surface of the gauze to the wound; never allow the edges of the gauze which are held in the fingers to come in contact with the wound.

Cleaning the Hands.

To clean the hands, wash with soap and water, scraping up some of the soap beneath the nails, and trim and clean the finger nails; scrub the hands carefully with a hand brush and soap; change the water at least four or five times while scrubbing with the hand brush; then immerse the hands in a solution of bichloride of mercury for at least a minute. After the hands have been cleansed, while working with a patient do not touch anything except sterile objects. In hospital work rubber gloves sterilized by heat are put on after the hands have been cleaned as directed. Even the most carefully washed hand is not sterile.

A Wound or Injury Without Serious Bleeding.

If a wound is bleeding very little, the bleeding may be stopped by pressure; for instance, if a piece of sterile gauze or cotton is placed over the bleeding vessel and held there for a few minutes, the bleeding will stop.

The next step in the treatment of a wound of this type is to swab it gently with tincture of iodine and then to cover it with sterile gauze and a bandage. The dressing should be changed every day. Under ordinary conditions, the wound will heal in a few days. If it becomes painful, red, and swollen, an infection should be suspected. For the treatment of infections, see *Infected Wounds*, p. 144.

Wounds with Hemorrhage (Bleeding).

If a wound is bleeding, the first requisite is to check the flow of blood. The bleeding may be from either an artery or a vein. If it is from an artery, the blood is of a light red color and flows in spurts. If it is from a vein, the blood is of a dark color and flows evenly, not in spurts, as from an artery; however, in case of rupture of large veins the flow is very rapid, and the loss of blood may cause death within a few minutes.

To Stop Arterial Bleeding.

To stop bleeding from an artery, first use direct pressure; that is, with a piece of sterile gauze press upon the bleeding artery, and hold it for a few minutes; the end of the artery may fill with a blood clot, which will stop the bleeding. This method is only for small arteries; it may suffice for rather large arteries, also, but it can not be depended upon for these; even if it does stop the bleeding from large arteries, the bleeding may begin again after a short while.



FIG. 13.—Illustration showing point of compression for carotid artery



FIG. 14.—Point of compression for brachial artery



FIG. 15.—Point of compression for femoral artery



FIG. 16.—Showing application of windlass tourniquet

If a large artery is torn or cut so that it bleeds, the bleeding must be stopped immediately or the patient will bleed to death in a very short time. The first thing to do is to press the artery with the fingers above the wound until a tourniquet can be applied. One who undertakes to give assistance in such cases should be familiar with the location of the large arteries in the neck, head, arms, and legs.

Tourniquet for Stopping Severe Bleeding.

A tourniquet is a contrivance used to compress a blood vessel when it is necessary to stop hemorrhage. There are many kinds of tourniquets, but the principle of them all is the same. A piece of heavy



FIG. 17.—Showing application of rubber tourniquet

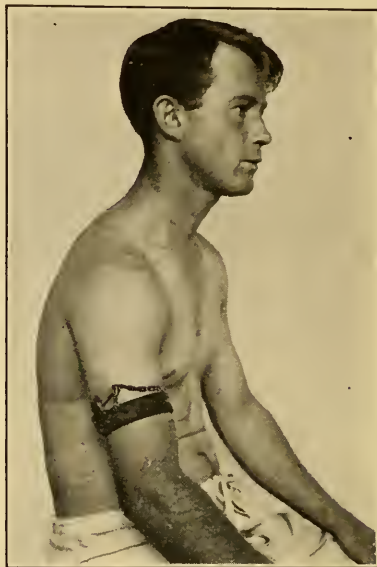


FIG. 18.—Showing application of rubber belt tourniquet

string, rope, rubber tubing, a belt, a bandage, a cloth, or similar material, or a handkerchief may be used as a tourniquet. To apply a tourniquet, wrap it around the limb above the bleeding, draw it fairly tight, then insert a stick under the wrapping and twist it until the bleeding stops. Good judgment must be used in applying the tourniquet so as not to injure the skin. If the tourniquet is narrow, as when a heavy string is used, extra precautions must be taken not to cut the flesh. *Under no circumstances should a tourniquet be left on for a greater period than 20 minutes.* Should it be necessary to keep it on for a longer time, the tourniquet should be loosened, so as to allow the blood to circulate in the limb for a few minutes; it may then be tightened again, if necessary.

After a tourniquet has been applied, the necessary preparations for tying the artery may be made and should be made as quickly as possible.

How to Tie an Artery.

Loosen the tourniquet a little at a time, until the bleeding end of the artery can be located in the wound; pick up the end of the artery with artery forceps; then, with either a piece of catgut or silk ligature, tie the artery. Material for sewing with a threaded needle is provided in a sterile glass tube and will be found in the medicine chest, ready for use.

How to Stop Venous Bleeding.

The flow of blood from a vein proceeds with a great deal less force than that from an artery. Bleeding from a vein may be controlled in most instances by pressure. With a piece of sterile gauze, press upon the bleeding vein, and hold it for a few minutes. If the vein is large, it may be necessary to apply a tourniquet or to tie the vessel. In applying a tourniquet to stop bleeding from a vein, it should be remembered that the tourniquet should be applied *below the wound*—that is, away from the heart. A vein is tied in the same way as an artery, except that both ends of a vein must be tied, while only in the case of very large arteries is it necessary to have both ends tied.

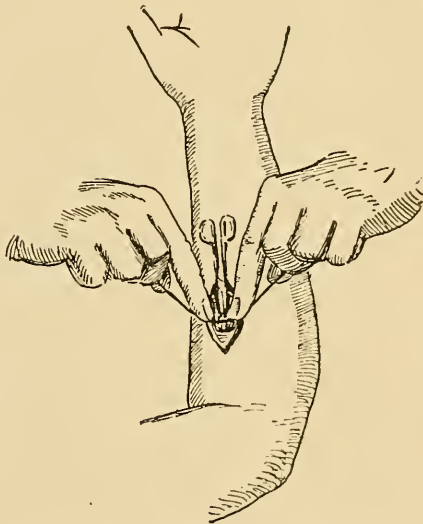


FIG. 19.—Proper method of tying artery

Lacerated Wounds.

A lacerated wound is one in which the flesh is badly torn; the edges are generally ragged, and there is likely to be a considerable amount of bleeding. A lacerated wound is always serious, because there is more or less destruction of tissue, and because the danger of blood poison is increased on account of damage to the blood and nerve supply, whereby the natural resistance is weakened.

In treating a lacerated wound, ragged pieces of flesh in which it is certain that the blood and nerve supply is destroyed should be clipped away with sterile scissors. If these ragged shreds are not removed, they will have to slough off and will greatly interfere with rapid healing.

Lacerated wounds may be either shallow or deep. Usually the edges of such wounds do not make good contact with each other.

Crushed Wounds.

A crushed wound is one in which the flesh is crushed to such an extent that its nerve and blood supply is destroyed. As a rule, such a wound does not bleed profusely, since the blood vessels having been crushed, the inner lining membrane of the vessels curls up and, together with the blood clotting, forms an effective plug.

Crushed wounds are serious injuries, because the flesh in which the blood and nerve supply has been destroyed must slough away. This type of wound is likely to become infected, since the act of crushing may grind germs into the wound, and infection, together with the poor blood and nerve supply, renders healing very difficult.

In treating a crushed wound, all shreds of flesh in which the blood and nerve supply is destroyed should be removed.

Punctured Wounds.

A punctured wound is one that has been caused by some small instrument, such as a pin, a nail, a sliver or splinter of wood, a knife, a bullet, etc.

Punctured wounds are especially dangerous, because germs and other foreign substances have been carried to the bottom of the wound by the entrance of the instrument of injury and can not be removed without opening and perhaps probing the wound. Lock-jaw and other infections often follow punctured wounds. It is not the rusty nail that causes blood poisoning; the blood poisoning comes from germs that adhere to the rough surface of the rusty nail and are carried by it deep into the wound; the skin, as it heals, soon covers the wound over, and in doing so provides an ideal place for the growth of the blood poisoning germs.

Treatment.—In the treatment of a punctured wound the primary object is to induce healing to proceed from the bottom of the wound. With a sterile knife, freely open the wound. Remove any foreign substance that may be present, wash out the wound with 1:5,000 bichloride of mercury solution, and put on a sterile dressing.

Healing of Wounds.

There are two different processes by which healing is accomplished—healing by first intention and healing by second intention.

Healing by first intention is healing that takes place in the most natural way and with the least obstruction; that is, when the cut edges of the wound are smooth; when the edges fall together in a correct position; and when there are no complications whatever. Wounds that heal by first intention are usually small wounds, in which there is but little interference with the blood and nerve supply of the flesh.

Healing by second intention is a more complicated process, which takes place when more or less destruction of flesh and usually some injury to the nerve and blood supply are involved. The edges of the wound are ragged, or else gape so that they can not be brought together in the natural way. Foreign particles, such as dirt, bullets, pieces of clothing, splinters, etc., may be present in the wound and may interfere with healing, as may also infection by pus-producing germs, which may occur in even a very slight wound.

In the process of healing, serum and blood, which soon clot, are poured out upon the surfaces of the wound. From the edges of the flesh new tissue forms, growing into the clot and absorbing it, and, as it increases in quantity, fills the wound. The skin around the edges grows and spreads over the surface and provides a new covering, which is a modified form of skin, composed of white fibrous tissue, known as scar tissue. Scar tissue is at first red in color, because of the presence in it of blood vessels; but as it grows older the new cells composing the tissue contract and destroy the blood vessels, leaving a white scar, the appearance of which is familiar. If a wound heals without the formation of a scar, it is because of the fact that but little tissue was destroyed, or else because the wound did not extend through the whole depth of the skin. Sometimes there is an enormous growth of scar tissue; but this is a complication that a ship's master will probably not be called upon to treat.

Preparation of Wounds for Stitching.

Small wounds should not be stitched, because it is better to allow them to drain, especially if an infection should occur to complicate the healing. They should be swabbed out with tincture of iodine and should be protected by a sterile dressing.

Wounds that gape widely or that are very extensive should be stitched. The first requisite in the treatment of such wounds is to stop the severe bleeding, either by tying the bleeding vessel or by applying pressure; the next step is to clean the wound, by which we mean to remove any foreign substances, such as are mentioned in the foregoing pages, which may be present. Swab out the wound with tincture of iodine, and apply iodine around the edges of it and on the skin for a distance of at least 2 or 3 inches all around the wound. The wound now being ready to be stitched, bring the edges together with the suture material. Put the first stitch about midway of the wound, just bringing the edges of the wound together; there is sure to be some swelling, and if the edges are tied too closely together the swelling may cause the sewing material to cut through the flesh, or may shut off the blood supply and cause the death of the flesh and so increase the danger already done. For sewing a wound, catgut, silk thread, or even horsehair may be used. These suture

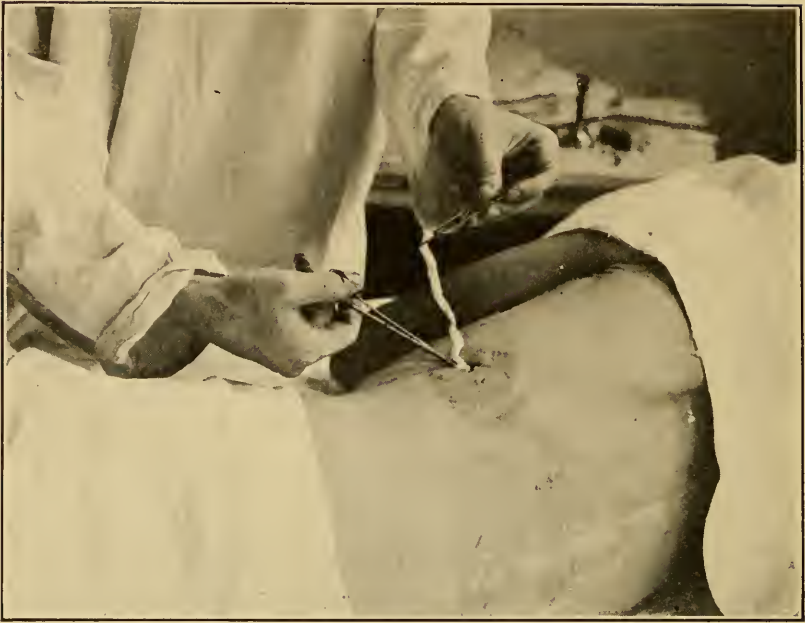


FIG. 20.—The insertion of gauze wick drain into a wound



FIG. 21.—Showing method of sewing a wound

materials are especially prepared and sterilized, and are usually put up in glass tubes ready for use. After putting in stitches, it is a good plan to paint the knots and the skin with tincture of iodine. Then apply a sterile gauze dressing, and secure it in place by a bandage.

Drainage of Wounds.

It is sometimes necessary to drain a wound, as is the case when infection has set in, or when there is an accumulation of pus. If the wound has been sewed up, the stitches should be removed; if it has not been sewed, open it carefully with a sterile knife point, enough to allow the pus to drain out freely; then swab it with tincture of iodine. If pus continues to accumulate and the opening closes up, the wound should be kept opened with a wick of sterile gauze. The size of this gauze wick depends upon the size of the wound. The wick should be renewed every day. The wick of gauze or other material used for a drain should be fastened to the dressing with a safety pin: otherwise it might be lost within the wound.

Removal of Stitches.

As a rule, stitches are not removed from a wound under 7 or 10 days. To remove stitches, paint one stitch at a time with tincture of iodine; then with sterile scissors cut the painted stitch on one side of the knot, and remove the stitch with a pair of sterile forceps. Boracic acid, or tincture of iodine, or some other dusting powder should then be applied, and the wound should be covered with sterile gauze and a bandage.

Splinters of wood often cause wounds, and usually remain in the wounds and have to be removed. A splinter may be removed with a needle, or better still with a knife, sterilized immediately before use. After the splinter has been removed, the wound should be painted with tincture of iodine, and a sterile gauze dressing should be applied.

Wounds from Fishhooks.

When a fishhook enters the skin, do not attempt to pull it out, because the barbed end will tear the flesh. Pour iodine on the wound and paint the hook thoroughly with iodine; then shove the barbed end of the hook forward through the skin, and cut off the barb with a pair of pliers. The fishhook can then be pulled back out of the wound; but before pulling it back, repaint the hook with tincture of iodine. Dress the wound with sterile gauze.

Gunshot Wounds.

The treatment of gunshot wounds should be governed to a great extent by conditions. The injury in case of a wound caused by a shotgun is, as a rule, extensive. Such a wound often contains many



FIG. 22.—The beginning of the application of a figure-of-eight bandage to the elbow



FIG. 23.—Completed figure-of-eight bandage of the elbow

pieces of shot, the felt wadding, fragments of clothing, and perhaps dirt. In treating a wound caused by a shotgun, a badly lacerated wound has to be dealt with; therefore, all foreign particles, such as shot, wadding, particles of clothing, and dirt should be removed at once, and all ragged shreds of flesh should be clipped away. Bleeding should be stopped, either by pressure or by tying the vessels, and the wound should finally be sterilized with tincture of iodine. Wounds of this kind sometimes need a few stitches.

A wound caused by a rifle ball or a pistol bullet presents a different condition. The entrance of the bullet makes a small hole, while the exit is quite likely to be larger. The bullet may sever a nerve or a blood vessel, or it may pass through the flesh without doing much damage; it may strike and shatter a bone; it may carry a part of the clothing or some other foreign substance into the wound. Often a bullet that is entering the body is deflected, as is proved by instances in which a bullet has been located at a considerable distance either above or below the point where it entered the body.

In case the bullet does not injure important vessels or nerves, the gravest danger lies in the possibility of infection. To probe about may injure an important blood vessel or nerve and may increase the danger of blood poisoning. *Do not probe for bullets.*

The wound should be treated with tincture of iodine, and a gauze wick should be inserted in the opening so that the wound may drain.

Shock.

Shock is the reaction produced by a severe injury, or by fright. This reaction may follow the accident immediately, or its occurrence may be delayed for some hours. It is a condition of extreme depression or collapse. The patient is pale and his skin is cold and covered with a clammy perspiration. He complains of chilliness or may actually be cold. His pulse is rapid and weak. He is usually conscious, but he may be unconscious. His breathing is rapid, shallow, and irregular. Nausea and vomiting may occur.

Treatment.—A person suffering from shock should be undressed and placed in bed, with hot-water bottles about him. Glass bottles filled with hot water or heated bricks may be used when it is necessary to provide more heat than can be supplied by hot-water bottles. Hot-water bottles, glass bottles, and hot bricks should be covered with towels or other cloths, so that they may not burn the patient, as may easily happen when a patient is unconscious. Burns from such sources are nearly always troublesome and heal with difficulty.

In shock the action of the heart is weak and needs stimulating. A good heart stimulant is aromatic spirits of ammonia, a half teaspoonful to a teaspoonful well diluted with water. Alcohol, a tablespoonful, well diluted with water, is also an excellent and effective heart stimulant to use in cases of shock.



FIG. 24.—The beginning of the application of a spiral reverse bandage

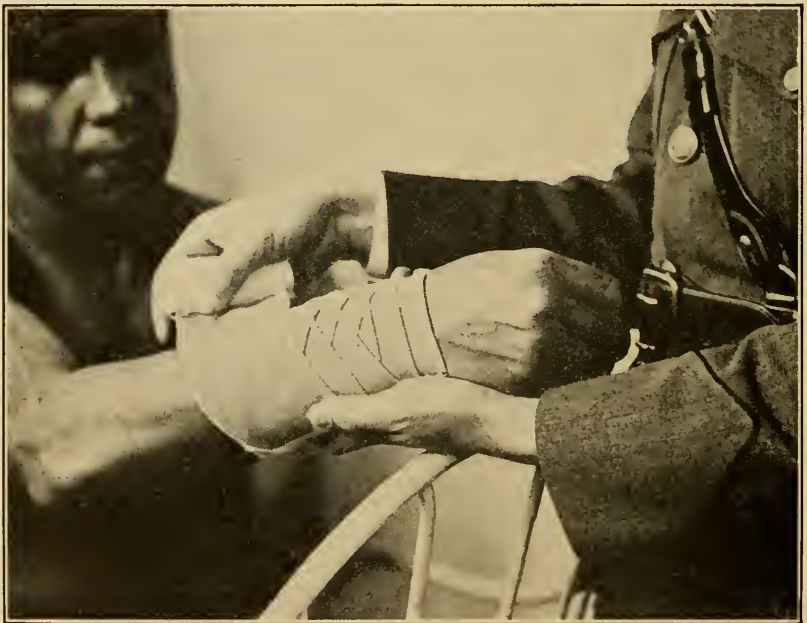


FIG. 25.—Showing the reversal of bandage in the spiral reverse bandage



FIG. 26.—Completed spiral reverse bandage to the forearm



FIG. 27.—Bandage of the hand

To stimulate a person who is unconscious from shock, let him inhale the fumes from ammonia; sprinkle a few drops on a handkerchief and hold this near his nose, or give a rectal injection of salt solution, two teaspoonfuls of salt to a quart of warm water. Allow the salt solution to flow into the rectum at the rate of about 20 to 30 drops a minute. Do not be in a hurry about doing these things; a period of unconsciousness does no harm and this may be excellent time to set broken bones, replace dislocations, or treat wounds.

When recovering from shock, a patient is likely to vomit. Should he begin to vomit before he becomes conscious, his head should be held to one side, in order that the vomit may find free exit and not be drawn into the lungs.

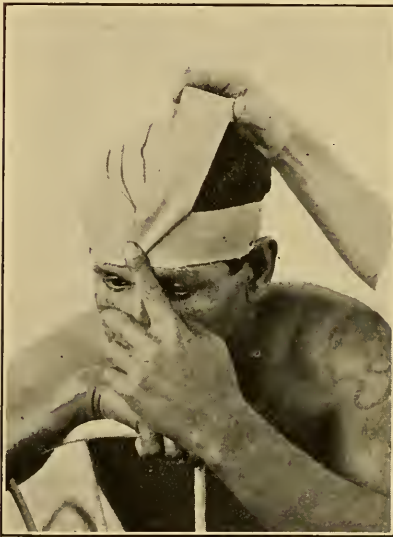


FIG. 28.—Application of a recurrent bandage of the head



FIG. 29.—Recurrent bandage of the head completed

Infected Wounds.

The infection of wounds arises from the presence and growth in them of pus-producing germs, of which there are a great many different kinds. The presence of pus germs in a wound always constitutes a serious condition. A small wound is just as likely to become infected as a large wound; in fact, a small punctured wound may be more dangerous than a large one, because a small wound is likely to be neglected, while a severe one receives proper attention.

As any wound may become infected, every wound should be carefully treated immediately after the accident which caused it; and this rule holds good regardless of the size or extent of the wound. A pin scratch has been known to cause death.

When a wound becomes infected, the patient recognizes the fact from the increased swelling, redness, and pain that accompany the infection; these symptoms are ushered in by chilliness or perhaps a severe chill. Following the chill, there is a fever which runs an irregular course. The pulse is increased in rate; in severe cases it becomes weak and the patient may appear quite ill. The wound discharges pus, which may have a foul odor.

Treatment of infection.—The first step in the treatment of an infected wound is to open it, so that there will be free drainage of the pus. If the wound has been sewed, the stitches should be removed. If necessary to do so for free drainage, the opening of the wound should be enlarged by cutting it. After opening the wound, allow the pus to drain out; then paint the wound with tincture of iodine and apply a hot dressing. The infected part of the body should be elevated as high as possible; for example, if the infected wound is on the hand, arm, or legs the limb should be placed upon one or more pillows; keeping the limb high aids the circulation and reduces the swelling.

The patient should be given a purgative, and the bowels should be kept in a free condition by repeating the dose whenever necessary. The diet should be light and nutritious; the patient should drink large quantities of water.

Hot applications.—To make hot applications, dissolve a tablespoonful of boracic acid in a pint of boiling water; wring out sterile gauze in the boracic-acid solution, having the solution as hot as the hands can bear it, and apply to the wound. As soon as they become cold the compresses should be replaced by others that are hot. A compress may be kept hot over a longer period if it is covered with a towel and then with heavy paper or oilcloth; or a hot-water bottle may be used to keep the compress hot.

Gurry Wounds.

It sometimes happens that in carelessly handling a fish which has just been caught, or in stepping on a fish in shallow water, serious wounds may be inflicted by the fins, the tail, or the gill covers of the fish. Such wounds, if inflicted by certain tropical fish, such as stingarees, catfish, devilfish, and sea devils, are actually poisoned, and are followed by much general disturbance, as well as pain and inflammation in the injured part.

The wound should be well washed with a strong solution of bicarbonate of soda or of Epsom salts; a hot-water bottle should be applied to it. The patient should be kept quiet for a time and stimulated by doses of aromatic spirits of ammonia or alcohol.

Bee and Wasp Stings.

The stings of bees, wasps, and yellow jackets are very painful, but are not, as a rule, dangerous to life, unless the number of stings is excessive. If the stinging apparatus of the bee is left in the wound, it should be removed and ammonia or a thick paste of sodium bicarbonate should be applied. An alcohol compress is also useful for reducing the pain and swelling.

Snake Bites.

A snake bite is very dangerous if the snake that inflicts it is of a venomous variety and the dose of poison injected is large. The bite of such a snake is followed by much pain and rapid swelling in and about the wound, and often by early and extreme collapse, which may lead to death.

Treatment.—About the limb, above the wound, tie a belt or a piece of rope or other material so as to shut off the circulation; then open the wound with a knife and allow it to bleed freely; afterwards rub into the wound some potassium permanganate. Crush a tablet of the permanganate and rub it into the wound. Stimulate the patient with alcohol. Loosen the constriction about the limb gradually. Whisky or alcohol is not a specific treatment for snake bite and should not be used.

Stings of Centipedes, Tarantulas, Scorpions, and Spiders.

The stings of these insects are no more painful than those of bees or wasps; but they are, as a rule, more poisonous and sometimes cause alarming symptoms, such as headache, weakness, sweating, and vomiting, though they are seldom, if ever, fatal.

Treatment.—It should be remembered that stings of insects are just as likely to become infected as any other wounds of the skin. If death follows an insect sting, it is usually because the wound became infected and blood poisoning set in.

Stings or wounds inflicted by the insects mentioned above should be encouraged to bleed; after they have bled they may be cauterized with red-hot metal or tincture of iodine may be applied. A sterile gauze dressing should always be applied to such a wound as in the treatment of any other wound. For the general symptoms of headache and weakness, 30 drops of aromatic spirits of ammonia may be given in half a glass of water, repeating the dose within half an hour, if necessary. The patient should have a cathartic, such as Epsom salts or castor oil.

Stings of Other Insects.

The pain and swelling that follow an insect sting are believed to result from the formic acid which is injected into the skin by the insect. Some people react more strongly to insect bites than others;

in case of such people the bites of bedbugs, mosquitoes, ticks, fleas, and other insects sometimes cause considerable swelling. The best treatment to follow in all cases is to apply an alkali, such as ammonia, or a thick paste of sodium bicarbonate, to the wound; alcohol and spirits of camphor are also beneficial. When the pain and swelling have subsided, paint the part with tincture of iodine and apply a sterile dressing in order to prevent infection.

Burns and Scalds.

Burns may be caused by dry or moist heat, by chemicals, or by electricity. They are extremely painful and are often attended by more or less severe shock. As the pain subsides, there is, if the burn is extensive, a varying degree of fever. If the burn becomes infected, all the symptoms of blood poisoning are developed.

When a person is taken out of a burning compartment dead, asphyxiation by gases has probably been the cause of death. In case of extensive burns on the body, ulcers of the intestines may develop after a few days and may cause death. Shock or blood poisoning are, however, the most frequent causes of death from burns.

Treatment.—A simple burn is best treated by applying a thick salve of boracic acid and covering it with sterile gauze, over which a thick application of cotton is placed and then heavy paper, oilcloth, or anything that will help keep air from coming in contact with the burn. Sterile heavy engine grease is useful to exclude air from burns. This treatment is for the relief of the severe pain. The use of morphine sulphate, $\frac{1}{4}$ -grain tablet as a dose, may be necessary for the relief of pain in severe or extensive burns.

After a few hours, when the pain has subsided, it will be found that the burned area is blistered. The method of treatment of the blister is a matter of opinion. Some physicians clip away the blister and treat the burn as an open wound; others believe that the raised skin is a protection and do not remove it but paint the area with dilute tincture of iodine and apply the sterile dressing over a framework, so that the gauze will not touch the wound and interfere with the tender and newly formed cells which nature provides to repair the injury.

Frostbite.

A frostbite is produced by cold that is so severe as to stop the circulation, so that the tissues freeze. If the frozen flesh is not properly treated, there is bound to be ulceration and sloughing.

Treatment.—The frozen part should be thawed out gradually, not by the application of heat, but of cold water and friction, or by rubbing with the hands. Snow may be used in place of cold water, if it is preferred to do so. After the frozen part has been thawed

and the circulation has been reestablished, the patient may go into a warm room. If the flesh has been frozen for a long time (several hours) or has been frozen to such a degree that death of the tissue has ensued, the affected area must be treated as a severe wound, because the dead frozen tissue will slough away, and there is danger of blood poisoning and gangrene. In such a case, the wound should be treated with tincture of iodine and covered with sterile gauze. The limb should be kept elevated, in order to help limit the swelling.

Bruises.

A bruise is usually made by some blunt instrument which, though it injures the flesh beneath the skin, does not break the skin. Sometimes a small blood vessel beneath the skin is ruptured, and the blood pours out into the flesh and produces the familiar discoloration of a bruise.

Treatment.—A bruise requires protective treatment. The skin should be dressed with sterile gauze. If the bleeding under the skin is extensive, it may sometimes be advisable to open the skin and let out the clot. When this is done, the wound must be treated as an ordinary open wound. Small bruises ordinarily require no treatment.

Gangrene.

Gangrene is the death of the tissues. If it involves the soft tissues, it is called sloughing; if it involves the bone, it is called necrosis.

Gangrene is classified as either moist or dry.

The signs of gangrene are (1) loss of pulsation in the blood vessels; (2) loss of normal body heat in the parts affected; (3) loss of sensation or feeling; (4) loss of function—that is, the part can not be used in the normal manner; (5) change of color, the part presenting a purple or mottled appearance if the affected part contains blood, and a waxy or colorless appearance if there is little or no blood in the part.

Dry gangrene.—Dry gangrene occurs when the body fluids have been drained from the affected part, as happens when a blood vessel becomes clogged, or when the vessel is pressed upon long enough to cause death of the tissues by depriving them of blood. If the part affected is kept free from germs, it will dry and shrivel into a black or dark-brown mass. If infection occurs, the affected area becomes very offensive.

Moist gangrene.—Moist gangrene occurs when the dead part is full of fluids, which may or may not be infected with germs. If germs are present, the tissues putrefy, and foul-smelling pus is formed.

The progress of the case depends upon the part that is affected and upon the size of the gangrenous area, and the fact of its spreading

or not spreading. The junction of the gangrenous area with the healthy tissue is marked by a sharply outlined area of inflammation (nature's effort to repair), called the "line of demarcation."

Treatment.—Treatment is local and general. Local treatment consists in keeping the skin sterile by antiseptic dressings, such as hot wet dressings of boric acid solution. General treatment consists in keeping the patient at rest, with the affected part elevated, putting the patient on a light but nutritious diet, and keeping the bowels in good condition by administering cathartics whenever necessary.

Blood Poisoning (Septicæmia).

Blood poisoning is an acute infection, or a disease produced by certain germs which have found their way into the body and so into the blood.

Blood poisoning is a serious condition. Its onset is often indicated by a chill, followed by a rise of temperature. The pulse rate is increased and weak; there is loss of appetite; the tongue is brown. Early in the course of the disease the bowels are constipated; but diarrhea may develop later. The victim is very ill and his chances for recovery are always questionable. Blood poisoning usually follows the introduction of outside disease-producing germs into a wound; but sometimes the germs may have been already in the body and blood and may settle in a wound or bruise and so produce infection.

Treatment.—If the blood poisoning is due to infection of a wound or bruise, pus may be formed at the site of infection; the abscess, as such a collection of pus is called, should be freely opened with a knife, so that all the pus may readily drain out. Unless the blood is badly affected by the poison, the patient will get well rapidly after the pus has been drained from the abscess; but if the poison has been widely circulated through the blood, his condition is very serious. He should be stimulated with alcohol. His bowels should be kept free by the use of Epsom salts or castor oil. He should be put on a liquid diet, and should drink plenty of water.

Boils, or Furuncles.

A boil is a localized inflammation that begins in a hair follicle (root) and finally results in a core of dead tissue.

The boil appears first as a small red pimple around the hair, but rapidly increases in size and is painful and tender. After a few days a whitish spot appears at the center of the boil; this breaks open a few days later and discharges pus. As soon as the boil opens, the intense pain is relieved.

Treatment.—With a sterile knife, open the boil so as to permit free drainage. *Do not "squeeze out" boils or pimples.* Using an appli-

cator, swab the boil thoroughly with tincture of iodine or with equal parts of iodine and carbolic acid, and then apply an antiseptic dressing.

Carbuncle.

A carbuncle is somewhat like a boil, but is different in that it goes deeper into the tissues, is more extensive, and has, as a rule, more than one opening. A carbuncle is more serious than a boil, because of the fact that it is more extensive and is more likely to result in general blood poisoning.

Treatment.—A carbuncle should be opened with a sterile knife, the pus should be cleaned out, and the wound should be swabbed with tincture of iodine, swabbing the outside toward the center, great care being observed lest the pus get on to the surrounding skin. A sterile dressing should then be applied. Give the patient a cathartic whenever necessary, to aid in removing absorbed poisons from the body, and have him drink plenty of water for the same purpose. At the first opportunity a physician should examine a specimen of the patient's urine.

Ingrowing toenails.

An ingrowing toenail causes considerable pain and discomfort, which result from ulceration of the soft tissues surrounding the nail. The swelling causes them to curl over the edge of the nail. The great toe is most frequently affected. The condition is due in most cases to the pressure of poorly fitting shoes. If infection occurs, the condition becomes still more serious.

Treatment.—The foot should be soaked twice a day for at least a half hour in a hot solution of boracic acid, and pieces of cotton should be tucked underneath the soft overgrowing flesh. Relief may sometimes be obtained by scraping away the center of the nail until it is very thin, or by cutting out a wedge-shaped piece from the edge of the nail, in order to allow the nail to buckle. The toe should be painted with tincture of iodine and protected with a sterile dressing. A pad placed between the second and the big toe will assist materially in relieving pressure on the affected toe. A shoe should not be worn on the affected foot unless the toe of the shoe has been cut away. If pus develops, it should be gotten out, and it may be necessary to remove the nail completely. The operation causes pain for a few minutes, but healing takes place rapidly after it. The nail grows again.

Abscess.

An abscess is a walled-off area containing pus. The formation of an abscess is caused by the invasion of a wound or a bruise by pus-producing germs. Sometimes an abscess forms in the internal

organs of the body, as the lungs or the liver; in such cases, the germs have been carried to the affected organ by the blood.

The wall that forms around an abscess is the protective device of nature, and is the means of saving many lives. Sooner or later an abscess bursts and empties its contents either at the surface of the body or into one of the body cavities. Sometimes several abscesses develop in different parts of the body at the same time. An abscess may develop in any part of the body and in either flesh or bone. The glands, such as those located in the neck, under the arms, or in the groin, are frequent sites for surface abscesses.

Treatment.—After having made absolutely certain that an abscess exists, the best treatment is to open it with a sterile knife, clean out the pus thoroughly, swab the sore with tincture of iodine, insert a gauze wick, and apply a sterile gauze dressing. Sterile gauze dressings should be changed daily. An abscess that drains freely will soon heal.

Sprains.

A sprain is an injury which results from stretching or tearing the ligaments and tissues that surround or enter into the formation of a joint. Such an injury is usually caused by direct violence, as a twist. Sprains of the ankle, the knee, or the back are of common occurrence.

When a sprain occurs, there is usually a feeling that something has given way, and this feeling is accompanied with a severe pain. The joint and the tissues immediately around the sprain swell rapidly; within a short time, the skin about the joint may show a bluish discoloration. The joint becomes stiff, and severe pain is felt on attempting to move it.

Treatment.—Place the part in the position most comfortable for it. This position will be found to differ in the different joints; but in all cases the joint should be elevated as much as the patient can bear to have it. Keeping the limb high relieves the throbbing pain and reduces the swelling. A snug-fitting (but not too tight) bandage sometimes helps to make a sprained joint comfortable; cold applications sometimes relieve the pain. After 12 to 24 hours, hot applications may be put on.

In the case of a sprained joint—for example, a sprained ankle—some physicians use a strapping or adhesive plaster, applying the adhesive in strips, each a half-inch wide and 10 to 12 inches long. Apply the center of the first strip over the back of the sole of the heel and carry the ends up along the back of the leg. The next strip has its center over the back of the heel, low down, and the ends pass along the sides of the foot, low down. Leave the point of the heel uncovered; pressure of the plaster directly on the heel may cause



FIG. 30.—Showing the proper method of beginning the strapping of an ankle with adhesive tape

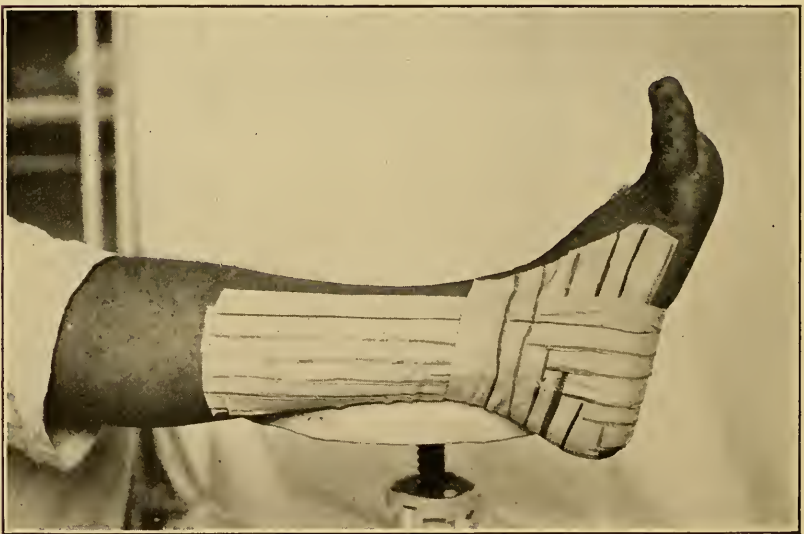


FIG. 31.—The proper method of strapping an ankle with adhesive tape

great discomfort. The third strip is put on so as to overlap the first, and the fourth to overlap the second. Alternate these strips until foot and ankle are covered and the dressing is complete. A sprained knee may also be strapped with alternate layers of adhesive.

Unless the joint is well strapped and ordinary movements are painless, do not allow the patient to use a sprained joint until the condition has cleared up. In all cases of sprains, examination should be made most carefully in order to determine whether there is a fracture of any of the bones. At the first opportunity, an X ray of the point should be made.

Fractures.

A fracture is the sudden breaking of a bone by some form of violence. There are numerous conditions which tend to make bones more liable to fracture; for instance, age; new growths, such as cancer; syphilis; scurvy; rickets; and any inflammatory condition, whatever its cause.

The immediate causes of fractures are (1) direct violence, in which the break in the bone occurs at the point struck; (2) indirect violence, in which the bone is broken at some distance from the application of the violence; (3) the sudden action of muscles, which sometimes fractures bones such as the tip of the elbow or the knee cap.

Fractures are divided into two great classes, *simple and compound*.

A *simple fracture* is one in which the bone is broken but in which the broken ends have no communication with the external air, and which is uncomplicated by extensive injury to the flesh in the immediate vicinity of the break.

A *compound fracture* is one in which the ends of the broken bone protrude through the skin and in which there is also injury to the surrounding tissue.

A fracture may be complete or incomplete. An incomplete fracture is one in which the broken ends are not entirely separated. This type is often called a "green-stick" fracture, because it resembles the breaking of a green stick. A complete fracture is one in which the bone is entirely broken through; and such a fracture may be transverse or straight across, depressed, oblique, or at an angle, or spiral, as in a twisted fracture.

The term *comminuted fracture* designates a fracture in which the bone is broken into a number of small pieces.

An *impacted fracture* is one in which one end of the broken bone is driven into the other end.

Signs of fracture.—When a bone is broken, the victim of the accident, if he is conscious, may hear or feel the bone snap and feels

intense pain on attempting to move. The hurt part swells rapidly, and there is often a pouring out of blood from the wound into the flesh about it.

An abnormal mobility, or looseness of motion, is perceptible in examining the bone. This is not true in cases of impacted fractures. There is loss of function of the limb, and some deformity is usually present. This deformity may be angular, or sidewise, and is caused by the overlapping, turning, or separation of the end of the broken bone. In most cases the position of the broken limb is determined by the direction of the force which caused the fracture.

A person who has sustained a fracture also suffers from shock, and sometimes from bleeding, which may be severe, especially if a large blood vessel is torn. Within a day or two after the occurrence of the fracture there is likely to be a rise of temperature. With this increase of temperature, persons who have been addicted to alcoholic liquors may develop delirium tremens.

Repair of fractures.—When a bone is fractured, its broken ends are rough and irregular; the membrane covering it is more or less torn, but some portions or shreds of the membrane usually remain to connect the broken fragments. The soft tissues surrounding the broken ends are more or less lacerated, and there is an outpouring of blood and serum between these.

New tissue cells begin at once to form; and these increase until the blood clot is replaced by new tissue called “granulation tissue,” which soon becomes changed into new bone.

The new bone tissue appears as an overgrowth and is called the “callus.” The callus gradually becomes more solid bone, at the same time growing less and less in size until it is about level with the surrounding bone surface.

As a rule, in the course of three or four weeks a broken bone will be sufficiently repaired to resist bending. Usually, after six weeks a healthy person may dispense with splints. For small bones, like those in the arm, three weeks may be long enough in splints.

Treatment of fractures.—In examining the victim of an accident, the possibility that bones have been broken should always be borne in mind, and a careful search for fractures should be made. The position of a limb often indicates the occurrence of a fracture. If, upon examination, a broken bone is found, the patient should be handled very cautiously, because if the broken ends of the bone are allowed to move they will injure the surrounding flesh and perhaps destroy important blood vessels and nerves. Sometimes the ends of the broken bones are forced through the skin, producing a compound fracture, which is much more serious than a simple fracture because of greater liability to infection and blood poisoning.

When the patient has been conveyed to the sick bay, the next step in the treatment is to cut away the clothing and wash the affected limb, great care being exercised not to disturb its position. The next step is to reduce the fracture or deformity; that is, to place the broken ends in correct position in relation to each other and, by means of splints, so to retain them that good union may take place.

Proper treatment of a fracture is of great importance to the patient; therefore, if the ship is near a port, the best plan is to make the patient as comfortable as possible by putting him in bed and placing the broken limb in as near a normal position as possible, and keeping it there by splints. In this way the patient may be kept fairly comfortable for three or four days, or until the ship makes port.

The treatment of fractures of the most frequent type is described in the following pages.

Complications that are liable to arise during treatment of fractures.—With persons of advanced years there is always danger that pneumonia (lung fever) may develop, especially if the patient is kept on his back. The occurrence of bed sores often causes considerable trouble; in order to prevent them, alcohol rubs should be given. If a splint is too tight or is improperly applied, the pressure produced by it may cause paralysis or contraction of the muscles, which may impair the usefulness of the limb. Sometimes, after putting on splints, there is a great deal of swelling, which may result in injury of the soft tissues, and even in gangrene. Gangrene may arise, too, from injury to important blood vessels, or from persistent swelling of the flesh, or as an extension from the infection of a compound fracture.

In compound fractures, those in which the skin is broken by the fractured bone, there is great danger of infection by germs. A most essential feature in treating compound fractures is to render the wound clean and well drained. Any loose fragments of bone should be removed. Bleeding should be stopped either by pressure or by tying the bleeding vessel. The ends of the bone should be brought into proper relation to each other and held in this position and the splints applied. Splints should be so arranged that the wound is accessible for redressing and observation.

The use of a fracture box and padding the limb with sand bags of various sizes will also produce good results. The wound should not be sewed up, but a sterile gauze dressing should be applied to it, and it should be freshly dressed every day.

Ununited fractures.—Sometimes broken bones unite and heal with difficulty; sometimes they will not unite at all. There are many reasons for this, the chief of which are lack of apposition, or failure

to place and keep the broken ends in proper relation, and imperfect immobilization, or failure to keep the limb perfectly still. The broken ends of a bone may not heal unless they are kept absolutely still. The presence of flesh, or of loose fragments of bone between the broken ends of the bone, imperfect blood supply to the ends of the broken bone or the surrounding flesh, and infection or blood poisoning prevent or interfere with healing, as do also constitutional causes, such as infectious diseases, scurvy, alcoholism, and syphilis.

A fracture can not be said to be ununited by true bone until 12 months have elapsed. In case of slow healing, the part should be massaged two or three times a day, so as to keep up and improve the blood supply of the limb. The massage should be administered



FIG. 32.—Showing how to pad a splint with cotton

with due regard to the fact that the limb must not move. The general health should be built up. The diet should be nutritious, and the intestines should be kept free by giving cathartics whenever necessary.

A "vicious union" is a union which has occurred when the ends of the broken bone have not been placed in proper relation and healing has taken place in such bad position that deformity or loss of function is the result. A vicious union is treated by rebreaking the bones and setting the ends in proper relation. This should not be done except by a surgeon.

Splints.—There are various kinds of splints, but the purpose of them all is to retain broken bones in a normal position so that they will heal correctly. If there is any movement of the broken ends of

bones, healing does not take place. Splints also serve to reduce the pain caused by a fracture. Splints are quite often used in the treatment of sprains, to keep the part from moving, and in such cases they not only help to relieve pain, but hasten healing. Splints

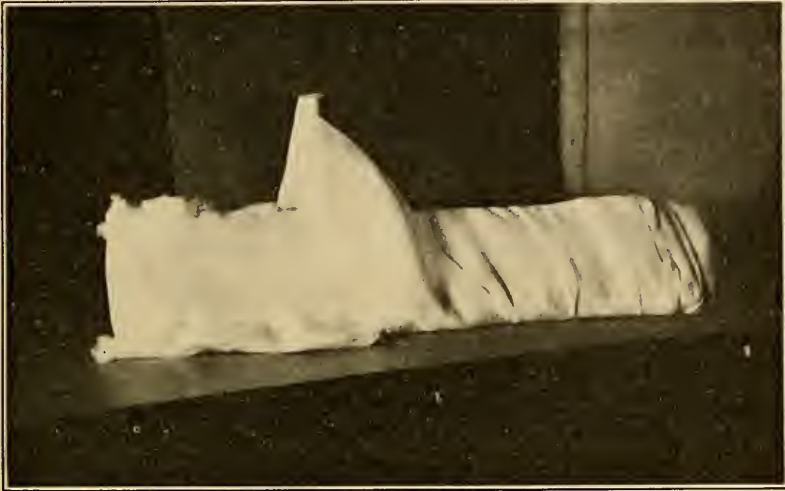


FIG. 33.—Showing application of gauze bandage to hold the cotton in place

are made of various substances. They should be strong enough not to bend, and their shape should conform as nearly as possible to that of the part of the body to which they are to be applied. They



FIG. 34.—Protective padding for fracture of the hand

must be carefully padded before they are used. Cover each splint with a heavy layer of cotton or other soft substance and wrap a bandage over this to hold it in place. A set of splints is provided in the medicine chest.

In applying a splint, it must not be bandaged to the limb so tightly as to press upon any important blood vessels and thus stop the circulation. Pressure should not be made upon any open sore, nor upon the wound of a compound fracture. If a splint feels uncomfortable, there is probably too much pressure, or the bone is not properly set, and it may be necessary to take the splint off and to reapply it. In practically all cases of fracture, the flesh swells considerably; and even after the bandage and splints are applied, the swelling must be watched, so that these appliances may be loosened if necessary. If the swelling becomes extensive and is not relieved by loosening the bandage and splints, gangrene may set in

and cause delay in healing, or may become so extensive as to cause loss of limb, or general blood poisoning and death.

In padding and applying a splint, any bony prominences should have extra padding, or else a hole or depression of sufficient size should be made in the splint.

Special Fractures.

Fracture of nose bones.—The bones of the nose are often broken (mashed) by direct violence. The signs of fracture are pain, swelling, and displacement. Nosebleed usually occurs.

Treatment.—Pad the blades of a small pair of artery forceps with short pieces of rubber tubing, and place them in the



FIG. 35.—Four-tailed bandage for fracture of the jaw

nostrils. By expanding the blades and by manipulating the nose on the outside with the fingers, the broken bones may be brought together into proper position. A splint of moistened cardboard or similar material, with openings for breathing, should be made to fit over the external surface of the nose. The nose should be washed out two or three times a day with a solution made by dissolving an alkaline antiseptic tablet in a half glass of warm water.

Fracture of the lower jaw.—The lower jaw may be broken by direct or indirect violence; but fracture of this bone is usually caused by a direct blow. The most usual location of a fracture is the weakest point in the jaw, which is in the neighborhood of the canine tooth (stomach tooth). Little trouble should be experienced in detecting a fracture of the lower jaw because in case of a fracture the gums

are usually lacerated and the line of the teeth is likely to be irregular, and abnormality of motion may be noticed.

Fracture of the lower jaw is frequently of the compound type, and some pus is always sure to form before it heals. If the fracture is at an angle or is in the upright portion of the jaw, there is usually but little displacement and deformity.

Treatment.—If there is little displacement, the jaw can be effectively fixed in place by a four-tailed bandage, which supports the lower jaw. Two of the tails are tied over the top of the head, somewhat back toward the crown, and the two upper ends are then tied to the lower ends, to prevent slipping.



FIG. 36.—Beginning of strapping of chest with adhesive



FIG. 37.—Completed strapping of chest

The patient should be fed with fluids for four or five weeks, and his mouth should be frequently washed out. A molded cast, like that described for use in fracture of the nose, may be made for the lower jaw. At the first opportunity the patient should be taken to a competent surgeon-dentist to have the jaw wired in place.

Fracture of the ribs.—Fracture of the ribs is not an uncommon injury, the ribs breaking at their most convex (curved) part. Injury to the lungs from fracture of the ribs is uncommon, but may occur, especially if the broken ends of the bone are driven inward. The fifth to eighth ribs are most commonly broken, the patient usually feeling them snap, and immediately begins to suffer from pain, which is worse when he takes a breath.

Treatment.—As a rule there is but little displacement of the broken ends, and so the treatment is quite simple, consisting in the application, in row after row, of strips of adhesive plaster, that reach from the spine to the center of the breastbone. Each strip of adhesive should begin at the spine and be brought forward, and, during a deep expiration, or blowing out of air from the lungs, fastened to the center of the breastbone. Each strip should overlap the last one about half its width. A bandage should be put on over the plaster.

If the fracture is due to direct violence and it is suspected that the broken ends are driven inwards, the adhesive should not be applied, but the patient should be placed in bed, and his chest should be held still by sand bags packed around his body. Broken ribs nearly always heal rapidly and without complications.

Fracture of the clavicle (collar bone).—Fracture of the collar bone is of common occurrence, and usually results from a fall on the hand or shoulder.

There may or may not be much displacement of the broken ends. The amount of deformity depends upon the location of the break. The patient usually supports the elbow of the injured side with the hand of the other side, and keeps his head bent toward the fracture, in order to relax the muscles of the neck. The displacement of the broken bone is due chiefly to the fact that the weight of the arm pulls down the outer end of the broken bone.

Treatment.—In an ordinary fracture of the collar bone, the displacement of the bones is corrected by drawing the shoulder upward, backward, and outward, and maintaining it in that position. There are three methods by which the ends of the broken bone may be kept in proper position.

Sayre's method is to place a pad of cotton in the armpit on the injured side; a broad strip of adhesive plaster is then looped loosely around the middle of the arm, so that the arm may be pulled backward by it. This strip is carried around the back, beneath the opposite axilla (or under the opposite arm), and across the front of the chest, beneath the armpit on the injured side, being stuck to the skin throughout. A broad piece of plaster, with a hole cut in it for the tip of the elbow, is fastened back and front over the opposite shoulder. The apparatus should be worn for three weeks and after it has been discarded a sling should be used for at least two weeks longer.

The "three-handkerchiefs" method for maintaining proper position in fracture of the collar bone is equally as effective as that described above, if it is properly applied. A handkerchief is folded and tied over each shoulder so as to form two loops and the two loops

are pulled upon from behind until the ends of the fractured bone are brought into place; the two loops are then fastened together with the third handkerchief. The same effect may be obtained by tying the patient to a padded cross made of two pieces of half-inch pine board, 3 by 18 inches and 3 by 16 inches.

The third method for treating a fractured collar bone is to place the patient on his back, with his head low, a pad between his shoulders, and his arm bound to the affected side. Examination should show the ends of the broken bone to be in proper place, and this position should be kept until the bone has healed.

Fracture of arm bone (humerus).—The humerus, or the long bone that extends from the shoulder to the elbow, is frequently broken; and great care must be used in setting it in order that the arm may not become useless.

When a physician sets a fracture of the arm bone, he proceeds to determine the exact location at which the bone is broken and plans his treatment accordingly; but for a nonmedical man the best plan of treatment is probably as follows: Straighten the limb by taking hold of it on either side of the fracture and placing the limb in its natural position. To hold the broken ends in place, use two *well-padded* splints about 4 inches wide and of unequal length; place the shorter splint on the inner side of the arm, so that it will extend from the armpit to about 1 inch below the point of the elbow; then place the longer splint on the outer side of the arm, to extend from the point of the shoulder to about 1 inch below the point of the elbow. The two splints should then be fastened with strips of adhesive. First wind a strip of adhesive around the middle of the two splints, and then a strip near each end. If necessary, other strips may be used. The splints should be held in rigid position while the adhesive is being applied. Reinforce the adhesive strip with a gauze bandage. Make a sling to hang about the neck, and place the hand in the sling. Do not forget to watch for swelling; if the arm becomes much swollen and painful, it will be necessary to loosen the splints, which may be done without disturbing the position of the arm. The injured man should be sent to a competent surgeon at the first opportunity.



FIG. 38.—Splint for fracture of arm (humerus)

Fracture of forearm bones.—The forearm contains two bones, the radius and the ulna. The radius extends from the elbow to the wrist, on a line with the thumb; while the ulna extends from the elbow to the wrist, on a line with the little finger.

The terms *pronation* and *supination* are used in describing the positions in which a broken arm may be placed in treating a fracture of the forearm. The first of these terms, *pronation*, designates a position in which the palm is turned down; *supination* is the reverse of *pronation*.

Fracture of the radius.—When the head of the radius—that is, the extreme upper end, near the elbow—is broken, a grating of the bones may be detected, and the upper fragment does not rotate when



FIG. 39.—First position for applying a triangle arm sling



FIG. 40.—Completed triangle arm sling

the forearm is rotated. Treatment consists in fixing the arm in splints in such a position that the thumb points upward.

If the neck of the radius, which is the portion just below the head of the radius, is broken, the lower fragment is drawn upward and forward, and projects upon the front of the elbow; and the head of the bone can not be rotated when the forearm is rotated. The treatment of this type of fracture consists in fixing the arm in splints in a fixed position.

Fracture of the shaft of the radius is characterized by pain, deformity, and abnormal mobility and grating of the bones.

If the fracture occurs in the upper portion of the shaft, the arm should be put in splints with the palm of the hand up. If the

fracture is located in the lower part of the shaft, the arm should be put up in a position that is between pronation and supination.

Fracture of lower end of radius (Colles's fracture).—Fracture of the lower end of the radius is of common occurrence and is caused by falling upon the outstretched hand. The line of fracture is about 1 inch above the wrist. In such a case, a characteristic deformity appears, which has often been referred to as the “silver fork deformity.”



FIG. 41.—Internal angular splint for fracture of the elbow

Treatment.—Reduction of this fracture is brought about by grasping the hand of the injured arm with a “shaking-hands grip” and drawing the hand toward the body of the operator; with the free hand the fragments are molded or worked into correct position. The arm is then put up in splints.

It is important in this type of fracture to begin early, about the end of the first week, with massage and passive movement of the wrist to prevent stiffness. Healing should be accomplished within about three weeks.

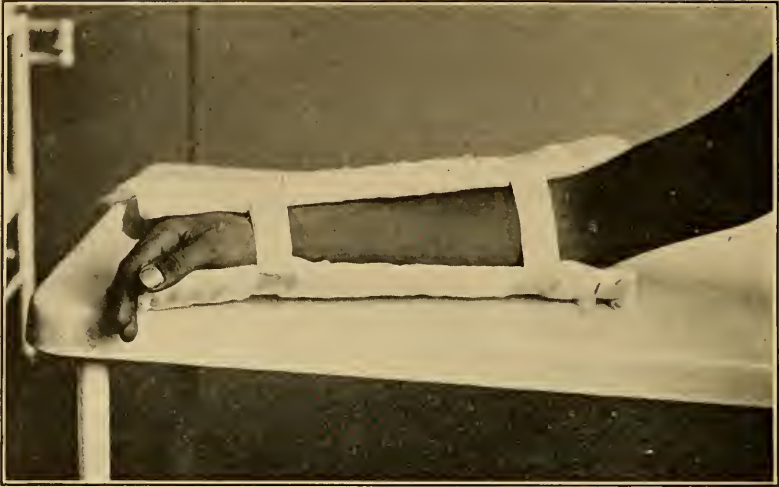


FIG. 42.—Splint for fracture of both bones of the forearm

Fracture of both bones of the forearm.—In treating this type of fracture, which results from direct violence, it is important to prevent lateral or side compression of the broken fragments; otherwise, the four ends may unite in one mass. If the break is located at the upper end of the bone, near the elbow, the arm should be put up in an extended position, with the palm supinated, or facing up. If the break is located lower down on the bone, the arm should be put up midway between pronation and supination.



FIG. 43.—Completed splint for fracture of the hand

Fracture of the femur (thigh bone).—Fracture of the hip or thigh bone may be caused by either direct or indirect violence and is liable to occur from tripping and falling. The bone may be broken at any point along its length. If the break occurs near the head or neck

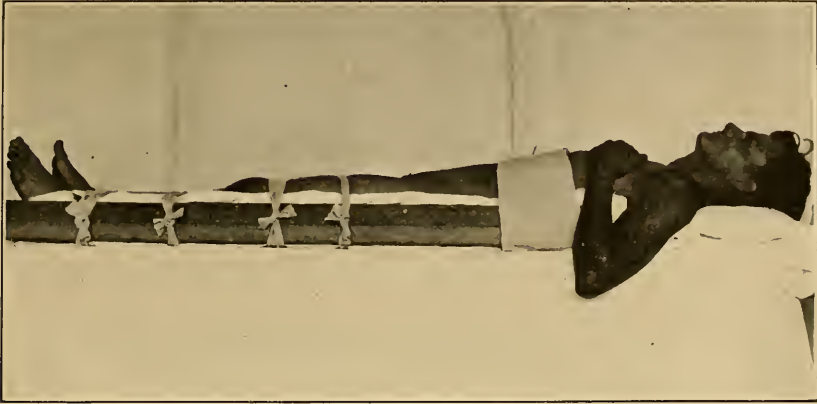


FIG. 44.—Splint for fracture of the thigh

of the bone—that is, near the hip joint—there may be some difficulty in its healing. A break at either extremity of the bone is more serious and difficult to treat than a break at some point along the shaft of the bone.



FIG. 45.—Splint for fracture of the leg (tibia or fibula)

The signs of fracture are pain, swelling, deformity, and often marked shortening of the limb. A person who has had a fracture of this bone is usually unable to move the injured limb, and in most cases, as he lies on his back, the foot on injured side turns outward.

The deformity depends to some extent upon the direction from which the force was directed; and the weight of the limb itself influences its displacement. In addition to the symptoms just described, the injured person often shows signs of severe shock.

Treatment.—Use two splints, one to reach from the armpit to a point just below the heel, the other to reach from the crotch to a point just below the heel.

The splints should be well padded with cotton, so that they will conform to the shape of the limb. The cotton is held in place by pieces of gauze bandage. Extra padding of cotton should be put in above and below the bony prominences, otherwise pressure may cause troublesome sores over them.

The limb should be placed in normal position—that is, when the patient is on his back, the great toe should point directly upward, never outward, and should be held in such position by an assistant. The splints should then be placed in position and should be tied in place with gauze strips. It may be well to reinforce these strips with strips of adhesive tape. Care should be observed in fastening the splints to see that they fit properly throughout their entire length; and the splints should be well looked over after they have been fastened, to make sure that they will stay in place and that there is no undue pressure at any point. Frequent examination of the splints and bandages is necessary, because some of them may require readjustment.

The patient should be put ashore at the first port where proper hospital attention can be given.

Fracture of the leg.—The leg bones, which extend from the knee to the ankle, are called the *tibia* and the *fibula*. The tibia, which is the larger of the two, is situated in front of the fibula. The sharp edge of the tibia is known as the “shin.” The fibula lies to one side of the shin bone and behind it.

In a fracture of the leg one of the bones or both bones may be broken; as a rule, both are broken and at different levels. The nearness of these bones to the skin accounts for the fact that the broken ends often protrude through it, creating a compound fracture.

Treatment.—The fracture should be reduced by bending the knee to relax the calf muscles, and then, by manipulation, bringing the broken ends into proper position. If the ends of the bones have pushed through the skin, the wound made by them should be cleaned and painted with tincture of iodine. The wound should be examined daily and, if necessary, redressed with sterile gauze. Should infection occur, it may be necessary to enlarge the opening in the flesh and to swab the wound out with iodine. The dressing should be changed daily. Two splints should be applied, one on the outside

of the leg and extending from the hip to the ankle, the one on the inner side reaching from the crotch to the ankle. Care must be taken that the splints are properly padded and not too tight. Another method is to construct a trough of $\frac{3}{4}$ -inch boards, 8 inches wide, 6 inches deep, and long enough to extend from the crotch to below the heel. This should be padded and the leg held in position in the trough by sand bags.

Fracture of the ankle joint.—Fracture of the ankle joint, or Pott's fracture, as it is sometimes called, is of common occurrence, and is usually caused by direct violence, such as accidentally turning or twisting the ankle toward the outside of the foot. The strain tears the ligaments, and the fibula may overbend to such an extent as to break off about 3 inches above the ankle. At the same time the foot is displaced outward, or outward and backward. In many cases, however, the displacement is slight. Sometimes the tibia may also be broken.

Treatment.—Relax the calf muscles by bending the knee. Steady pulling and manipulation should then be applied to the foot, and the limb should be fixed on a right-angle splint applied to the back of the leg and sole, with side splints in addition. The foot should be kept at right angles to the leg.

The proper treatment of fracture of the ankle joint is of great importance, because permanent deformity may result from careless treatment. The patient should therefore be placed ashore in hospital at the earliest opportunity.

Fracture of the spine.—Fracture of the spine may occur as the result of direct violence, such as a fall over a railing, or a heavy blow on the back. Indirect violence, as in forcible bending of the spine, is, however, the more usual cause of such a fracture.

Treatment.—The patient should be handled with greatest gentleness and placed in bed in a comfortable position. Sandbags should be placed along the neck and sides to prevent motion of the spine. If the spinal cord is injured, the symptoms displayed will depend upon the location and extent of the injury of the cord. The patient should be kept on a semisolid diet. His bowels should be regulated by either cathartics or rectal injections. If there is paralysis of the bladder, the patient should be relieved by drawing off the urine with a catheter. The patient should be placed in hospital at the first opportunity.

Bedsore.

Special care should be taken to prevent bedsore. The bed should be as comfortable as possible. The back and buttocks, which are the most usual sites for bedsore, should be kept clean by frequent washing with soap and water. The skin should be dried with a

soft towel and then rubbed with a mixture of equal parts of alcohol and water and dusted with starch. If the skin becomes red, indicating the beginning of a bedsore, zinc ointment should be applied, and the part should be surrounded by a thick ring of cotton shaped like a bird's nest.

Dislocations.

A dislocation is a displacement of the ends of the bones which enter into the formation of a joint.

The contributing causes of accidental dislocations are the nature of the joint and the age of the patient; young people are more likely to have a separation of the bone, while older people are more liable to fractures as the result of accidents. The condition of the muscles and the flesh around a joint also has an influence in dislocation; for example, if the flesh is wasted, there is less hindrance to dislocation than when the muscles are strong and hard. The exciting cause of dislocation is always violence, which may be direct, indirect, or muscular. A dislocation may be complicated by a fracture or by more or less injury to important blood vessels and nerves.

The signs of dislocation are pain, discoloration, swelling, deformity, and limitation of movement.

The difficulties in reducing dislocations arise from the shape of the joint, from the fact that the surrounding fibrous capsule and tendons get in the way, and from the contraction or tightening up of the surrounding muscles.

If a dislocation is allowed to remain untreated, the displaced head of the bone becomes in time surrounded by a false joint; the true articular cavity (or the hollow which formerly held the head of the bone) becomes filled with fibrous tissue, and adhesions are likely to occur between the injured fibrous tissues and the adjacent blood vessels and nerves, so that an attempt at a late reduction may injure those vessels and nerves.

Lower jaw, dislocation of.—Dislocation of the jaw may occur as a result of yawning, of other muscular action, or of a blow received on the chin while the mouth is open. When the lower jaw is dislocated, the mouth is widely opened and remains so, and the jaw projects forward. Motion is interfered with and saliva dribbles from the mouth.

Treatment.—The person who reduces this dislocation should first cover his thumbs with a fold of towel or similar material, in order to prevent them from being bitten; because the dislocation is usually reduced with a snap that brings the teeth together with sufficient force to produce a bite that might do injury.

The padded thumbs are placed in the mouth over the lower molar (large back) teeth, are pressed firmly downward until the head of

the bone is free, and then, with the fingers under the chin, the jaw is brought forward and upward, and the heads of the bone slip back into place. A four-tailed bandage should be worn for a few days.

Shoulder dislocation.—The most frequent dislocation in adults is that of the shoulder. Such a dislocation is usually caused by a fall on the hand or the elbow while the arm is extended, throwing the head of the humerus (long bone of the upper arm) upon the weakest point of the joint capsule, which gives way and allows the head of the bone to pass out of its socket.

In case of dislocation the shoulder is flattened; a prominent bony process may be felt at the point of it; the head of the humerus may be felt to be in an abnormal position; the elbow is displaced from the side and can not be made to touch it while the hand of the affected side is placed on the opposite shoulder; a comparison of the injured shoulder with the opposite one will show a conspicuous difference in shape and contour. When the head of the bone is displaced backward, close to the shoulder blade, the elbow is displaced forward and may be made to touch the chest wall.

Treatment.—In treating a dislocation of this type, give an anesthetic, such as chloroform or ether, until the muscles are relaxed; as a rule, the slightest motion will then suffice to produce reduction.

Kocher's method of reduction is to grasp the elbow of the affected arm with the corresponding hand, i. e., if the left shoulder is dislocated, grasp the elbow with the left hand. Grasp the wrist with the opposite hand. Bend the forearm and press the elbow to the side. The arm is then turned fully outward at a right angle with the body. The elbow is then brought to the mid line of the body and the hand of the affected side is placed on the opposite shoulder. These movements relax the tense part of the capsule, and bring the head of the bone down to the tear in the capsule and then through it back into the joint.

The elbow joint.—Dislocation of the elbow joint occurs mostly in young people. If such dislocation is observed before much swelling has occurred, the deformity or the location of the ends of the bones may be easily felt.

There are several types of dislocation of the elbow. Both bones may be dislocated backward, or, rarely, both may be dislocated forward—the latter type usually being complicated by a fracture of the tip of the elbow; lateral or side dislocation is sometimes seen; the ulna or the radius alone may be dislocated; and there is a condition often called "pulled arm."

Treatment.—Reduction of a backward dislocation should be made early; otherwise, rapid swelling will greatly interfere with reduction,

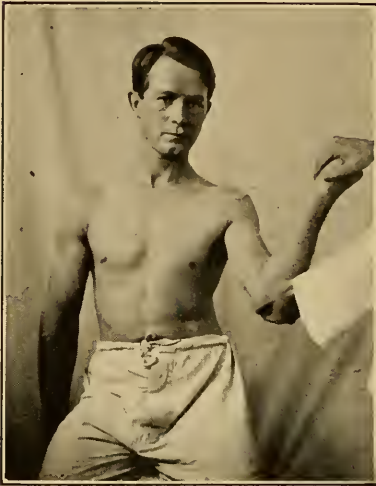


FIG. 46.—First position of Kocher's method for reduction of a dislocated shoulder



FIG. 47.—Second position for reduction of dislocated shoulder



FIG. 48.—Dislocated shoulder reduced by Kocher's method



FIG. 49.—Method of reducing dislocation of a finger

if it does not prevent it. To reduce the dislocation the patient should be placed in a sitting position and the first-aid man should place his knee against the dislocated elbow, grasp the patient's wrist with one hand and the lower part of his arm with the other hand, pull forward on the wrist, and at the same time bend the arm around his knee.

If the bones of the arm are dislocated forward, the treatment consists in forced bending of the forearm, and then fully extending the arm, at the same time making pressure upon the dislocated ends of the bones, in order to force them into place. After reducing a dislocation, apply splints, which should be kept on for two weeks. After that the joint should be bent gently back and forth daily by the ship's officer until well.

"Pulled arm" may occur in adults when, in falling, some object is grasped in an effort to prevent the fall. Severe pain is immediately complained of in an injury of this nature. The patient can not turn his hand over either when the palm faces up or when it is down. Treatment consists in pronating or supinating, flexing fully, and then extending the arm.

Dislocation of the thumb.—A backward dislocation of the thumb is sometimes difficult to reduce, because the tendons hook around the head of the bone.

Treatment.—Take a piece of bandage and throw two half hitches around the dislocated thumb. The thumb should be pulled outward until it is at right angles with the hand; then, while it is still being pulled, the thumb should be quickly bent until it lies along the index finger.

Dislocation of a finger.—Treat as above directed.

Hip dislocation.—The hip joint, composed of the thigh bone and its socket in the pelvic bone, is of the ball-and-socket variety, the ball being the end of the thigh bone.

In case of dislocation at the hip, the injured limb will be shorter than the other one; the foot may be twined inward or outward; the hip will be less moveable; there will be pain on attempted motion. If there is any suspicion of fracture at the hip, make the injured man as comfortable as possible and do not meddle with the hip.

Treatment.—The patient is placed upon a mattress on the floor, and is given chloroform. The leg is bent upon the thigh, and the thigh is bent upon the abdomen. The head of the femur, or leg bone, is thus rolled down to the lower part of the socket. The knee is then turned outward and brought down straight into its normal position; this motion carries the head through the tear in the tough ligament

surrounding and connecting head and socket and allows it to enter the socket where it belongs.

Transportation of the Injured.

Stretchers are appliances for moving the sick or injured. They are borne by two or more persons. The essential parts of a stretcher are two stout poles, about 8 feet long, with a strip of some strong material fastened between them, for the person carried to lie on. The ends of the poles serve as handles. Regular stretchers are the most convenient, but in an emergency equivalent appliances may easily be improvised. A very serviceable litter may be devised out of two gunny sacks and two suitable poles. Two holes are made in the bottom of the sacks at opposite corners. The poles are placed inside the bags and thrust through the holes, and the sacks are drawn into place. Cross strips of wood may be lashed or nailed between the poles to hold them apart.

Another method is to lay a blanket on the deck and roll the outside edges around the poles and to continue the rolling until the poles are about 20 inches apart. The blankets are then fastened by nailing them to the poles or tying them securely with strips of strong twine. Canvas may be used in place of a blanket.

A coat stretcher is constructed out of two coats and two side poles. The coat sleeves are first turned inside out. The poles are thrust through the sleeves from the shoulder and the coats are buttoned around the poles with the buttons down, so as to make a webbing across the poles.

If tools and lumber are available an excellent stretcher may be constructed out of boards. Make the bed about 6 feet long and 18 or 20 inches wide. Suitable handles may be fastened to the ends or sides. Injured persons may also be carried on doors, shutters, benches, short lengths of ladders, etc.; but all rigid appliances of this sort must be padded with blankets, clothing, mats of straw, or some other cushioning material.

Every improvised stretcher should be tested by placing a well man on it before it is used for an injured person.

A great many instructions have been written about the methods to be used in lifting a patient onto a stretcher. Such instructions are very useful for military forces and other trained bodies, but they are somewhat elaborate and are likely to be forgotten by the ordinary person in an emergency. It is best, therefore, to depend mainly upon common sense, while taking special care that no additional harm is inflicted on the injured part. Place the stretcher alongside the patient, and, if plenty of help is available, have one person raise the head and shoulders, another the hips, and a third the knees of the patient. These helpers stand or kneel on one side of the patient,

with the stretcher on the other side. A fourth assistant stands on the opposite side and his whole duty is to reach over the stretcher and handle and support the injured arm or leg.

If but two persons are present, the head and shoulders of the patient may be placed upon the stretcher first. The helpers then change their position to the lower part of the body and lift the hips and legs so as to place them upon the stretcher, guarding the injured part as carefully as possible.

When the patient is on the stretcher, he should be well covered with blankets or clothing. Ordinarily the bearers can well dispense with their coats for this purpose. It makes no material difference whether the patient is carried feet or head forward, except in going uphill or upstairs, when the head should always go first. The bearers should break step and proceed slowly. The stretcher handles should be supported with the arms hanging down, and should not be borne upon the shoulders. If obstacles are encountered, it is best to try to go around them.

It is sometimes difficult to handle a stretcher in narrow halls, ship's holds, and similar places; and so in such places the patient may be carried in a chair. Two poles may be lashed between the legs of the chair and used as handles. The poles should be attached so that the chair will tip well backward when the handles are level. The poles should be sufficiently long to afford space for the bearers to walk without coming in contact with the patient; or the Stokes or wire-basket stretcher may be used.

A sling may be constructed by taking two blankets and rolling each of them up diagonally from one corner, to form a large cylinder. The two rolls are united by tying them together at the ends. The loops thus formed are slipped over the heads of the two bearers and allowed to rest on their shoulders, the middle parts of the blankets forming two slings. The patient sits on the slings and steadies himself by placing his arms around the necks of the bearers.

Other devices for carrying men up ladders or hoisting them perpendicularly on stretchers are sometimes used on vessels.

Occasions may arise when it is impossible to take sufficient time to obtain a stretcher or other such appliance for carrying an injured person. Under such circumstances helpers must carry the patient without the assistance of any apparatus. If there are two bearers, a man may be carried for a short distance on what is known as a "lady's chair." This is formed by each bearer grasping his left wrist with his right hand. The free left hand then grasps the right wrist of the other assistant. The injured person sits on the support thus formed and places his arms around the necks of the bearers.

Another plan is for the bearers to stand side by side and each to grasp the other's nearest shoulder. The outside hands are clasped together, and the patient sits upon these. The other arms act as a backrest. To carry an unconscious man for a short distance, the forward bearer may walk between the patient's legs, grasping his knees, while the rear bearer supports the patient's shoulders by putting his hands in his armpits.

It is extremely difficult for one person to carry a patient for a considerable distance. If the patient is conscious, he may be carried on the back of the bearer with his arms around the neck of the latter and his thighs supported by the bearer's forearms, after the fashion called "picka-back." The greatest difficulty, however, is encountered when a single bearer attempts to pick up an unconscious person. It is, of course, quite practicable to lift a child or a small adult in the arms, but it is difficult for a man of ordinary strength to lift a heavy individual in this way.

Methods by which One Operator May Carry an Unconscious Person.

Various methods are described for getting an unconscious person up on the bearer's back. An unconscious person is limp; and although he may be lifted to his knees without great difficulty, he is likely to fall forward on his face as soon as the bearer's grip is shifted below the hips.

If the patient is only partially unconscious and is capable of stiffening himself a little, he may be got upon the bearer's back by the following maneuvers:

First, turn the patient on his face. Stand astride of his body at the hips. Place the hands under the patient's flanks and raise him to his knees; then lift him to his feet. Holding him in this position with the right arm, grasp his left wrist with your left hand, lower your head, and pull his left arm around your neck. Now work your right foot forward until it is in front of his legs, and bend forward until his body is supported on your back. Now put your right hand forward and pass it between the unconscious person's legs, grasping his right thigh above the knee from behind. With a sudden motion, throw the patient upon your back. Shift him farther upward, release his left wrist, and grasp his right wrist with your left hand. The unconscious person will then be on your back and can be carried without great difficulty.

Appendicitis.

Appendicitis, which is caused by an infection of the appendix, may be induced by digestive disturbances, indiscretions in diet, by injury, the presence of a foreign substance in the appendix, and by the presence of germs. An attack begins with a feeling of distress in the abdomen, increasing rapidly in intensity until it is a real

pain, which at first may be general, extending through the entire abdomen but which finally localizes in the lower right flank, about 3 or 4 inches below the ribs. The patient may be nauseated and may vomit. Sometimes the pain in the abdomen is very intense and the abdominal muscles of the right side are hard and rigid. The greatest danger attending an attack of appendicitis is that the appendix may burst and cause general peritonitis, which is liable to result in death.

Treatment.—DO NOT GIVE CATHARTICS. The patient should be placed in bed and kept absolutely quiet. The patient should abstain from all food until all symptoms have subsided. Pain should be controlled by giving morphine. A rise of temperature and a sudden relief from the pain and the distention and rigidity of the abdomen are signs of a ruptured appendix and the case is a serious one. Should the pus wall off, the outlook is much better than when it fails to do so. A marked swelling of the abdomen is usually a sign of general inflammation of the abdomen and of an unwall-off abscess.

In a great many instances the attack of appendicitis will subside without rupture of the appendix. Yet, since there is no way of knowing when an appendix will rupture, even the severe symptoms can not be depended upon to indicate the outcome of an attack; therefore such patients should receive very careful attention and be kept absolutely at rest until it is certain that the attack has passed. At the first opportunity the patient should be put ashore, to receive proper treatment in a hospital.

Rupture (Hernia).

A rupture (hernia) is the protrusion of a portion of intestine or other viscus through an opening in the wall of the abdomen. Any bulging in the abdominal wall should be suspected as a rupture and should be examined. Rupture may be present in any part of the abdominal wall, but is most frequently located in the groins and in the navel.

The protruding portion of the intestines may carry with it any one of the abdominal organs, but it usually includes only intestine and omentum. Hernias occur more often in the small intestines than in the large intestines.

A rupture in the groin is known as an inguinal hernia.

Treatment.—Hernia may be relieved either by the use of trusses or by operation. The first step in the treatment is to reduce the rupture—that is, to put the contents of the bulging sac back into the abdomen. The patient should be placed upon his back with the hips higher than the shoulders, with knees drawn up, so as to relax the abdominal muscles; then, by gentle manipulation with the fingers,

the protruding mass may be gradually worked back into the abdomen. Great gentleness and patience must be used in reducing a rupture, in order not to injure the intestine. If a rupture has been protruding for a long time, adhesions may have formed, and therefore it can not be reduced. When the rupture has been reduced, a truss should be put on. A temporary truss may have to be made, as follows: Make a smooth pad which will fit over the hernial opening. The pad may be made from a block of wood, a flat piece of steel, a flat piece of coal, or any such object. Cover the pad with cotton and then with gauze. Strap it to the body with adhesive plaster and reinforce it with a gauze bandage extending around the waist, with a strip drawn through the crotch, to hold the pad in place.

In cases in which the rupture can not be reduced, there is danger that the intestine may become compressed by adhesions or swelling to such a degree that its blood supply is shut off. If this occurs, gangrene rapidly sets in and causes general peritonitis and death within a few days. A case of strangulated rupture, as this type is termed, calls for an operation, but on board ship conditions are not, as a rule, suitable for major surgery; therefore, use hot applications, wash out the bowels with soapsuds, and give a liquid diet until the patient can be either placed ashore or transferred to a passing ship, provided the latter carries a physician and has facilities, or else can make port promptly.

Piles (Hemorrhoids).

"Piles" is the name given to a varicose or swollen condition of the veins surrounding the anus and the lower inch or two of the rectum.

One reason for the formation or production of piles is the fact that the veins in this location receive very little support from the tissues. The principal exciting cause of piles is constipation, in connection with which prolonged straining in the effort to evacuate the bowels causes the veins to become distended and gradually to break away from their normal location and to form tumors. Other causes of piles may be tumors in the pelvis or abdomen.

Piles may be either external or internal, or both. External piles are those which protrude below the external sphincter and are covered with skin. Internal piles lie within the bowel and cause only slight symptoms, unless they become inflamed.

Treatment.—Piles which protrude from the rectum should be replaced. Hot applications give a great deal of relief; a solution to use for the hot applications may be made by dissolving several alkaline antiseptic tablets in a pint of hot water. An excellent pile salve may be made by mixing well a heaping tablespoonful of zinc

oxide ointment with a half teaspoonful of turpentine. Turpentine blended thus with zinc oxide salve does not burn, but, on the contrary, has a cooling and pain-relieving effect.

Affections of the Penis.

“**Phimosis**” is the inability to retract or draw back the prepuce (foreskin). This condition is frequently caused by venereal disease.

Treatment.—The proper treatment is circumcision; but relief may be obtained by splitting the foreskin, under aseptic conditions, with a knife or scissors. A hot, wet dressing should be applied and should be replaced by a fresh one as soon as it grows cold. A moderate amount of bleeding does no harm; but should the bleeding continue it should be controlled by pressure with a piece of sterile gauze held between the fingers.

Paraphimosis is a condition in which the foreskin is back of the head of the penis, and because of swelling and inflammation can not be brought forward. This condition, like phimosis, is a frequent complication of venereal disease. If either of these conditions is neglected, extensive ulceration may occur.

Treatment.—Apply wet dressings for three or four hours; then attempt to bring the foreskin forward by grasping the penis between the fore and middle fingers of each hand; and, as a rule, by pressing with the thumbs on the head the swelling is gradually lessened and the skin may be drawn forward over it. If the swelling can not be reduced by the above method, make a number of punctures through the skin of the swollen part with a sterile knife point; through the openings so made the fluid and blood will be able to escape from the part, and the swelling will be reduced so that the skin may be brought into proper place. Circumcision should be performed by a competent surgeon at the earliest opportunity.

Stricture.—Stricture is a narrowing of the urethra which obstructs the flow of urine from the penis. The most common cause of stricture is venereal disease. When a venereal sore heals it contracts and thus lessens the size of the canal in the penis and so interferes with the passing of urine. In such cases, the size of the stream is smaller than it should be; and in severe cases the urine is passed only in dribbles or is shut off entirely.

Treatment.—The patient must be relieved; therefore, take the smallest catheter from the medicine chest, boil it in water, cover it with a thick film of vaseline, and pass it into the penis and to the bladder. Do not be rough, but be patiently persistent, until the catheter enters the bladder and thus empties it of urine.

Effects of Electricity.

Electricity exerts both a general and a local action. Its general action is evidenced by a shock, as in the passage of a strong electric

current through the body, which may lead to momentary unconsciousness, to prolonged unconsciousness, or perhaps to death. When a person comes into contact with a strongly charged wire, he is unable to break the contact, because of spasm of the muscles. The electric current should be immediately shut off. If rubber gloves or some nonconducting material are at hand, these should be used in pulling the victim away from the electric wire. If nothing else is available, a dry board may be used to break the contact. Whatever the rescuer uses for the purpose, he must be sure it is of nonconducting material, or else he will be in as bad a plight as the victim.

Electrical burns should receive the same treatment as any other kind of burns.

If a person who has been shocked by electricity is unconscious, artificial respiration should be given and should be kept up for at least an hour or two. Early and effective artificial respiration may save life in such a case, and it should be continued until it is certain that life is beyond recall.

Artificial Respiration.¹

When a person has been rendered unconscious by fumigation gas, by an electric shock, drowning, or any other cause, and breathing ceases or becomes very shallow, artificial respiration should be begun at once. Proceed as follows:

1. Lay the patient on his belly, one arm extended directly overhead, the other arm bent at elbow and with the face turned outward and resting on hand or forearm, so that the nose and mouth are free for breathing. (See fig. 50.)

2. Kneel straddling the patient's thighs with your knees placed at such a distance from the hip bones as will allow you to assume the position shown in Figure 50.

Place the palms of the hands on the small of the back with fingers resting on the ribs, the little finger just touching the lowest rib, with the thumb and fingers in a natural position, and the tips of the fingers just out of sight. (See fig. 50.)

3. With arms held straight, swing forward slowly, so that the weight of your body is gradually brought to bear upon the patient. The shoulder should be directly over the heel of the hand at the end of the forward swing. (See fig. 51.) Do not bend your elbows. This operation should take about two seconds.

4. Now immediately swing backward, so as to remove the pressure completely. (See fig. 52.)

¹ This method (the prone pressure method) has been approved by the following organizations: American Telephone & Telegraph Co.; American Red Cross; American Gas Association; Bethlehem Steel Co.; National Electric Light Association; National Safety Council; Bureau of Medicine and Surgery, Navy Department; Office of the Surgeon General, War Department; U. S. Bureau of Mines; U. S. Bureau of Standards; and U. S. Public Health Service.



FIG. 50



FIG. 51



FIG. 52

5. After two seconds, swing forward again. Thus repeat deliberately twelve to fifteen times a minute the double movement of compression and release, a complete respiration in four or five seconds.

6. Continue artificial respiration without interruption until natural breathing is restored, four hours or longer if necessary, or until a physician declares the patient is dead.

7. As soon as this artificial respiration has been started and while it is being continued, an assistant should loosen any tight clothing about the patient's neck, chest, or waist. *Keep the patient warm.* Do not give any liquids whatever by mouth until the patient is fully conscious.

8. To avoid strain on the heart when the patient revives, he should be kept lying down and not allowed to stand or sit up. If the doctor has not arrived by the time the patient has revived, the patient should be given some stimulant, such as one teaspoonful of aromatic spirits of ammonia in a small glass of water or a hot drink of coffee or tea, etc. The patient should be kept warm.

9. Resuscitation should be carried on at the nearest possible point to the place where the patient received his injuries. He should not be moved from this point until he is breathing normally of his own volition and then moved only in a lying position. Should it be necessary, due to extreme weather conditions, etc., to move the patient before he is breathing normally, resuscitation should be carried on during the time that he is being moved.

10. A brief return of natural respiration is not a certain indication for stopping the resuscitation. Not infrequently the patient, after a temporary recovery of respiration, stops breathing again. The patient must be watched; and if natural breathing stops, artificial respiration should be resumed at once.

11. In carrying out resuscitation it may be necessary to change the operator. This change must be made without losing the rhythm of respiration. By this procedure no confusion results at the time of change of operator, and a regular rhythm is kept up.

Instructions for Saving Drowning Persons by Swimming to Their Relief.

1. Before jumping into the water to save a drowning person, undress as quickly as possible. If there is any object lying about that may be thrown to the person in the water, such as a life buoy, or other buoyant object that may help to keep a person afloat, throw it to him before jumping overboard.

2. On swimming up to a person in the water, assure him with a loud and firm voice that he is safe. If he is struggling, do not seize him at once, but keep off for a few seconds until he becomes quiet; it is sheer madness to take hold of a man when he is struggling in the water; if you do so, you run a great risk. Always endeavor to

make your approach from behind. It is important to retain your presence of mind and a clear, cool head, and to keep at a safe distance until the person is nearly exhausted.

3. When he has ceased to struggle, get close to him, and, grasping him firmly by the hair of his head, turn him as quickly as possible upon his back, give him a sudden pull, which will cause him to float, then throw yourself on your back also and swim for the shore—one or both your hands having hold of his hair, you on your back and he on his, and, of course, his back to your stomach. In this way you will get more quickly and safely to shore than by any other plan. One great advantage of this method is that it enables the swimmer to keep his head up and also to hold up the head of the person whom he is trying to save.

4. There is probably no such thing as a “death grasp.” As soon as a drowning man begins to grow weak and to lose consciousness, he gradually slackens his hold until he quits it altogether. No apprehension need therefore be felt in regard to a “death grasp” when attempting to rescue a drowning person.

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

6. In rescuing a person by diving to the bottom after him, the hair of his head should be seized with one hand only, and the other should be used with the feet in raising yourself and the drowning person to the surface.

7. If the accident occurs some distance out at sea, it is sometimes a great mistake to try to get to land. If there is a strong outsetting tide, and you are swimming either alone or while holding a person who can not swim, get on your back, and float till help comes. Many a man exhausts himself by trying to stem the billows for the shore on a back-going tide, and sinks in the effort, whereas, if he had floated, a boat or other aid might have reached him.

8. These instructions apply alike in all circumstances, whether they involve rough sea or smooth water.

CHAPTER VII

EMERGENCY REFERENCE SECTION

This section is designed for speedy reference in time of emergency only. It is urged that the other chapters be carefully studied at other times so that proper treatment may be instituted promptly and intelligently. After emergency treatment has been given, read over the chapter dealing with the disease or injury and begin regular treatment.

Alcoholism (drunkenness).

Induce vomiting with several spoonfuls of mustard dissolved in a pint of warm water and then put patient to bed.

Amputations (accidental). (See Ch. VI, hemorrhage and shock.)

The first thing is to stop the bleeding and then get the patient into bed; treat for shock and dress the wound.

Asphyxia (suffocation).

Due to inhaling poisonous gases or from drowning. Get the patient into the open air as quickly as possible and give artificial respiration at once.

Bleeding. (See Hemorrhage.)

Types: Spurting, flowing, oozing.

Spurting bleeding is from a cut artery; the blood is bright red; and if the bleeding is not soon checked, the patient may quickly bleed to death. The best method of stopping it is to clamp with a forceps and tie both of the cut ends of the artery with sterile catgut. Usually a tourniquet, as described on page 134, should be applied first to control the bleeding.

Bleeding from a vein does not spurt, but wells up and flows from the wound. If the ends of the cut vein can be found, they can be clamped and tied as above, but a tight bandage *beyond* the wound toward the extremity will control the bleeding so that it will clot when a snug bandage is applied.

Oozing bleeding comes from the small capillaries; the amount of blood lost is seldom large. A snug bandage over a clean dressing will control the bleeding and allow a clot to form.

Bites (insect).

In treating insect bites, apply 1 per cent carbolic acid solution to stop itching, then poultice with a paste of wet soda or soap.

Rat bites should be thoroughly washed, first with soap and water, then with alcohol, and the wound opened with a knife and washed out with 5 per cent carbolic acid.

Broken bones (fractures).

The first thing is to *cut* away the clothing from the broken part. *Splint the patient where he lies* to avoid further damage in moving him. If the broken end is sticking through the skin (compound fracture), pull gently and steadily on the part until it goes in through the skin wound; then tie well padded boards to the part and put a clean sterile dressing over the wound before attempting to move the patient. If the skin is not broken (simple fracture), merely pull the parts into approximately normal position and apply splint. The patient can now be moved to a hard bed and after detailed study of the kind and location of the fracture (see Ch. VI), proper reduction and splinting may be attempted.

Bruises (contusions).

Apply to the skin ice or cloths wrung out in cold water. No treatment is necessary for the "black and blue" discoloration; it will fade away slowly.

Burns.

Cut away the clothes from the burned skin. If the skin is only reddened, apply a clean ointment or linseed oil to the surface. If there are large blisters, they should be drained, best through a hollow needle, going under the good skin a short distance from the blister and then coming up into it. Do not break or remove the skin over a blister but bandage it with a clean snug dressing. Deep burns with black charred edges should have the dead charred flesh cut away and then dressed as wounds.

Cramps.

Look up "Colic" in Chapter V and decide on the type and follow the treatment advised. In the meantime put the patient to bed with several hot-water bottles to the flanks and abdomen (belly).

Crushing.

Examine for fractures, stop bleeding, and dress as instructed under Wounds (this chapter). If the part is so badly crushed that it is certain that it will not recover, cutting it off (amputation), as discussed in Chapter VI, is to be considered. *Never perform an amputation at sea if it is possible to reach port within several days.*

Dislocations.

First, move the patient to a warm, comfortable bed and give him a hot drink (whisky or tea). Then determine the type of disloca-

tion and read it up in Chapter VI before attempting to get it back in place.

Drowning.

Hold the patient with the head hanging downward and shake him several times to allow as much water as possible to run out of his lungs. Then start artificial respiration (see p. 178). After breathing is well established, put the patient in a warm bed with some one to watch him and start artificial respiration again if his breathing should stop.

Electric Shock.

If the patient is still in contact with the live wire, do not touch him but *shut off the current first*, or else push him away from the wire with a dry board. Start artificial respiration at once and later when he is breathing normally, dress the burns.

Fainting.

Get the patient into the open air, loosen his clothing, lay him flat, so that his head is as low as possible, and dash cold water in his face. Try to determine the cause of the faint, if possible; especially look up heat exhaustion and apoplexy in Chapter V.

Fits (Spasms). (See Epilepsy, Chapter V.)

During the fit, the patient should be prevented from injuring himself by striking against surrounding objects. He can be held by several men, or a blanket tied around him. A handkerchief may be stuffed into his mouth to prevent him from biting his tongue. Use a stick to push it into his mouth, so that the fingers will not be bitten.

Gassing. (See Asphyxia, above.)

Gunshot Wounds.

Look especially for fractures and for evidences of bleeding internally. If bits of clothing can be seen in the wound, they should be fished out. Do not probe around and try to get out the bullet if it is deep. Apply dressing as described under wounds.

Intoxication. (See Alcoholism.)

Knife Wounds.

Usually the wound is clean. Stop the bleeding as outlined above and sew (see Suturing, Chapter VI) the cut edges together. Dress as any clean wound.

Mortification (gangrene).

Death of the flesh of a part is due to something cutting off its blood supply and is usually preceded by swelling and a reddish-blue dis-

coloration. These advance signs indicate that something is wrong and tourniquets, splints, or bandages above the part should be loosened at once. After the tissues are dead, nothing can be done to restore them.

Pain.

Pain is an indication that something is wrong and is Nature's way of insisting on rest, since any movement of the part causes additional pain. In the treatment of pain, the underlying cause must be sought and treated in order to secure permanent relief. In the meantime, the pain can usually be lessened by rest, hot applications locally to the seat of the pain, and quieting drugs like aspirin or morphine, if necessary.

Paralysis. (See Apoplexy, Chap. V.)

Paralysis is usually the result of some injury to the nervous system. If a nerve is cut, the muscles supplied by it are paralyzed until the nerve grows back. If a part of the brain is destroyed, as by a bursting blood vessel in apoplexy, the muscles supplied are paralyzed. Little or nothing can be done for paralysis as an emergency measure. Massage and splinting of the part involved prevents muscular wasting and contractures while new nerve fibers are growing.

Poisoning.

In treating poisoning correctly, it is very desirable to know what poison was used. If this is known, look up the specific treatment in Chapter IV and give the proper antidote.

If the poison has been taken by mouth, although its nature is unknown, it is always safe to give large amounts of white of egg and then try to induce vomiting by tickling the throat. A stomach tube can usually be passed safely and the stomach washed out, if necessary. Later a large dose of Epsom salts is helpful in removing the poison which has passed into the intestines.

Respiration, Artificial. (See Artificial Respiration, p. 178.)

Place the individual on his belly with one arm above his head and the other arm bent to support his cheek, the head being turned somewhat to one side. Kneel astride the patient facing his head. The palms of the hands are placed on the lower part of the patient's chest and by leaning the weight forward, pressure is made against the lower part of the chest, decreasing its size, and thus forcing out the air or water contained in the lungs. (See illustrations, p. 179.) When the pressure is removed, air will be sucked into the lungs by the springing out of the chest wall. This motion is continued slowly,

not any faster than twelve or fifteen times to the minute. If an assistant is at hand, continuous rubbing of the limbs toward the body helps to restore the circulation. *Do not stop artificial respiration under two hours*, as there is still a chance to restore life within this time. As soon as breathing is established at a regular rate, undress the patient, wrap him in warm blankets, give him a drink of whisky, and put him to bed for several days. During the first day he should be continually watched, as breathing may suddenly stop and more artificial respiration be necessary to start it again.

Retention of Urine.

Retention of urine is usually due to a stricture and comes on slowly. It may be due to rupture of the urethra or disease or injury of the nerves of the bladder. Look up strictures (Ch. V and methods of passing catheters in other sections of this book.

Rupture (Hernia).

The only emergency treatment of rupture is to get the protruding mass back and keep it back with large pads and snug bandages. To reduce a rupture, the patient should be lying on his back with the knees bent; and while he relaxes as much as possible, by breathing with the mouth wide open, gentle, steady pressure is made with the palms against the mass. It will usually slip back with little trouble, but the difficulty is to keep it back. A person with a hernia can be finally cured only by an operation, closing the unnatural opening, and a sailor should enter a hospital for operation and repair of the hernia as soon as possible.

Scalds.

Scalds are treated like any burn, except that the clothing must always be cut away very carefully so as not to tear open the large blisters. These are then drained and the burns dressed in the usual manner. It is advisable to give morphine at once to patients with severe scalds to relieve the pain.

Sprains.

Sprains are due to stretching or tearing of the ligaments around a joint. These ligaments are very important structures, as they hold the bones together; and, since they heal slowly, a bad sprain requires splints and careful treatment as described in Chapter VI.

Spasms. (See Fits and Epilepsy.)

Strangling.

Strangling is due to something shutting off the windpipe. It may be around the neck, as in hanging, or may be something caught in the throat. If a patient is strangling, always look and feel down his throat. The throat may be straightened out by putting a pillow

under the shoulders, letting the head fall back, and pulling up on the tongue. By doing this, and using a flash light, it is often possible to see directly down into the larynx ("voice box") and lift out a foreign body, such as a piece of meat, with a pair of forceps or even with the fingers. Then loosen the clothing around his neck and, if he does not start to breathe, give artificial respiration.

Suffocation.

Get the suffocated person out into the fresh air and give artificial respiration.

Unconsciousness.

Unconsciousness may be temporary and of little importance, as in fainting, but, if it lasts for several hours it usually indicates a serious condition. Drunken stupor should be recognized as differing from true unconsciousness. Serious injuries, especially head injuries, may give long continued unconsciousness. Apoplexy, diabetic coma, uremia, poisoning, especially by morphine, are to be considered. The points in recognizing these conditions are discussed in Chapter V.

Vomiting.

Vomiting is a symptom usually due to an overloaded or poisoned stomach. It should be encouraged rather than suppressed, as it is nature's method of getting rid of what is harmful. Vomiting of greenish material is not in itself serious, but merely indicates that nature is emptying the first part of the small intestine also. However, if the vomiting is long continued or contains foul-smelling black material, it is a sign of serious trouble, usually some obstruction in the intestinal tract, and the patient should have medical attention as soon as possible. Vomiting without sensation of sickness in the stomach occasionally occurs with head injuries or brain disease.

After the action of vomiting is over, a drink of cold lemonade or some whisky in hot water may help "quiet the stomach."

Wheezing.

Wheezing is a noisy rasping sort of breathing heard in asthma or may be caused by a foreign body in the windpipe, when it is really a partial strangulation.

Wounds.

Stop the bleeding. (See Bleeding, this section.) Foreign bodies, such as bits of cloth, should be lifted out and the wound cleansed by washing with some antiseptic like peroxide or boric acid if it contains much dirt. If it looks clean, leave it alone, bring the edges together with adhesive or sutures, apply a clean dressing, and change the dressings daily.

CHAPTER VIII

RADIO MESSAGES REQUESTING MEDICAL ADVICE

It sometimes happens that a ship's master is in urgent need of advice in regard to the treatment of a sick member of his crew. In such an emergency, the radio provides a means of communication with the shore and with the medical officers of the United States Public Health Service, so that the master or his officers may receive from them instructions as to how to relieve, if possible, the sufferings of the sick on board until it is possible to reach port, where further and more adequate treatment can be given.

It can not be too strongly impressed upon the officer charged with radioing for advice that he should impart to the physician consulted sufficient information concerning the case to enable him to make a diagnosis and to outline the best possible treatment. If the radio message contains all the necessary data, the physician will probably not have to ask for additional and more specific data. To embody in the first message all pertinent information may save time and suffering, and perhaps life.

The medical officers of the United States Public Health Service are familiar with the contents of a standard medicine chest and this book, so that treatment advised by them will be in accordance with the medicines at hand and this book of instructions. For instance, if a physician advises the application of a mustard plaster, it will not be necessary for him to go into details and explain how to make the mustard plaster, because the method of making and applying one is described in this book. This applies also to the preparation and application of other remedies contained in the medicine chest. It is evident that much time can be saved and that the chances for misunderstanding can be lessened in handling cases of sickness on board ship, if advice is requested by radio.

Information That Should Be Obtained and Sent By Radio to a Hospital or Relief Station of the United States Public Health Service

Before attempting to send a radio message for medical advice, the sender should first carefully examine the patient and should obtain all the information possible in other ways and he should then embody in one message all the data found.

The following outline is presented in order to guide in obtaining data concerning the patient:

1. How long has the patient been sick? Was he taken sick suddenly or did the sickness come on slowly?
2. Has the patient a fever, and if so, how much?
3. What is the patient's pulse rate per minute?
4. How many breaths does the patient take per minute?
5. What is the general appearance of the patient? Is the flesh in any part of body swollen?
6. Is the sickness thought to be due to a poison or to poisoned food?
7. Is the sickness believed to be due to a communicable disease, such as cholera, smallpox, etc.? To what diseases have the crew been exposed? Name and how long out of port of departure?
8. Are other members of the crew suffering from the same sickness, or have other members been sick and recovered or died?
9. Mention all the symptoms or complaints of the patient.

Following is a list of common symptoms which may be used to aid in bringing out all the information:

1. Headache.
2. Chill.
3. Fever.
4. Pain, location and character.
5. Nausea.
6. Vomiting.
7. Diarrhea.
8. Constipation.
9. Appearance of tongue, coated or swollen.
10. Colic.
11. Urine, increased, decreased, or absent.
12. Consciousness.
13. Unconsciousness.
14. Labored breathing.
15. Convulsions.
16. Bleeding from any part of body, as mouth, bowel, or skin.
17. Rash, jaundice, or any discoloration of the skin.
18. Swelling of any part of the body.
19. Areas of tenderness.
20. Paralysis in any part.
21. Injury to any part of body.
22. The treatment that has been given.

Examples of good radio messages:

Man, aged 30, deck hand, sick for past 24 hours with severe pains and cramps in lower right side of abdomen, which is hard and tender to touch. There is nausea and some vomiting. Temperature is 99½; pulse, 120 per minute; breathing, 25 per minute. Have given no medicine.

Information such as that above will inform the physician that the patient is probably suffering from an acute attack of appendicitis, and he will therefore advise treatment accordingly.

Man, aged 20, fireman, became sick three days ago with chill and headache, followed in few hours by high fever, which does not go down. Fever is 104; pulse, 140; breathing, 50 per minute. Has severe pains in chest when he breathes. Face flushed. Lies on left side. Coughs; sputum rusty or blood-colored. Has hot-water bottle to side.

Such information immediately conveys to the physician the idea that this patient is perhaps suffering from pneumonia and he will outline the treatment accordingly.

Man, aged 45, cook, fell and broke both bones right leg, apparently near middle. Bones protrude through skin.

The physician receiving such a message will have no difficulty in understanding the nature of this fracture, and will advise proper treatment.

It can be seen from the above messages that it is important to give all the facts noted about the sick person. Contrast the above messages with the following, which are vague and unsatisfactory:

Man ill, temperature 102. Complains backache, headache and fever, pain in chest, thinks he has pneumonia.

Man taken ill suddenly. Cramps in abdomen for two days. Has fever, gave castor oil, no better. Request advice.

From the facts given in these messages no definite diagnosis could be made and only symptomatic treatment advised.

Through the courtesy of private radio corporations and the cooperation of Government ships or stations having radio equipment, messages may be sent to marine hospitals of the Public Health Service and other points on shore and medical advice furnished in reply to ships at sea. Under ordinary circumstances there is no great urgency for the exchange of these messages, but in serious emergencies it is permissible for a ship to use the emergency signal, which in priority of claim is second only to the distress signal. The following is quoted from the code of regulations adopted by the International Radio Telegraph Conference which met in Washington, D. C., in November, 1927:

The emergency signal consists of several repetitions of the group¹ * * *, sent by clearly separating the letters of each group from the successive groups. It is sent before a call. This signal indicates that the calling station has a very urgent message to transmit concerning the safety of the ship * * * or the security of a person aboard a vessel or within sight thereof.

Such signal shall have priority over all other communications, except those of distress, and all the mobile stations or land stations which hear it shall take care not to cause interference with the transmission of the emergency traffic.

As a general rule, the emergency signal may be employed only if the mobile station which sends it addresses a determined station.

¹ In great emergency the call is preceded by three X's. This, however, must be authorized by the captain. The purpose is to clear the air.

Mobile stations which hear the emergency signal must remain on watch during three minutes at least. When this period of delay is past, if no emergency message has been heard, they may resume their normal service.

Nevertheless, the land stations and ship stations, which are in communication on the authorized waves other than that used for the transmission of the emergency signal which follows it, may continue, without stopping, their normal work.

The emergency signal shall be transmitted only with the authorization of the master or of the person responsible for the ship, * * *.

Marine Hospitals and other relief stations of the Public Health Service at the following ports have been especially designated to furnish medical advice by radio:

New York, N. Y.

Key West, Fla.

New Orleans, La.

Galveston, Tex.

San Francisco, Calif.

Chicago, Ill.

Cleveland, Ohio.

Sault Ste. Marie, Mich.

Honolulu, T. H.

Manila, P. I.

APPENDIX

Excerpts from the Regulations of the United States Public Health Service Concerning Beneficiaries

PAR. 590. The following persons are entitled to the benefits and facilities of the hospitals and other relief stations of the service as hereinafter prescribed :

(1) Persons (hereafter designated as American seamen) employed on board in the care, preservation, or navigation of any registered, enrolled, or licensed vessel of the United States, or in the service on board of those engaged in such care, preservation, or navigation.

(2) Officers and enlisted men of the Coast Guard.

(3) Officers and seamen on vessels of the Coast and Geodetic Survey.

(4) Officers and crews of vessels, certain keepers and assistant keepers of the Lighthouse Service.

(5) Officers and crews of vessels of the Bureau of Fisheries.

(6) Immigrants detained at Ellis Island.

(7) Seamen from vessels of the Army Engineer Corps and Army transports, or other vessels belonging to United States Army.

(8) Seamen employed on the vessels of the Mississippi River Commission.

(9) Beneficiaries of the Employees' Compensation Commission.

(10) Patients of the Veterans' Bureau.

(11) Lepers.

(12) Pay patients designated as such under departmental authority, as officers and enlisted men of the United States Army and Navy.

(13) Officers of the Public Health Service and employees of the Public Health Service on field duty.

PAR. 591. No person employed in or connected with the navigation, management, or use of vessels under 5 tons, or canal boats engaged in the coasting trade, shall, by reason thereof, be entitled to any benefit or relief from the service.

PAR. 593. Sick or disabled seamen taken from wrecked vessels of the United States returned to the United States from foreign ports by the United States consular officers, if sick or disabled at the time of their arrival in a port of the United States, shall be entitled to the benefits of the service without reference to length of service.

PAR. 594. A sick or disabled seaman, in order to obtain the benefits of the service, must apply in person, or by proxy if too sick or disabled so to do, at the office of the Public Health Service, to an officer of that service, or to the proper customs officer acting as the agent of the said service at stations where no medical officer is on duty, and must furnish satisfactory evidence that he is entitled to relief under the regulations.

PAR. 595. Masters' certificates and discharges from United States shipping commissioners, made out and signed in proper form, showing that the applicant for relief has been employed for 60 days of continuous service "in a registered, enrolled, or licensed vessel of the United States," a part of which

time must have been during the 60 days immediately preceding his application for relief, shall entitle him to treatment. The phrase "60 days of continuous service" shall not be held to exclude seamen whose papers show brief intermissions between short services that aggregate the required 60 days, provided that any such intermission does not exceed 60 days.

PAR. 596. The certificate of the owner or accredited commercial agent of a vessel as to the facts of the employment of any seaman on said vessel may be accepted as evidence in lieu of the master's certificate in cases where the latter is not procurable.

PAR. 597. Masters or owners of documented vessels of the United States shall, on demand, furnish any seaman who has been employed on such vessel a certificate of the length of time said seaman has been so employed, giving the dates of such employment.

PAR. 599. Any master of a vessel or other person who shall furnish a false certificate of service with intent to procure treatment of a seaman shall be immediately reported to the nearest United States district attorney for prosecution. A person who ships for the purpose of thereby qualifying for treatment of a preexisting disability is ineligible.

PAR. 603. Whenever a beneficiary applies for relief without a master's certificate, the oath or affirmation of the applicant as to the facts of his last employment, stating names of vessels and dates of service, may be accepted as evidence in support of his claim for relief. This oath or affirmation shall be taken before a notary or other person authorized by law to administer oaths.

PAR. 607. When a seaman applies for relief after an absence of 60 days or more from his last vessel and it satisfactorily appears that it was impracticable for him to apply to the proper officer for treatment, or that he obtained treatment at his own expense, a statement of the facts, together with a copy of the application and other papers in support of same, shall be filed and the seaman admitted to hospital.

PAR. 608. Any seaman who is able to write will be expected to sign his name upon the face of the master's certificate issued to him before said certificate is signed by the master of the vessel, and the officer receiving such certificate shall require the applicant to verify the signature in his presence.

PAR. 610. When a seaman who has received continuous treatment at the out-patient office for a period of two months applies for further treatment, he must, to entitle him to treatment, furnish a new certificate of service showing that he is still following his vocation as seaman, or has been prevented from resuming this occupation by reasons not under his control, giving the latest dates of services, and, in case of lack of recent service, its explanation, to appear on his record card. The medical officer in charge may waive this requirement in instances where the nature of the disability has been such as to prevent a resumption of a seaman's vocation or when the port is closed.

PAR. 611. The expenses of caring for sick and disabled seamen incurred during a voyage, or when not prearranged by an authorized agent of the Government, will not be paid by the service.

PAR. 613. In no case shall money be paid to a seaman or to his family or friends by the service as reimbursement for expenses incurred during his sickness or disability.

PAR. 614. Seamen who may be injured in street brawls or while committing a breach of the peace, and are, therefore, confined in jail or taken to civil hospitals by the local authorities for such acts, shall not receive treatment at the expense of the service. Such seamen should, however, be furnished treatment if brought to service or contract hospital.

PAR. 615. Seamen taken sick or injured on board or ashore while actually employed on a documented vessel shall be entitled to treatment at relief stations without reference to the length of their service.

PAR. 616. A certificate of discharge may, at the discretion of the officer in charge, be given to a hospital patient, but such certificate, when presented at another relief station, shall not be taken as sufficient evidence of the applicant's title to hospital relief, but may be considered as collateral to other satisfactory data submitted by the seaman.

PAR. 617. Temporary relief only is contemplated, and admission to hospital is not intended to permit as indefinite residence therein for cause other than actual disease or injury. Seamen who have changed their occupation or who have retired from their calling because of age or for any other reason not requiring relief from actual disease or injury within a period of 60 days after leaving the vessel shall not be entitled to service relief.

TREASURY DEPARTMENT
U. S. Public Health Service
Form 1915
Revised August, 1926

MASTER'S CERTIFICATE OF SERVICE OF SICK OR INJURED SEAMEN

(Place)

-----, 19-----

MEDICAL OFFICER IN CHARGE,
United States Public Health Service.

I certify, on honor, that -----, whose signature and description appear below, has been employed on board in the care, preservation, or navigation, or in the service on board of those so employed, of the

----- of -----
(Name and class of vessel) (Home port, where permanent document issues)
Official Registry No. -----, a vessel whose personnel is entitled to medical treatment by the United States Public Health Service. His period of service on the above-named vessel was from the ----- day of -----, 19-----, to the ----- day of -----, 19-----. I further certify that the person named herein has, in my presence, signed his name in the blank space provided below for that purpose.

(Master of the above-named vessel)

Signature of the person named above -----
Nativity -----, age ----- years, height ----- feet ----- inches,
color of eyes -----, color of hair -----, distinguishing marks -----

Previous service -----

Total service on United States vessels ----- years ----- months.

NOTICE: This certificate must be signed by the master or authorized agent of the vessel. Any person defrauding the United States by forging signatures or gaining admission to a hospital when not a seaman will be prosecuted and punished according to sections 5418, 5421, or 5438, Revised Statutes.

This certificate is merely for information of Public Health Service officers at marine hospitals and other relief stations of the Public Health Service. It does not authorize relief by any private agency.

United States Marine Hospitals

Baltimore, Md., Remington Avenue and Wyman Park Drive. Out-patient office, Customhouse.

Boston (Chelsea), Mass., High Street. Out-patient office, Customhouse.

Buffalo, N. Y., 2183 Main Street. Out-patient office, 228 Federal Building.

Chicago, Ill., 4141 Clarendon Avenue. Out-patient offices: 536 Lake Shore Drive, Old Post Office, Van Buren Street Station, East Ninety-first Street.

Cleveland, Ohio, 1041 Lakeside Avenue. Out-patient office, Parcel-post Building.

Detroit, Mich., East Jefferson and Mount Elliott. Out-patient office, Post-office Building.

Evansville, Ind., 1700 West Illinois Street.

Fort Stanton, N. Mex., Public Health Service Tuberculosis Sanatorium.

Key West, Fla., Front and Emma Streets.

Louisville, Ky., Portland Avenue and Twenty-second Street. Out-patient office, Customhouse.

Memphis, Tenn., Delaware and California Streets.

Mobile, Ala., St. Anthony and Bayou.

New Orleans, La., Tchoupitoulas and Henry Clay Avenue. Out-patient office, Customhouse.

Pittsburgh, Pa., Fortieth Street and Penn Avenue.

Portland, Me., Woodford's Station. Out-patient office, Customhouse.

Port Townsend, Wash., Franklin and Quincy.

St. Louis, Mo., 3640 Marine Avenue. Out-patient office, old Customhouse.

San Francisco, Calif., Fourteenth Avenue and Lake. Out-patient office, Appraiser's Building.

Savannah, Ga., York and Abercorn Streets.

Stapleton, N. Y., Bay Street.

Vineyard Haven, Mass.

Ellis Island.

Carvillè, La., Leprosarium.

Hudson Street, New York, N. Y., 67 Hudson Street. Out-patient offices: Barge office; Post-office Building, Thirty-fourth Street and Seventh Avenue; Seamen's Church Institute, 25 South Street.

Norfolk, Va., Hampton Boulevard, Larchmont. Out-patient office, Customhouse.

In addition to the hospitals listed above, the United States Public Health Service maintains relief stations at 126 other ports. The out-patient offices are usually located in Federal buildings. The address may usually be obtained by referring to the local telephone directory. A complete list of relief stations of the United States Public Health Service will be sent to ship masters and vessel owners upon request addressed to the Surgeon General, United States Public Health Service, Washington, D. C.

Excerpts from Maritime Laws

PROVISIONS AND WATER

Should any master or owner of any merchant vessel of the United States neglect to provide a sufficient quantity of stores to last for a voyage of ordinary duration to the port of destination, and in consequence of such neglect the crew are compelled to accept a reduced scale, such master or owner shall be liable to a penalty as provided in section 456S of the Revised Statutes. (R. S. 4564; December 21, 1898, sec. 12.)

Any three or more of the crew of any merchant vessel of the United States bound from a port in the United States to any foreign port, or being of the burden of 75 tons or upward, and bound from a port on the Atlantic to a port on the Pacific, or vice versa, may complain to any officer in command of any of the vessels of the United States Navy, or consular officer of the United States, or shipping commissioner or chief officer of the customs, that the provisions or water for the use of the crew are, at any time, of bad quality, unfit for use, or deficient in quantity. Such officer shall thereupon examine the provisions or water, or cause them to be examined; and if, on examination, such provisions or water are found to be of bad quality and unfit for use, or

to be deficient in quantity, the person making such examination shall certify the same in writing to the master of the ship. If such master does not thereupon provide other proper provisions or water, where the same can be had, in lieu of any so certified to be of a bad quality and unfit for use, or does not procure the requisite quantity of any so certified to be insufficient in quantity, or uses any provisions or water which have been so certified as aforesaid to be of bad quality and unfit for use, he shall, in every such case, be liable to a penalty of not more than one hundred dollars; and upon every such examination the officers making or directing the same shall enter a statement of the result of the examination in the log book, and shall send a report thereof to the district judge for the judicial district embracing the port to which such vessel is bound; and such report shall be received in evidence in any legal proceedings. (R. S. 4565.)

If the officer to whom any such complaint in regard to the provisions or the water is made certifies in such statement that there was no reasonable ground for such complaint, each of the parties so complaining shall forfeit to the master or owner his share of the expense, if any, of the survey. (This section shall not apply to fishing or whaling vessels or yachts; Dec. 21, 1898, sec. 26.) (R. S. 4566; Dec. 21, 1898, sec. 13.)

If any seamen, while on board any vessel, shall state to the master that they desire to make complaint, in accordance with the two preceding sections, in regard to the provisions of the water, to a competent officer against the master, the master shall, if the vessel is then at a place where there is any such officer, so soon as the service of the vessel will permit, and if the vessel is not then at such a place, so soon after her first arrival at such place as the service of the vessel will permit, allow such seamen, or any of them, to go ashore, or shall send them ashore in proper custody, so that they may be enabled to make such complaint; and shall in default be liable to a penalty of not more than \$100. (R. S. 4567.)

CREW ACCOMMODATIONS

Crew space required on vessels constructed between June 30, 1895, and March 4, 1915.—(a) The tonnage of the spaces or compartments occupied by or appropriated to the use of the crew of the vessel. Every place appropriated to the crew of the vessel shall have a space of not less than 72 cubic feet and not less than 12 superficial feet, measured on the deck or floor of that place, for each seaman or apprentice lodged therein. The provisions of this act requiring a crew space of 72 cubic feet per man shall apply only to vessels the construction of which shall be begun after June 30, 1895. Such place shall be securely constructed, properly lighted, drained, and ventilated, properly protected from weather and sea, and, as far as practicable, properly shut off and protected from the effluvium of cargo or bilge water; and failure to comply with this provision shall subject the owner to a penalty of \$500. Every place so occupied shall be kept free from goods or stores of any kind not being the personal property of the crew in use during the voyage; and if any such place is not so kept free the master shall forfeit and pay to each seaman or apprentice lodged in that place the sum of 50 cents a day for each day during which any goods or stores as aforesaid are kept or stored in the place after complaint has been made to him by any two or more of the seamen so lodged. No deduction from tonnage as aforesaid shall be made unless there is permanently cut in a beam and over the doorway of every such place the number of men it is allowed to accommodate with these words, "certified to accommodate — seamen." (August 5, 1882; March 2, 1895.)

Crew space required on vessels constructed after March 4, 1915.—On all merchant vessels of the United States the construction of which shall be begun after the passage of this act, except yachts, pilot boats, or vessels of less than 100 tons register, every place appropriated to the crew of the vessel shall have a space of not less than 120 cubic feet and not less than 16 square feet, measured on the floor or deck of that place, for each seaman or apprentice lodged therein, and each seaman shall have a separate berth and not more than one berth shall be placed one above another; such place or lodging shall be securely constructed, properly lighted, drained, heated, and ventilated, properly protected from weather and sea, and, as far as practicable, properly shut off and protected from the effluvium of cargo or bilge water. And every such crew space shall be kept free from goods or stores not being the personal property of the crew occupying said place in use during the voyage.

Hospital space.—That in addition to the space allotment for lodgings hereinbefore provided, on all merchant vessels of the United States which in the ordinary course of their trade make voyages of more than three days' duration between ports, and which carry a crew of 12 or more seamen, there shall be constructed a compartment, suitably separated from other spaces, for hospital purposes, and such compartment shall have at least one bunk for every 12 seamen constituting her crew: *Provided*, That not more than six bunks shall be required in any case.

Steamboats on the Mississippi, etc.—Every steamboat of the United States plying upon the Mississippi River or its tributaries shall furnish an appropriate place for the crew, which shall conform to the requirements of this section, so far as they are applicable thereto, by providing sleeping room in the engine room of such steamboat, properly protected from the cold, wind, and rain by means of suitable awnings or screens on either side of the guards or sides and forward, reaching from the boiler deck to the lower or main deck, under the direction and approval of the Supervising Inspector General of Steam Vessels, and shall be properly heated.

Washing accommodations on new vessels.—All merchant vessels of the United States, the construction of which shall be begun after the passage of this act, having more than 10 men on deck, must have at least one light, clean, and properly ventilated washing place. There shall be provided at least one washing outfit for every two men of the watch. The washing place shall be properly heated. A separate washing place shall be provided for the fireroom and engineroom men, if their number exceed 10, which shall be large enough to accommodate at least one-sixth of them at the same time, and have hot and cold water supply and a sufficient number of wash basins, sinks, and shower baths.

Fumigation.—Any failure to comply with this section shall subject the owner or owners of such vessel to a penalty of not less than \$50 nor more than \$500: *Provided*, That forecastles shall be fumigated at such intervals as may be provided by regulations to be issued by the Surgeon General of the Public Health Service, with the approval of the Department of Commerce, and shall have at least two exits, one of which may be used in emergencies. (March 3, 1897, sec. 2; March 4, 1915, sec. 6.)

MEDICINES AND ANTISCORBUTICS

Every vessel belonging to a citizen of the United States, bound from a port in the United States to any foreign port, or being of the burden of 75 tons or upward, and bound from a port on the Atlantic to a port on the Pacific, or vice versa, shall be provided with a chest of medicines; and every sailing

vessel bound on a voyage across the Atlantic or Pacific Ocean, or around Cape Horn, or the Cape of Good Hope, or engaged in the whale or other fisheries, or in sealing, shall also be provided with, and cause to be kept, a sufficient quantity of lime or lemon juice, and also sugar and vinegar, or other anti-scorbutics, to be served out to every seaman as follows: The master of every such vessel shall serve the lime or lemon juice and sugar and vinegar to the crew within 10 days after salt provisions mainly have been served out to the crew, and so long afterwards as such consumption of salt provisions continues; the lime or lemon juice and sugar daily at the rate of half an ounce each per day; and the vinegar weekly at the rate of half a pint per week for each member of the crew. (R. S. 4569.)

If on any such vessels such medicines, medical stores, lime or lemon juice, or other articles, sugar, and vinegar, as are required by the preceding section, are not provided and kept on board, as required, the master or owner shall be liable to a penalty of not more than \$500; and if the master of any such vessel neglects to serve out the lime or lemon juice and sugar and vinegar in the case and manner directed, he shall for each such offense be liable to a penalty of not more than \$100; and if any master is convicted in either of the offenses mentioned in this section, and it appears that the offense is owing to the act or default of the owner, such master may recover the amount of such penalty and the costs incurred by him from the owner. (R. S. 4570.)

Care of Bodies After Death

It is not expected that a ship's master will be called upon to embalm a body; and, therefore, the following suggestions refer only to the general care of bodies after death.

Within a very short time after death the muscles become hardened, and the position of the limbs, eyes, jaw, etc., becomes more or less fixed; it is therefore essential that immediately after death the body should be placed in the position desired. For example, the eyelids should be closed; the lower jaw, which often sags, leaving the mouth opened, should be raised to its proper place, and if it will not stay there, a roll of cloth should be placed under the chin, or a bandage may be placed under the jaw and tied over the crown of the head to hold it in place. After a few hours this bandage may be removed. The arms should be folded across the chest, and the legs should be straightened out.

If the patient died of a contagious disease, the body should be carefully and completely wrapped in a sheet which has previously been soaked in a strong solution of bichloride of mercury (one tablet to a quart of water).

If the body is to be buried at sea, it should be prepared for burial by carefully wrapping it in a sheet and then sewing it up tightly in canvas; and a heavy weight should be attached to the feet.

If the body is to be kept on board ship for a day or two, it should be washed, and vaseline should be applied to the face and hands. The anus, mouth, and nostrils should be plugged with cotton saturated with dilute formaldehyde solution (1 part formaldehyde to 7 parts of water). Some embalmers recommend washing the whole body with this formaldehyde solution.

If it is possible to put the body in a refrigerator, it will keep in good condition for some days. Some large ships have special arrangements for such refrigeration. In the absence of such equipment, it is best either to send the body ashore or to bury it at sea.

If the body is to be delivered at the nearest port, it should be turned over to the proper authorities. All available information concerning the deceased, his family, or his friends, together with a history of his illness and any other information regarding the case, should be given to the authorities. The personal property of the deceased should be turned over to the proper authorities, and a receipt should be taken for it. The relatives or friends of the deceased would probably be grateful to the ship's master if he notified them of the death and sent them all the information possible regarding the case and its final disposal. If the body is buried at sea, the personal property of the deceased should be listed and should be checked by a witness and then sent to his relatives or friends. A complete record of the case and its final disposal should be recorded in the ship's log.

GLOSSARY

Abdomen.—Belly.

Abscess.—A local collection of pus.

Acid.—Sour, opposite of alkali.

Acute.—Sharp, sudden, usually severe.

Adhesive.—Sticking plaster of large size used to hold dressings in place and also wound edges together until healing occurs.

Alkali.—Opposite of acid, neutralizes acid. Vinegar is an acid; lye is an alkali.

Anaesthesia.—Loss of feeling.

General anaesthesia.—Sleep under ether or chloroform.

Local anaesthesia.—Production of loss of feeling in a part.

Antidote.—A remedy for counteracting a poison and stopping its action.

Antiscorbutic.—A substance, usually a food, used to prevent scurvy.

Antiseptic.—A substance which will prevent the growth of germs.

Artificial respiration.—Breathing caused by artificial methods.

Bacteria.—Germs; very small forms of vegetable life which can be seen only with the microscope.

Bladder.—The organ which holds urine, located in the lower abdomen.

Blood clot.—Blood which exposed to air has become solid.

Bowel.—Intestine; gut.

Bubo.—Swollen gland.

Capillary.—A very fine blood vessel, too small to see with the naked eye.

Capsule.—A small case made of gelatin for giving bad-tasting drugs.

Cathartic.—A substance which, when taken by mouth, causes a movement of the bowels.

Caustic.—A drug which burns or destroys tissues.

Centigrade thermometer.—One in which freezing temperature reads 0 and boiling water 100°.

Charring.—To turn black.

Clinical record.—A record of occurrences during illness.

Clinical thermometer.—A thermometer used to take the body temperature of a person.

Colic.—Cramp-like pains, especially in the abdomen.

Collapse.—Extreme prostration and depression, with failure of the circulation.

Comminute.—Splintered, broken into small pieces.

Compress.—A wad of cotton or gauze, applied over wounds or over a painful area.

Constitutional.—Throughout the whole body or system.

Contamination.—To become dirty by touching.

Contused.—Bruised.

Counter irritant.—Some substance applied to the skin to produce redness.

Cramps.—Sharp pains due to spasms of muscles, usually come and go.

Crepitus.—A grating sensation which can be felt when broken ends of bones are rubbed together.

Delirium.—Condition in which patient is said to be "out of his head."

- Diagnosis.**—The act of distinguishing one disease from another.
- Digestion.**—The process of preparing food taken into the body for use by the body.
- Dilute.**—Not strong.
- Disinfection.**—The destruction of germs.
- Disinfestation.**—Destruction of vermin.
- Distended.**—Filled, enlarged.
- Epidemic.**—Condition in which there are many cases of a disease.
- Eruption.**—A “breaking out,” as on the skin.
- Excretion.**—A process by which the body disposes of waste, as in urine or sweat.
- Extension.**—To straighten out; to pull.
- Fahrenheit thermometer.**—One in which freezing temperature is 32° and boiling is 212°.
- Fever.**—Higher body temperature than normal.
- Forceps.**—An instrument with two blades for clamping, grasping, or crushing.
- Fumigation.**—The exposure to poisonous gases or fumes (usually with the idea of killing vermin or germs).
- Gangrene.**—Local death of a part.
- Gauze.**—A very thin cloth used for dressing wounds.
- Hemorrhage.**—Bleeding.
- Hypodermic.**—Under the skin.
- Incise.**—To cut.
- Incubation period.**—The time required for a disease to develop after exposure to it.
- Infection.**—The growth of germs, frequently with the formation of pus.
- Inoculation.**—The intentional introduction of a virus to produce a mild form of a disease which will protect against the severe form of that disease.
- Inunction.**—Rubbing medicines or salves into the skin.
- Isolate.**—To separate; to place alone.
- Jaundice.**—Yellowness of the eyes and skin.
- Laceration.**—A torn wound.
- Ligate.**—To tie off, as a blood vessel.
- Ligature.**—A thread for tying a vessel.
- Malinger.**—To pretend; to fake.
- Manipulate.**—To work with the hands; to move and place.
- Mucous membrane.**—The reddish lining of all body cavities which communicate with the air, as the mouth.
- Nausea.**—“Sick at the stomach”; desire to vomit.
- Organism.**—An individual form of life constituted to carry on the activities of life. An animal or plant.
- Papular.**—Composed of papules which are small, round elevations on the skin.
- Pox.**—A term used to designate smallpox or syphilis (great pox).
- Pratique.**—Permission given to a ship that has satisfied the health regulations to enter a port.
- Prevalence.**—To be present and extend widely.
- Prophylaxis.**—The prevention of disease.
- Purgative.**—A medicine which causes the bowels to move freely.
- Pus.**—The creamy discharge from an infected wound.
- Relax.**—To make loose; to slacken.
- Retching.**—Attempts at vomiting without results.
- Rupture.**—To break through.
- Saliva.**—Spit.

Septicemia.—Blood poison.

Serum.—The fluid part of the blood in which the corpuscles float.

Sloughing.—The separation and fluffing out of dead tissue from a wound.

Sterile.—Free of all germ life.

Sterilization.—The process of killing all germs.

Stimulate.—To produce activity or quicken and strengthen action, as of the heart.

Stool.—Material passed from the bowels.

Strangulated.—A condition in which a part is pinched or constricted.

Suture.—A substance used for sewing.

Symptoms.—The complaints and discomforts of a patient indicating disease.

Tincture.—A medicine dissolved in dilute alcohol.

Ulcer.—A local open sore.

Ventilation.—The process of continually supplying fresh air.

Vesicle.—A blister on the skin or mucous membrane and filled with clear fluid.

Vitality.—Life.

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