

**MHI  
Copy 3**

**FM 21-22**

**WAR DEPARTMENT BASIC FIELD MANUAL**

---

**WATERMANSHIP**

---

**WAR DEPARTMENT • 25 APRIL 1944**

CHANNON, R. I.

WAR DEPARTMENT BASIC FIELD MANUAL

FM 21-22

---

# WATERMANSHIP

---



WAR DEPARTMENT •

25 APRIL 1944

---

*United States Government Printing Office  
Washington: 1944*

*For Sale by Superintendent of Documents*

WAR DEPARTMENT,

WASHINGTON 25, D. C., 25 April 1944.

FM 21-22, Watermanship, is published for the information and guidance of all concerned.

[A.G. 300.7 (15 Mar 44).]

BY ORDER OF THE SECRETARY OF WAR:

G. C. MARSHALL,  
*Chief of Staff.*

OFFICIAL:

J. A. ULIO,  
*Major General,*  
*The Adjutant General.*

DISTRIBUTION:

As prescribed in paragraph 9a, FM 21-6: Bn and H 1, 3, 5, 8-15, 19, 28, 35, 55 (5); C 1, 3, 5, 8-15, 19, 28, 35, 55 (20); AAF Sch (200); ASF Sch (200); AAF Unit Tug Cen (500); ASF Unit Tug Cen (500); AAF RTC (500); ASF RTC (500).

For explanation of symbols see FM 21-6.

# CONTENTS

---

	<i>Paragraphs</i>	<i>Page</i>
<i>Section</i>		
I. General .....	1-3	1
II. Swimming .....	4-13	3
III. Safety equipment .....	14-25	18
IV. Abandoning ship .....	26-42	52
V. Operation of lifeboats, rafts, and floats.....	43-45	80
VI. Living aboard life craft...	46-59	86
VII. First aid at sea.....	60-77	103
VIII. Protection against water animals .....	78-93	112
IX. Safety measures and emer- gency procedure in land- ing craft .....	94-99	123
X. Safety measures and emer- gency procedure in river crossings .....	100-104	140
<i>Index</i> .....		144





# SECTION I

## GENERAL

---

**1. GENERAL.** Military watermanship means taking care of yourself on or in the water in any military situation. It combines ordinary swimming ability and knowledge of the sea with common sense and self-discipline.

You may have to travel over water on various types of craft. All sorts of conditions arise where a knowledge of what to do and how to do it may mean the difference between life and death.

Panic due to ignorance is often the main cause of loss of life at sea. Those who know what to do and keep a cool head have little trouble in keeping afloat until picked up.

**2. PURPOSE.** The purpose of this manual is three-fold:

**a.** To give you those basic principles of watermanship that will enable you to meet with confidence any emergency that may arise.

**b.** To teach you certain fundamental practices used during small landing-craft operations.

**c.** To show you how to swim small lakes or rivers under combat conditions.

**d.** This manual does not describe waterproofing of individual equipment and weapons. Such information is covered in existing manuals and publications of the technical services supplying the equipment. The information included is intended to suggest ways and means rather than to prescribe definite rules. Methods must be modified according to the actual situation.

**3. INSTRUCTION.** Training in military watermanship will, to a large degree, consist of actual practice under various conditions. Its objective is to equip you with the knowledge and confidence to take proper steps for your own safety.

## SECTION II

### SWIMMING

---

**4. GENERAL.** Military swimming means swimming in full clothing and equipment to reach your objective in fit condition for action. If shipwrecked far from shore the soldier does not try to swim to shore but tries to keep afloat until he is rescued. Consequently, military swimming includes the basic water skills which conserve energy and which best insure buoyancy for long periods. The soldier must know how to jump from a sinking ship and how to swim under water to escape observation, or strafing, or to avoid surface oil or flame. Basic military swimming therefore includes the following items:

- a. Submerging and floating.
- b. Dog paddle and breast stroke.
- c. Treading water.
- d. Side stroke.
- e. Elementary back stroke.
- f. Jumping.
- g. Underwater swimming.

For swimming instruction see chapter 5, FM 21-20. During practice if the man finds he can do the scissors kick more naturally and effectively than the frog kick, or vice versa, no attempt should be made to change his style.

**5. SUBMERGING AND FLOATING.** **a. Submerging.** Initially, the man must be taught to submerge in shallow water and keep his eyes open. He must learn by experience that it is difficult to stay under water because



[1] *To submerge, raise arms sideward and upward abruptly; stay under as long as possible.*



[2] *To rise again, lower arms sideward and downward abruptly.*

*Figure 1. Bobbing conceals and protects swimmer from enemy fire.*

the buoyancy of air trapped in his chest forces him to the surface. By expelling part of the air he can submerge without effort. He learns how to expel air through his nose under water, and above water to gulp air through his mouth. He gains confidence. In deeper water he is taught how to bob up and down. Bobbing is performed by raising the arms abruptly, sideward and upward, when he wants to go down (fig. 1 [1]); and lowering the arms abruptly, sideward and downward, when he wants to go up (fig. 1 [2]).

**b. Floating.** Floating is the best way to conserve energy. Anyone can float, either motionless or with a slight movement of the arms or legs. To increase body buoyancy the chest is expanded as much as possible. After taking a deep breath further expansion can be accomplished without sucking in air merely by pulling up the stomach with the stomach muscles. Floating, combined with particular arm and leg movements to give propulsion, is swimming.

(1) *Back float* (fig. 2 [1]). This, the best relaxing float, can be accomplished with legs together or apart and arms extended to the side or overhead. With legs together and arms by the side there is a tendency for the legs to sink and drag the body under.

(2) *Jelly-fish float* (fig. 2 [2]). The body is doubled up by bending the legs, pulling the knees to the chest, and dropping the head on the chest. Arms clasp knees. In this position the body will roll forward until only the back is visible above water. The jelly-fish float is used mainly when removing clothing.

(3) *Prone float* (fig. 2 [3]). This is the basic position for all prone swimming strokes. It is performed by lying face down on the water, arms and legs extended. It is used with the face submerged, eyes open, to see under the water, or with the head high, to observe above it.

**6. PRONE STROKES. α. Dog paddle** (fig. 3). This is done from the prone-float position by using the arms and legs in exactly the same manner as when climbing



[1] Use back float to relax. Modify back float to avoid blast injury in water by crossing legs, tensing body, tightening anus; float on very top of surface.



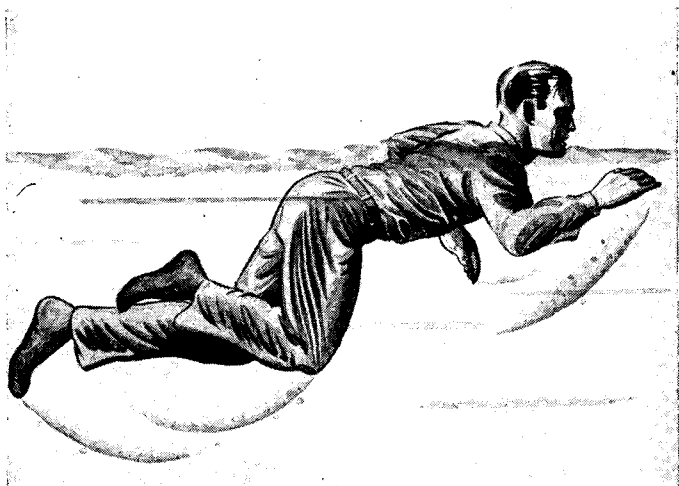
[2] Use jelly-fish float to remove clothing.



[3] Prone float is basic position for all prone swimming; submerge face and open eyes to see under water or raise head high to observe over it; arms and legs are extended.

Figure 2. Conserve strength by floating.

a ladder. The hands, slightly cupped, fingers joined, thumb along the forefinger, reach forward and pull on the water. They reach as far forward as possible without exertion and pull back on the water. The legs push back on the water by being doubled up and extended to the rear. Left leg and left arm, right leg and right arm, work together. Since legs and arms do not break surface, this is a useful stroke for silent swimming.

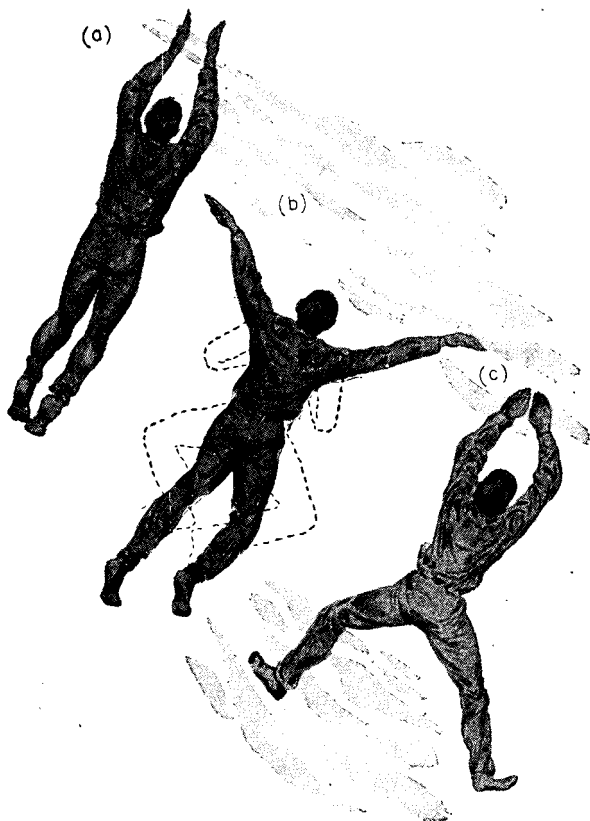


*Figure 3. Dog paddle is elementary swimming stroke; used for silent swimming. Hands reach forward and pull back; legs push away on the water; left leg and arm and right leg and arm work together.*

**b. Breast stroke** (fig. 4). The breast stroke, like the dog paddle, is an extremely easy and relaxed stroke. It can be used in all types of water, calm or choppy, and should be done with the head held high for better observation. It is also used for underwater swimming. This is a good stroke to use when carrying equipment on the back. By splashing with hands and arms on the forward movement, the breast stroke may be used to



push away debris and thin surface oil and flame. For this and other strokes not covered in detail, see FM 21-20.



*Figure 4. Breast stroke is dependable in all situations, in all types of water. Head may be raised or submerged. a. Start with prone float. b. Pull arms to sides horizontally. When arms reach shoulder level, start to draw in legs. Arms and hands meet under chest; legs assume deep knee bend with knees separated. c. Arms lunge forward under water and terminate as at a; legs are lashed out to side straddle hop then return to starting position.*

**7. TREADING WATER** (fig. 5). Treading water consists of standing upright in the water with the feet going through the motions of climbing a ladder. It should be



*Figure 5. Observe while swimming by treading water. Stand upright and move feet as in climbing a ladder; hands push down on the water.*

sufficient to keep the head high out of water. If desired, the hands may be employed to push down on the



[1] Lie on side, one hand lower than other; execute deep knee bend with legs, knees together.



[2] Thrust legs backward and apart, then close them fully extended. At same time thrust lower arm forward and upward and upper hand downward and backward across body.



[3] Pull lower arm back in under chest and carry upper arm forward until position [1] is reached. Legs return to deep knee bend.  
Figure 6. Side stroke most useful for carrying or towing; swim on either side.

water. Treading water is extremely useful when stopping to observe.

**8. SIDE STROKE** (fig. 6). The side stroke may be performed on either side and hence is especially useful if either arm is disabled. This stroke can be used to carry equipment above water or to tow an object or another man. If an item of equipment is too heavy for one man to carry, two men, using the side stroke, can carry the object with their free arms (fig. 7).



*Figure 7. Use one-arm side stroke to carry machine gun. This method can be used by strong swimmers for short distances.*

**9. ELEMENTARY BACK STROKE.** The elementary back stroke is a relaxed stroke derived from the back float. The legs do the inverted frog kick or scissors kick. Arms are raised shoulder high, elbows straight, and then carried to the side, pushing the water towards the feet. When the arms are disabled or when it is necessary to carry equipment above water (fig. 8), arm motions can be omitted.

**10. JUMPING.** For military swimming, jumping into the water is better and safer than diving. It is safer than to chance hurting the head and face by diving into water of unknown depth or into debris. While jumping, it is easier to observe the surface, for instance, to



*Figure 8. Use back stroke to carry equipment. It rests swimmer; restores normal breathing. Inverted frog or scissors kick suffices to make progress; pushing motion of arm from shoulder level toward legs aids progress. All movements occur under water. Strong swimmers can negotiate short distances with equipment in this manner. , Waterproofing of gas mask is described in TM 3-205.*

locate lifeboats on the water. Remove the helmet before jumping. In jumping, the left hand pinches the nostrils together and the right hand clutches the left shoulder or vice versa. The arm across the chest protects the face from impact with the water. The head is held erect. The body is relaxed and straight and the legs are together. (See fig. 9.) In training, jumping should start from about 3 feet and gradually be increased to 25 feet (the average height of a vessel's deck from the water). When the soldier has mastered jumping, he should practice it from various heights while clothed.

**11. UNDERWATER SWIMMING.** In underwater swimming, either the dog paddle or breast stroke is used, the latter being better. The head is held high to see ahead or to see the surface of the water. Underwater swimming is used to escape oil, surface flame, or debris. (See par. 41.)

**12. ADVANCED SWIMMERS.** α. Men who have mastered basic military swimming while clothed should learn the fundamentals of diving, especially surface and shal-



*Figure 9. Position of body while jumping: left hand pinches nostrils; right hand clutches left shoulder or vice versa. Body is relaxed, straight, feet together.*

low diving. Surface diving is helpful when retrieving articles which have sunk in water no deeper than 10 feet. It is executed by ducking the head, rolling forward and downward, pulling backward with the arms and hands, and kicking with the legs. When using it to go under surface oil or flames, legs should be bent and the knees kept close to the chest. If the legs are extended before being completely submerged, they may be burned or covered with oil. The shallow dive can be executed from a running start. It consists of diving forward when slightly above the surface of the water, and arching the body by raising the head and chest and flinging the arms upward so that when the body hits the water it skims along the surface instead of going under. (See fig. 10.) The shallow dive is useful in shallow water or water of unknown depth or when it is necessary to cross a body of water quickly, as when escaping from an enemy shore. From the shallow dive it is easy to go into any strong swimming stroke.

b. Learn the life-saving methods described in chapter 5, FM 21-20, and the various breaks, supports, and carries. Artificial respiration is covered in paragraph 62.



*Figure 10. Use shallow dive in shallow water of unfamiliar deep water. Shove off strongly with feet; arch body by raising head and chest and throw arms upward, body skims over surface when it hits water.*

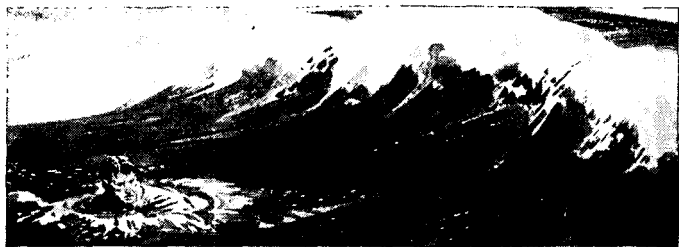
**13. SWIMMING TO SHORE. a. Surf.** In case of shipwreck near shore or of the necessity of swimming to shore from a landing craft sunk or beached on a sand bar offshore, every soldier should know how to protect himself against surf, current, undertow, and tide rip. When approaching a shore, he should take up the breast stroke or dog paddle and survey the conditions of the beach (rock, sand), power of the surf, undertow, tide rip, and existing currents.

(1) Surf is the breaking of the waves on a beach. Undertow is the strong current beneath the surface that sets seaward after the wave has passed over. Tide rip is a condition set up when an outgoing tide opposes and slips under an incoming tide. The line of opposition is usually identified by a line of frothing water. Undertow is only within the first line of breakers; a strong push on the bottom with feet will push the swimmer to the surface immediately after being rolled, putting him in position to collect himself again and try for another landing. There is no cause for fear.

(2) Difficulty also sometimes results from encountering a body of water left between the beach and a sand bar by an outgoing tide. The trapped water may cut a path through the sand bar and create a strong outgoing current through the path and for some distance beyond the sand bar, with comparatively still water on either side. After surveying the beach the swimmer should swim opposite the point selected for landing; or if a current exists, to such a point that by going diagonally across the current the landing spot will be reached. He should remove the life preserver and all other means of support and discard them if possible. The weak swimmer may hang on to them but always should be ready to let go.

(3) Before swimming to shore one should remember the action of any sea animal in swimming through surf. The seal, for instance, disappears outside the line surf and reappears on the shore. It takes advantage of the calm water beneath the breaking waters of the surf. The soldier making a landing should follow its example;





[1] *Look ahead to check direction, look behind for oncoming waves.*



[2] *Bob under breaking wave; do not fight undertow—it exists only short distance below surface and wave action will advance swimmer farther than undertow carries him back.*



[3] *Break through surface and repeat [1] and [2].*

*Figure 11. To swim in surf.*

he should duck under breaking waves. He should use the breast stroke, side stroke, or dog paddle, looking behind to see the waves and looking ahead to check the direction. He should bob under the breaking waves, then come up and swim toward shore continuously looking behind for the next approaching wave. (See fig. 11.) He should not fight undertow and should remember that it exists only for a short distance out below the surface. He must avoid panic and conserve energy. The wave will advance the swimmer more than the undertow will carry him back. He should swim easily until the next breaker comes along and then come in on the forward swell following the breaker. If he can stand on the bottom easily, he should watch the waves more carefully. They vary in size. He should go under the large ones and walk toward shore with the small ones, bracing his feet against returning undertow. He must always be patient even though making only a few feet at a time.

**b. Rocky shore.** In landing on a rocky shore, the swimmer must not allow himself to be hit by a breaking wave. The danger is that a wave will throw him upon the rocks. He must bob under the wave before it breaks and cling to the bottom if possible. The *bottom* is usually calm.

**c. Currents.** He should not swim against the pull of a current; it will exhaust him. Instead he should swim diagonally across its pull without panic and with a strong stroke. Before long the effect will be avoided. Then he should continue swimming toward shore at some other point.

**d. Weak swimmer.** The weak swimmer must remain outside a breaking surf with his life preserver until help arrives. If no aid is available, he must swim along the shore outside the surf and with the current, looking for an inlet to a river or bay, a long jetty, or a point where the surf breaks only when close to shore.

## SECTION III

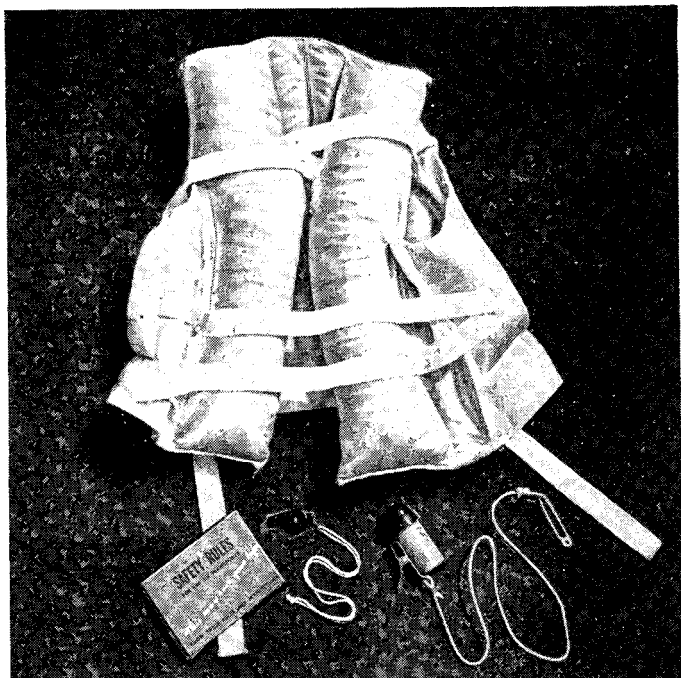
### SAFETY EQUIPMENT

---

**14. GENERAL.** **a.** Safety equipment aboard a troop transport includes life preservers, lifeboats, life rafts, life floats, life nets, ladders, ropes, and lifebuoys. Additional equipment will be found in lifeboats and life rafts. Unit commanders will take immediate steps to have the use of safety equipment explained to all soldiers and to conduct such drills and training as may be prescribed for the particular vessel. Instruction will be given in use of lifeboats, life rafts, life preservers, and the rules to be followed in abandoning ship. Every man boarding a vessel is given a life preserver, a life-preserver light, a whistle, and a pamphlet of safety rules. (See fig. 12.) Equipment not self-explanatory will have printed instructions. A single-blade jackknife may also be issued.

**b.** Each man should check his own equipment, provide himself with  $\frac{1}{4}$ - to  $\frac{3}{8}$ -inch line of convenient length, and improvise a canvas or paulin container for personal essentials needed in an emergency. If canvas is unobtainable, use sacking or old clothes. A line is indispensable aboard ship or in the water; in spare time, use it to practice tying knots and lashings.

**15. LIFE JACKETS.** **a. Description.** The life jacket has cotton tape straps 12 inches long, so placed as to allow the jacket to be reversed. Each jacket will support at least 20 pounds downward pull of gravity for 24 hours. The buoyant material may be cork or balsa blocks,



*Figure 12. Individual safety equipment aboard transport: kapok life jacket, safety rules, whistle, and life-preserver light (red, flashlight).*

granulated cork, or kapok. Kapok jackets are most widely used because they are more comfortable, warmer, and safer to use. The hard cork or balsa jacket when jumping is forced up against the jaw by impact with water.

**b. Uses and exceptions.** (1) Kapok life jackets are worn—

(a) At all times when vessel is outside inland waters.

(b) When jumping from transports of moderate free-board (distance from waterline to deck) and tugs and harbor craft.

(c) When floating or swimming.

(d) When aboard lifeboat, float, or raft.

(2) Balsa and cork jackets are worn—

(a) At all times when vessel is outside inland waters.

(b) When floating or swimming.

(c) When aboard lifeboat, float, or raft.

(d) When jumping from vessels of not more than 10-foot freeboard. Hug jacket tightly until under surface.

(3) Life jackets are not worn—

(a) When jumping from great heights. Tie jacket to your person in such cases; it will follow you into water.

(b) When jumping into flame or oil-covered surface. (See par. 37.)

(c) When swimming through flame or oil, or under water. (See par. 41.)

**c. Putting on life jacket.** Bend over and pass one arm through the jacket (fig. 13 [1]); straighten up, throw the jacket over the shoulders, and insert other arm. A double bowknot (tie a loose, ordinary bowknot; before closing it pass one bow through opening in knot a second time) is used to tie the straps. Any other knot, especially when wet, is difficult to untie in an emergency. The lower inside straps are tied first (fig. 13 [2]), then lower outside and upper outside straps. Life jacket must be tied properly, securely, and snugly (fig. 13 [3]); otherwise it may become necessary to use the hands to hold jacket on while floating.

**16. LIFE-PRESERVER LIGHT AND WHISTLE** (fig. 13 [3]). The waterproof life-preserver light, battery-operated, attracts attention to the floating survivor. It is turned on by screwing on the red cap as far as it will turn. The light has a cord and large safety pin by which it is pinned to the jacket. It also has a clip on its side by which it is attached high on the jacket to gain maximum visibility and to keep it out of water. The life-preserver light is red to distinguish floating per-



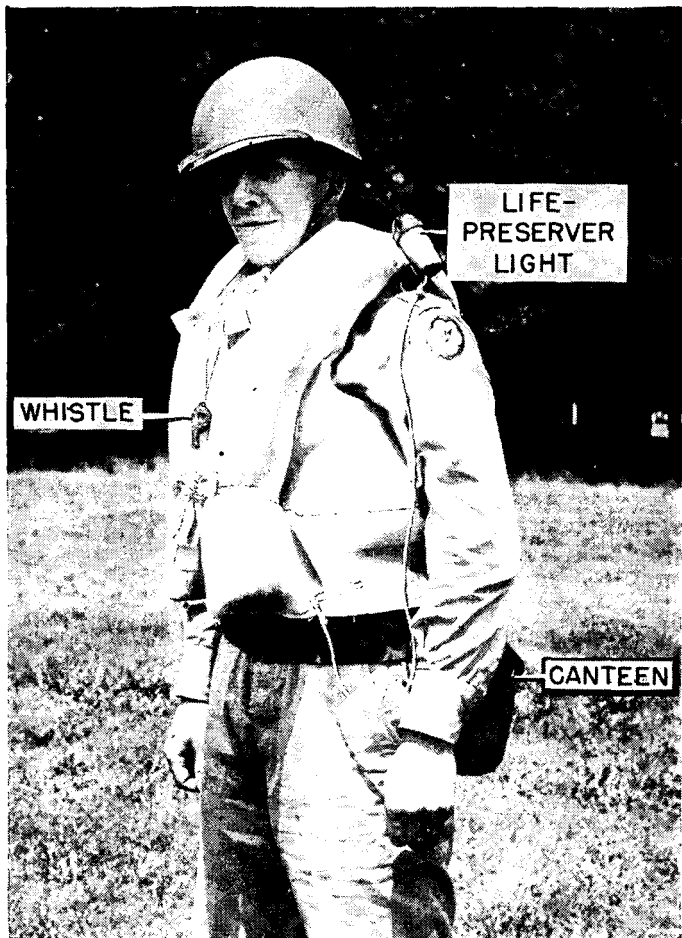
[1] *Bend over, pass one arm through jacket, straighten up, throw jacket over shoulders and insert other arm.*

*Figure 13. Putting on life jacket.*



[2] *First tie lower inside strap with double bowknot.*

*Figure 13. Putting on life jacket—Continued.*



[3] *Lower outside and upper outside straps are tied last. Finally secure individual safety equipment.*

*Figure 13. Putting on life jacket—Continued.*



sonnel from floating equipment, which shows a white light. The whistle, worn at all times fastened to a cord around the neck, also is valuable to attract attention. Immersion in salt water for a long time may affect the voice but it will still be possible to blow a whistle. Carbon dioxide life belts are ordinarily issued to amphibious troops. Description and use of these belts are detailed in paragraph 95.

**17. LIFE NETS. a. General.** Life nets or cargo nets are normally hung over the side of a ship and are used as broad ladders for disembarking into landing craft or abandoning ship. Their width allows four to six men to climb down abreast, and all men should know how to use them quickly and safely.

**b. Descending nets.** Four to six men abreast start over the ship's side simultaneously, *left foot first*. The left foot is always swung over first whether descending from our own or allied vessels. When the first line of soldiers has descended halfway, another line starts over the side. Thus there are always a line of soldiers starting over the side, a line halfway down, and a line at the lower end of the net.

**c. Methods of descending.** There are two methods of climbing down life nets.

(1) Hands grasp a single vertical strand, the feet being on the horizontal strands on either side of the vertical strand. (See fig. 14 [1].)

(2) Hands grasp the outside strands of a group of three vertical strands, the feet being on either side of the center strand. (See fig. 14 [2].)

(3) In either method the man grasps vertical, not horizontal, strands of the net so that his hands will not be stepped on by a man descending above him. Hands are well above the head, head up, feet skipping one square at a time. Longer steps slow the descent. Look up, not down.

**d. Dropping from net.** In vessels not combat-loaded the nets may not reach the water and it may be necessary to drop from the end of the net. To drop from the

net, place both feet on the same horizontal strand near the bottom of the net. Now bring the hands down until the body is hanging in a crouched position with arms



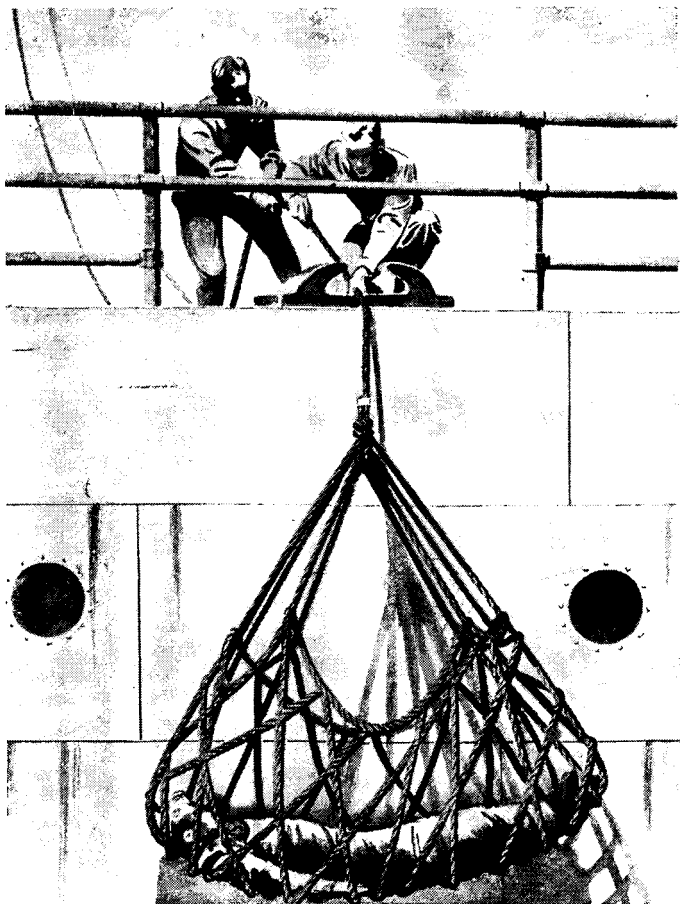
Figure 14. Descend life net, [1] by grasping single vertical strand with feet on horizontal strands on either side of vertical strand; [2] by grasping outside strands of group of three vertical strands with feet on either side of center vertical strand.

bent. Kick with the legs (fig. 15 [1]) and push with the hands, bringing the body vertical as you drop into the water (fig. 15 [2]).



Figure 15. Jumping from life net. [1] Place feet on same horizontal strand nearest bottom of net; descend into a crouch using hands, arms are bent. [2] Shove off with hand and feet, and straighten body.

**e. Lowering survivors.** To lower a disabled survivor over the side, place him in the middle of an unattached cargo net, bring the lengthwise net corners together, and



*Figure 16. Lower disabled survivor using a cargo net. Lengthwise corners are gathered and secured to lowering line.*

attach a lowering line to them. By this means the disabled survivor can be lowered any required distance to the lifeboat or raft with the least risk of further injury. (See fig. 16.)



*Figure 17. Descend boom ladder one rung at a time hand under hand using either rope, place leg on either side; keep rung ends pointed at body. Leg and arm on same side move together.*

**18. BOOM LADDERS.** These are rope ladders with round wooden rungs, hung from a boom or other projection over a ship's side. They may be descended hand under hand on either rope, placing a leg on either side with the rung end toward the body; descend one rung at a time, leg and arm on the same side working together. Thus, two men can use the ladder simultaneously. (See fig. 17.)

**19. JACOB'S LADDERS.** These are rope ladders with flat steps. Hands grasp the vertical ropes and feet skip one step at a time. Hand and leg on the same side move together.

**20. SINGLE ROPES. a. General use.** Ropes of various sizes and lengths are usually on deck. They can be attached to parts of the ship and thrown over the side to descend to the water. It is always better to climb down the side than to jump off a ship.

**b. Methods of descending ropes.** Climb over the side and grasp the rope with the feet before grasping with the hands to go down hand under hand. Grasp the rope one hand over, not on, the other. Arms are slightly bent. There should be a sensation of holding and gripping, rather than hanging. Descend slowly, hand under hand.

**c. Leg grips.** The leg grip depends on the tautness or slackness of the rope, its size and weight, the length of descent, and the condition of the hands.

(1) *Taut rope* (fig. 18). On a taut rope the legs are crossed with one knee drawn up and the toes lifted. The rope runs along the inside of this leg, over the front of the ankle, and down the outside edge of the foot. The other foot is crossed over so it clinches the rope between the outside edges of the feet near the heels. Applying pressure with knees and feet slows the descent.

(2) *Loose rope.* When the rope is sufficiently loose either of two leg grips may be used.

(a) *Stirrup grip* (fig. 19 [1]). Legs are straight and held together. The rope lies along the outside of one



*Figure 18. Descend taut rope hand under hand, with legs crossed, one knee drawn up, and toes pointed up. Rope runs along inside of leg with knee drawn up, over front of ankle and down outside edge of foot. Other foot is crossed over to clinch rope along outside edges of feet near heels. Apply pressure with knees and feet to slow descent.*

leg, under the foot and over the foot of the other leg. Pressure of one foot against the other regulates the speed of descent. Hand under hand method may be used or the hands may slide together, taking a firm hold when foot pressure stops the descent. If the hands are disabled the rope is hugged with the arms, possibly with a half turn around one arm and with the other arched against it to check the slip.



[1] *Rope lies along outside of one leg, under foot of that leg, and over foot of other leg. Pressure of feet regulates descent.*

*Figure 19. Leg grips on loose ropes.*

(b) *Secure foot grip* (fig. 19 [2]). This grip is best for long descents where the arms may need to be rested. The rope drops between the legs and across the instep of one foot. The other foot steps on the rope where it crosses the instep and, by applying pressure, grasps or releases it.

**d. Knotted ropes.** (1) Ropes used for abandoning ship usually have knots at frequent intervals. (See fig.





[2] *Rope lies between legs and across instep of foot. Pressure of other foot upon rope acts as brake.*

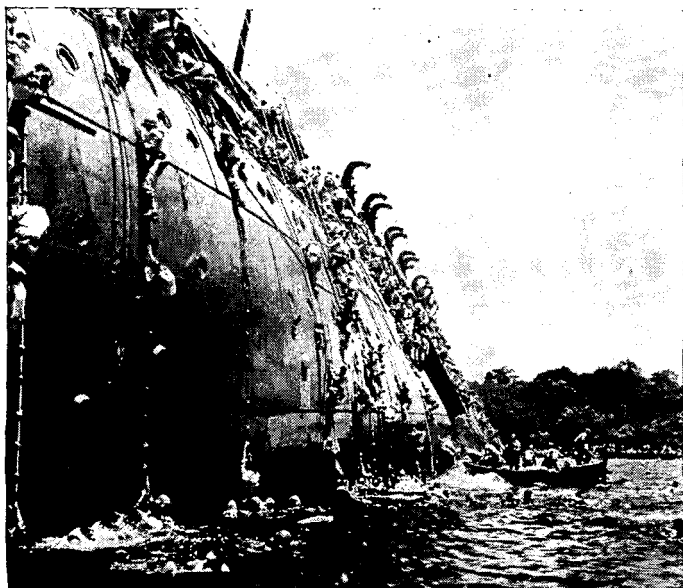
*Figure 19. Leg grips on loose rope—Continued.*

20.) The feet and hands can easily grasp the rope just above the knots, allowing some muscular relaxation and preventing slips and rope burns. The feet are kept together, pressing the rope between the insteps. Legs and arms are slightly bent.

(2) Grasp the rope with the hands just above a knot. Release the feet and lower them on to the next knot. Hold with the feet and bring the hands down one knot.

**e. Deliberate descents.** Rope descents should be deliberate and unhurried, legs and feet applying pressure to prevent arm strain and the consequent slipping and hurrying. Long or fast drops or slipping will cause severe rope burns. Skillful use of the feet and legs is the surest safeguard.

**f. Discipline.** When a single rope is being used by several men either at the same time or in succession they should space themselves so that they do not crowd up,



*Figure 20. Photograph of use of knotted ropes in abandoning U.S.S. President Coolidge.*

but keep well separated. Discipline must be maintained, and groups retained in control. Look out for other men coming down ropes. A man above may slip and fall heavily on the man below.

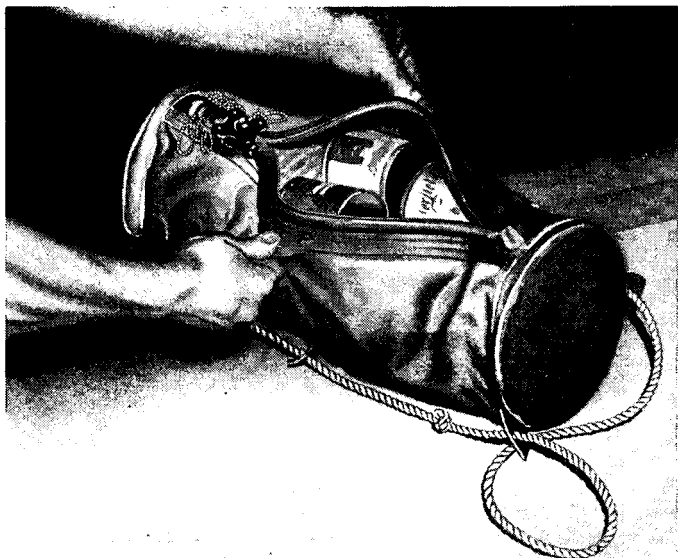
**g. Climbing a rope.** The rope is grasped with the hands as far up as possible and, holding with the hands, the legs are brought up as high as possible and grip the rope, using the taut leg grip. The hands are relaxed and reach for a new hold above (fig. 21 [1]); the legs are moved up for a new grip (fig. 21 [2]) and the rope then is climbed by alternately pulling with the hands and holding fast with legs.



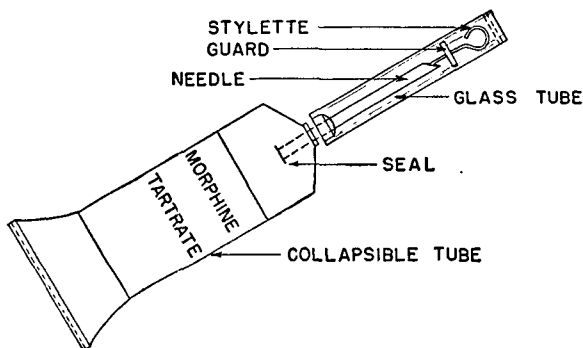
*Figure 21. Climbing a rope. [1] Grasp rope overhead to [2] limit of reach; use taut leg grip (fig. 18). Pull legs up high and "brake" rope; relax hands and reach for new grip.*

**21. ABANDON-SHIP KIT** (fig. 22). All vessels of 3,000 gross tons and over carry at least two abandon-ship kits. The following items, composing the kit, are packed in a watertight container:

- 20  $\frac{1}{4}$ -grain syrettes of morphine.
- 48  $\frac{1}{2}$ -gram tablets of sulfadiazine in bottle.
- 10 Navy-type, watertight packages containing  $2\frac{1}{2}$  grams of crystalline sulfanilamide.
- 4 ounces of oil-cleaning solution, in bottle with screw cap.
- 5 4-ounce tubes of 5 percent sulfadiazine—10 percent tannic-acid jelly.
- 2 chemical heating pads.



*Figure 22. Abandon-ship kit.*



[1] Surette consists of glass-tube shield, collapsible tube and needle.



[2] Remove shield; hold wire stylette by hook and push through needle into syrette thus breaking seal. Withdraw wire. Puncture skin of arm or shoulder with needle held at 45° angle; squeeze tube until flat; withdraw needle.

Figure 23. Morphine tartrate syrette and method of injection.

The kits are kept in separate locations. The master of the ship designates officers to take the kit if it becomes necessary to abandon ship. The kit is buoyant. Usually it is kept sealed, but it may be opened by the master of the vessel for inspection or by inclusion of extra items such as cigarettes or aspirin. The kit must not be so overloaded that it loses its buoyancy. The case is marked with orange or chrome yellow. The kit will also contain three copies of the following directions:

*For Giving Morphine*

1. Remove the transparent shield from end of syrette. (See fig. 23[1].)
2. Holding wire by loop, push wire through needle into syrette, thus breaking seal. Withdraw wire.
3. Stick needle under skin of arm or shoulder, at an angle of  $45^\circ$ , and squeeze until tube is flat. (See fig. 23 [2].)
4. Withdraw needle and throw away syrette.
5. Additional injections may be given every 3 hours as long as necessary.

*For Using Sulfadiazine Tablets*

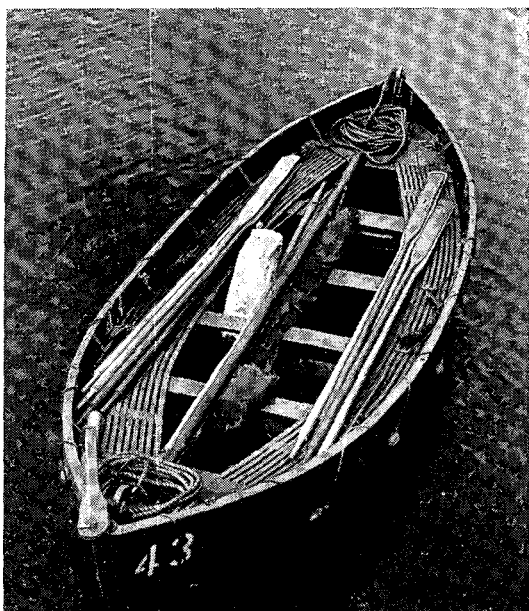
Give each wounded or burned man a single dose of eight tablets, and no more.

*For Sulfanilamide Powder*

Open package of sulfanilamide and sprinkle powder directly into wound; then apply a compress and bandage. Sulfanilamide, properly used, will prevent or arrest infection.

*For Using Oil-Cleaning Solution*

The solution is for removing fuel oil or the like from eyelids, nose, and lips. A pledget of cotton or a small piece of cloth is saturated with oil-cleaning solution and rubbed lightly over the skin until oil is removed. To allay or prevent infection or irritation of eyes from fuel oil, eye ointment from first-aid kit should be used.



[1]

*Figure 24. Lifeboat and equipment.*

#### *For Using Tannic-Acid Jelly*

Apply thick layer of jelly to gauze compress, obtained from first-aid kit, of sufficient size to cover the burned area completely. Lay this dressing on the burn and hold in place with a bandage loosely tied. On small burns jelly may be used without a dressing, if desired. If, when changing, dressing tends to stick, soak compress in fresh or sea water to loosen it.

#### *For Using Chemical Heating Pads*

Chemical heating pads supply heat to bodies of person suffering from shock. (See par. 63.) Patient must be kept warm. The chemical heating pad may be ap-



[2]

*Figure 24. Lifeboat and equipment.—Continued.*

plied to localized parts of the body to supply heat to those parts. Wrap the pad in cloth or clothing to prevent burning the skin. Directions are on heating pad.

**22. LIFEBOATS.** Every ship carries enough lifeboats and rafts, equipped with food, water, medical equipment, and other items, to accommodate all persons on the ship. (See fig. 24[1] and [2].) On combat-loaded vessels powered landing craft replace most of the lifeboats. Lifeboat equipment has been carefully chosen to aid men to survive exposure and to attract attention of rescue craft. The soldier will find in a lifeboat the equipment listed below. This equipment is fastened



to the boat to prevent loss during rough weather or in capsizing. It is kept to a minimum, to interfere as little as possible with the men in the boat. Passenger capacity is marked on each side of the boat.

**a. Bailer.** Metal or wooden scoop with lanyard attached, for bailing water.

**b. Bilge pump.** Pump made of materials not readily deteriorated by salt water, permanently fastened well down in center line of the boat. It has a removable strainer. Pump requires priming when dry. This is done by removing cap or plug from the T-fitting on discharge side of pump, pouring about a quart of water into the chamber, and replacing cap or plug.

**c. Blankets.** Each boat has at least six woolen blankets in waterproof containers, for use of sick and injured.

**d. Boathooks.** Two white ash boathooks, 8 feet long and  $1\frac{1}{2}$  inches in diameter, for fending and retrieving objects fallen overboard.

**e. Bucket.** One 2-gallon galvanized iron bucket with lanyard attached.

**f. Canvas hood and side spray curtain.** This provides shelter from wind, sea, and sun. The curtain may be held in place by rods installed in rowlock sockets and is transferred from side to side according to direction of wind.

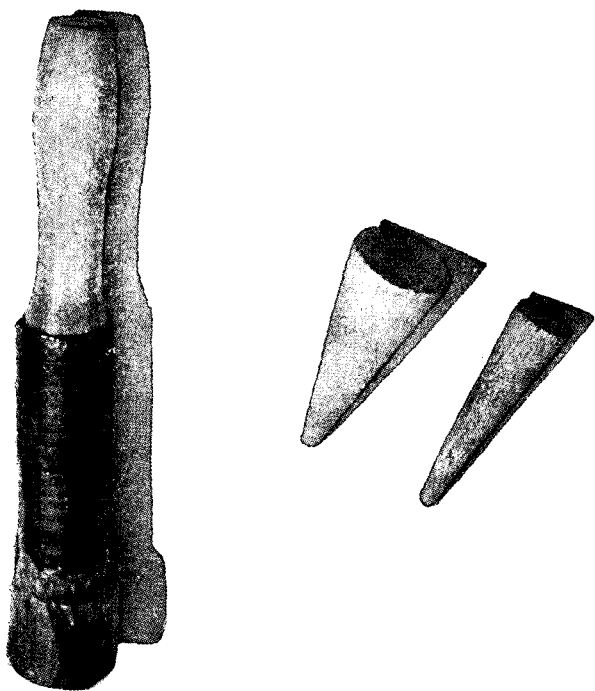
**g. Chart, pilot.** This tells the natural ocean currents and prevailing winds. When abandoning ship all persons are told approximate position of vessel so they can use chart effectively.

**h. Compass.** One liquid compass. If the liquid has evaporated, fresh water may be added, although it will corrode metal parts. The compass should be held as high as possible with its lubber's line directly over and parallel to the center line of the boat. This height lessens effect of metal equipment. On vessels equipped with degaussing or demagnetizing equipment as protection against magnetic mines, the compass may become demagnetized, but it will return to normal after a short time. Therefore, check it with sun or stars before relying

on it fully. If inaccurate, keep it since it can be used after it returns to normal.

**i. Daytime distress signals.** Four self-contained smoke signals which will give a large volume of orange- or reddish-colored smoke while floating on the surface. They should be thrown overboard to leeward. Leeward means downwind—the direction toward which the wind is blowing and not against it.

**j. Distress lights** (fig. 25). Twelve self-igniting red lights in a watertight metal case. They give a brilliant red flame of 500 candlepower for 2 minutes. Lights should not be removed from case except for use. Flare



*Figure 25. Bullet-hole plugs and distress light.*

must be held to leeward to prevent burning particles from falling on persons in lifeboat.

**k. Ditty bag.** Canvas bag containing sail twine and needles.

**l. Drinking cups.** At least three drinking cups of rust-resisting material, lanyard attached. Cans are saved to give men receptacles for eating and drinking.

**m. Drinking water.** In each lifeboat, minimum amount of fresh water in quarts is 15 times carrying capacity marked on each side of boat. Water is stored in metal tanks or in wooden kegs, called breakers. Rust in drinking water is harmless. Each container is legibly marked with its capacity in U. S. gallons. All available containers should be used to collect rain water to augment the water supply.

**n. First-aid kit.** A first-aid kit containing the equipment listed below and packed in a strong, watertight container is provided in each boat:

2 units—1-inch adhesive compress, each unit containing 16 compresses.

1 unit—ammonia inhalant, four tubes, 2 cc. per tube; and 4 drinking cups.

1 scissors, blunt.

1 unit—gauze compress, 24 by 72 inches.

2 units—3 ounces tannic acid jelly in not less than two tubes. The jelly is 10 percent tannic acid with 5 percent sulfadiazine.

1 unit—3 eye pads, adhesive strips; 3 tubes eye dressing not less than  $\frac{1}{8}$  ounce each.

1 unit—3 vials of iodine, 10 cc. each.

1 unit—4-inch bandage compress.

2 units—4 each, 2-inch bandage compress.

1 unit—triangular bandage, 40-inch.

1 unit—6 yards of 4-inch gauze bandage.

2 units—containing tourniquet and forceps.

1 unit—splint-wire or equivalent.

1 dozen safety pins.

**o. Fishing kit** (fig. 26). This kit is packed in a metal, waterproof, key-opening can. Marking on container reads, "Emergency Fishing Kit—Open Only for Actual

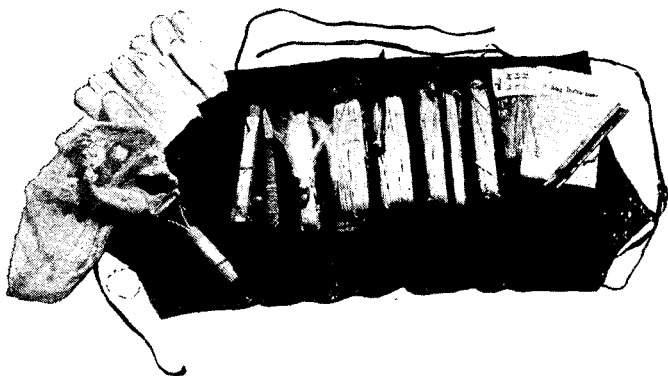


Figure 26. Emergency fishing kit.

Emergency Use." Simple and complete instructions for use of kit, printed on waterproof paper, are included with kit.

**p. Flashlight.** One portable, watertight, focusing flashlight with one extra lamp and three extra batteries.

**q. Grab rails.** Grab rails attached to outside of each lifeboat near the waterline and extending about two-thirds length of boat. They provide means of clinging to boat if overturned.

**r. Hatchets.** A single-edge hatchet, lanyard attached, at each end of the boat.

**s. Illuminating oil.** One gallon of oil for lantern.

**t. Lantern.** One lantern with enough oil to burn 9 hours. Two additional wicks.

**u. Lifeline.** A rope running entire length of each side, and fastened to boat at about 3-foot intervals. Small floats are on the rope between fastenings. The lines are for swimmers to grasp when reaching the boat.

**v. Life preservers.** Two life preservers which can be given men lacking preservers or used with rope attached to throw to men in the water.

**w. Locker.** A locker or box for storage of small items such as signal flag, ditty bag, bullet plugs, matches, com-

pass, signaling mirrors, drinking cups, first-aid kit, lantern, extra batteries and wicks, and fishing kit.

**x. Manila line.** About 180 feet of 1-inch rope for general use.

**y. Mast and sails.** A mast with at least one main-sail and jib, with necessary gear, protected by a canvas cover.

**z. Matches.** Three boxes of friction matches in a watertight container.

**aa. Oars.** A total of seven to nine oars including one steering oar.

**ab. Painters.** Manila rope secured to bow to make the boat fast. Used, when lowering lifeboat, to keep boat attached to ship.

**ac. Plugs.** Two plugs, attached to boat with chains, used to fit into drain hole in the bottom of the boat. The drain hole is kept plugged except when draining. However, check bottom of lifeboat to see the plug is in.

**ad. Propellers.** Hand-operated propellers to maneuver the lifeboat away from the sinking ship.

**ae. Provisions.** Each boat carries the following provisions for each person the boat is certified to carry:

23 ounces of biscuits (C ration).

14 ounces of pemmican.

14 ounces of milk tablets.

NOTE. 14 ounces of chocolate tablets may be substituted for 14 ounces of biscuits.

**af. Oarlocks.** A sufficient number of oarlocks are furnished, attached to boat by separate chains. These are inserted into place on top of boat sides and oars are then placed inside them.

**ag. Rudder and tiller.** A rudder and tiller to be fitted to it.

**ah. Sea anchor.** A conical-shaped anchor of canvas into which a conical container of storm oil may be fastened, see ai below. When riding out a storm the sea-anchor line runs over the bow to keep the boat headed into the wind and thus prevent capsizing. A boat anchor, a bucket on a line, three oars lashed into

a triangle and weighted, or a similar device will serve as a sea anchor if it provides drag.

**ai. Storm oil.** A container holding 1 gallon of vegetable or mineral oil. It is fitted with two valves, one at each end, which should be opened slightly to allow a slow seepage of oil. The oil tends to reduce the forming of waves by wind and breaking of seas. Lashing rings are provided on the container to secure it inside the canvas tip of the sea anchor.

**aj. Signal flag.** A yellow or bright orange bunting, 4 feet 6 inches by 8 feet, with ties for attaching to a staff for signaling rescue parties. To signal airplanes two men hold ends of flag and tilt it from side to side.

**ak. Signaling mirrors.** (1) Two polished metal mirrors with about 20 square inches of reflecting surface on each side and a sighting hole in center. They are coated with grease and wrapped in a container marked "signaling mirrors." In clear weather flashes may be seen up to 10 miles. Any reflecting surface such as a flattened tin can or wet blade of an oar, may be used.

(2) *To use signaling mirror* (fig. 27)

(a) Face a point about half-way between sun and observed object.

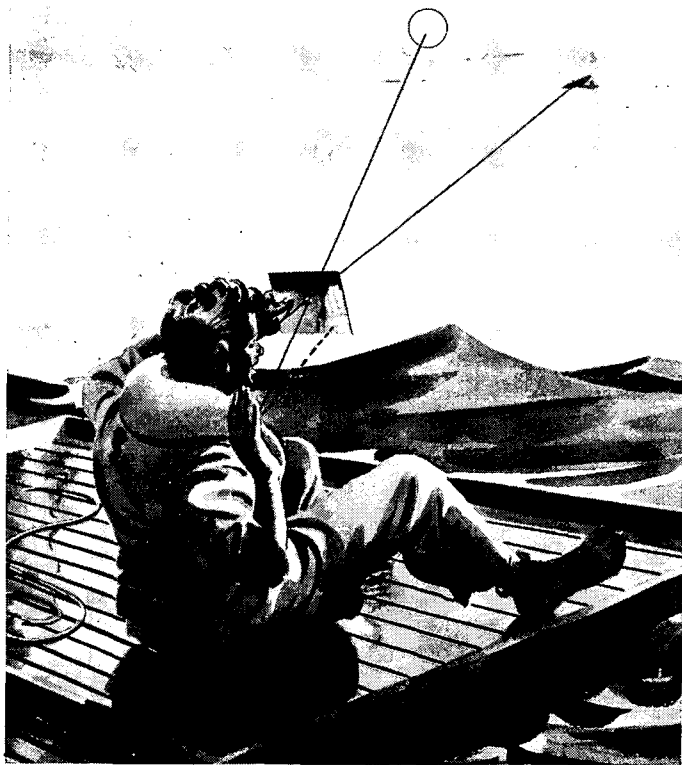
(b) Hold mirror in one hand about 4 inches from the face, and through hole or cross in mirror, sight object to be signaled.

(c) Hold the other hand about 12 inches behind mirror in line with sun and with the hole through the mirror, so a small spot of light appears on the hand. The spot of light on the hand is reflected on the side of the mirror facing the user.

(d) Now tilt mirror so the spot of light on it disappears through the hole in it, keeping the observed object sighted through the hole. In this position sunlight will be reflected to the observed object.

(e) Practice flashing from bow to stern to acquire efficiency in its use.

NOTE. When angle between sun and observed object is small, the spot of light will appear on the face of the observer, thus allowing both hands to be used in tilting mirror.



*Figure 27. To use signaling mirror: a. Face point about half-way between sun and observed object. b. Hold mirror in one hand about 4 inches from face and sight object to be signaled through hole or cross in mirror. c. Hold other hand about 12 inches behind mirror in line with sun and hole through mirror so that small spot of light appears on hand and is reflected to back face of mirror (side toward observer). d. Tilt mirror so that spot of light on mirror disappears through hole, at the same time keeping observed object sighted through hole. e. When angle between sun and observed object is small, spot of light will appear on face of observer thus allowing both hands to tilt mirror.*

**al. Signal pistol** (fig. 28). A signal pistol with lanyard attached and 12 parachute signal cartridges are contained in a watertight metal case. The cartridge will give off a brilliant red flame of 20,000 candlepower at a height of 150 feet for about 30 seconds. Even by day the bright light or the smoke may attract rescue parties.

**am. Bullet-hole plugs** (fig. 28). About 25 soft wood conical plugs  $\frac{3}{8}$  inches long and tapered from  $\frac{3}{4}$ - to  $\frac{1}{4}$ -inch diameter for plugging bullet holes. To fill jagged holes cloth may be wrapped around the plugs for insertion.

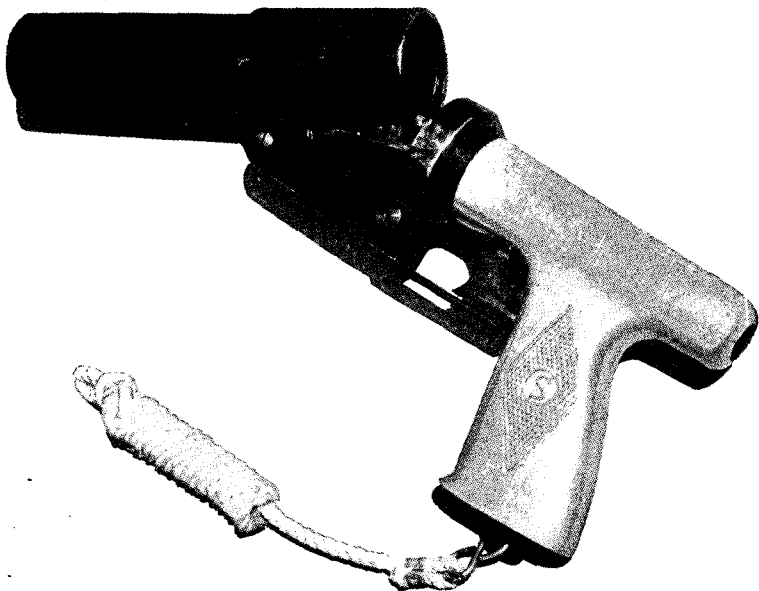
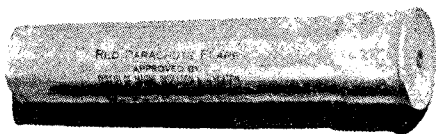
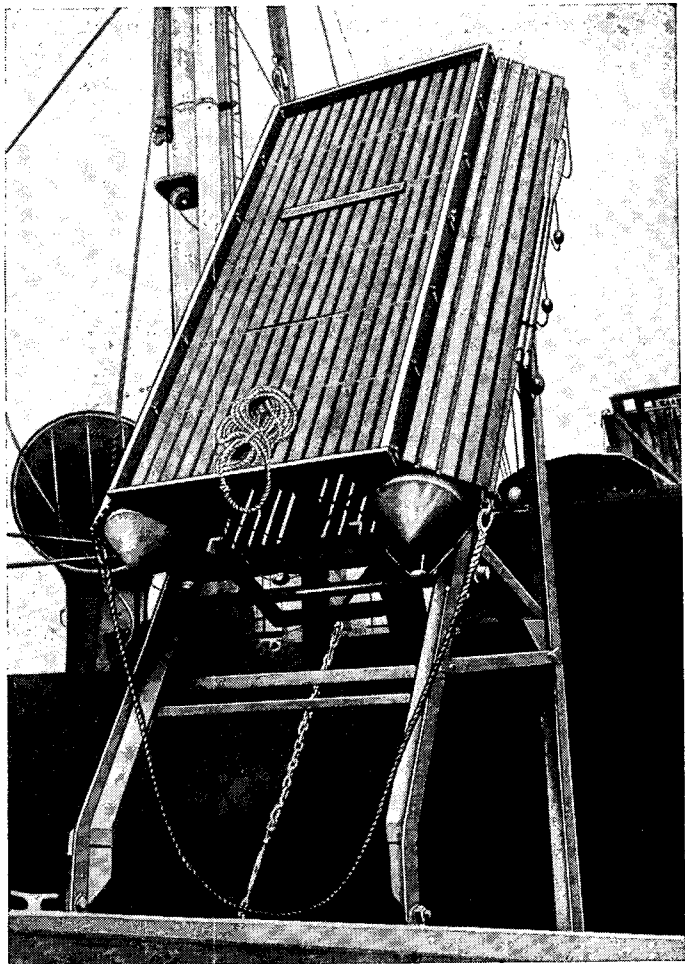


Figure 28. Signal pistol.





*Figure 29. Life raft on skids ready for launching.*

**23. LIFE RAFT** (fig. 29). **a.** Life rafts are of several different types. They are stowed on ships on skids or launching ways so they may be easily released into the water either by a tripping device or automatically when the ship sinks. Rafts will hold from 5 to 20 persons and are provided with equipment according to their normal capacity. Rafts may be used either side up. Equipment is kept in a compartment which can be reached through a trap door on either side or is kept lashed to the sides of the raft.

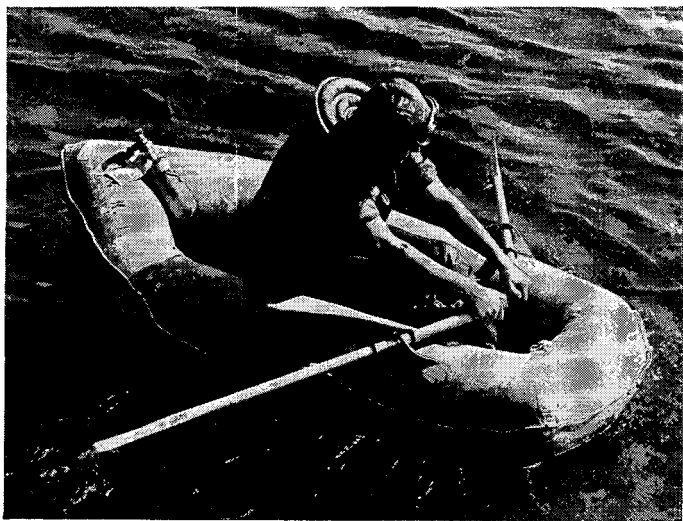
**b.** Equipment consists of items similar to those found in a lifeboat, and is used the same way. It consists of:

- 2 bridles for making fast to painter at each end of raft.
- 12 distress lights.
- 2 enameled drinking cups.
- 3 quarts of drinking water per person.



*Figure 30. Carley float released into water.*

- 1 first-aid kit.
  - 1 fishing kit.
  - 1 life line.
  - 90 feet of  $\frac{3}{4}$ -inch manila line.
  - 1 box friction matches.
  - 4 oars.
  - 1 painter.
  - 5 oarlocks.
  - 1 sea anchor.
  - 1 self-igniting water light.
  - 1 signal flag.
  - 2 signaling mirrors.
  - 1 gallon of storm oil.
  - 25 bullet-hole plugs.
- Provisions



*Figure 31. One-man carbon-dioxide rubber boat.*

**24. LIFE FLOATS.** **a.** A life float (fig. 30) is another type of emergency buoyancy equipment that may be available. It is a doughnut-type float of at least 15-person capacity that is launched overboard or floats free of sinking ship.

**b.** A white electric water light is attached to each float by a suitable lanyard. At least two paddles are lashed to the sides. Other equipment aboard a float will vary with the type of vessel but all of it will be lashed securely by suitable lanyards which travel completely around the float. This type of lashing permits easy access to equipment even if the float has been launched bottom side up.

**25. CARBON-DIOXIDE RUBBER BOAT** (fig. 31). This is a collapsible rubber boat self-inflated by carbon dioxide contained in a large bulb with a hand valve. The boat has bags along the inside for equipment. Equipment varies with the type of boat but usually includes:

- 1 compass.
- 1 first-aid kit.
- 1 fishing kit.
- 2 collapsible oars.
- Provisions.
- Sail fabric.
- Signaling mirror.
- Smoke grenades.
- Water.

## SECTION IV

### ABANDONING SHIP

---

**26. GENERAL. a. Assignments.** Men will be assigned abandon-ship stations and shown the routes to them. Often, these routes will be marked by arrows painted on the floor of passageways. Lifeboats or rafts will also be assigned; learn the number and location of these so well you can find them in the dark.

**b. Inspection of equipment.** Since men are moved frequently to give others an opportunity to share the limited bunk space, platoon commanders inspect the equipment of every soldier at least once every 3 days.

**c. Counterintelligence.** Blackout at night, use of ship's head (latrine) at prescribed times, and the prohibition against throwing overboard garbage or other matter are rigidly enforced. Other counterintelligence measures are prescribed for each ship.

**d. Abandon-ship drills.** These are held at different hours, without warning, and simulate real emergencies as far as possible. Drills are first held by day to enable men to become familiar with locations of ladders, cables, equipment, and projecting parts, so they can find their way to stations in the dark. Drills in the dark are given later. Alternate routes to stations are prescribed. At different times one or more routes are blocked off so that men must use others and thus become familiar with them. Instruction in leaving the ship includes use of safety equipment, special precautions to be taken, and conduct in the water and on lifeboats and rafts.

**27. INDIVIDUAL SAFETY PROCEDURE.** When aboard ship follow these rules unless instructed otherwise:

**a.** Always have your life preserver or safety belt, whistle, rope, life-preserver light, and a full canteen of water with you. Wear the preserver during the day and use it as a pillow at night.

**b.** Do not wear leggings while aboard troop ship.

**c.** Smoke only at the times and places designated.

**d.** Keep out of the way of the ship's crew members; do not interfere with the performance of their duties. Movement of traffic on deck is counterclockwise: on the starboard side—toward the bow; on the port side—toward the stern.

**e.** Learn thoroughly the procedure for meeting emergencies such as abandoning ship, fire, and air attack.

**f.** Know the emergency signals for all ship's drills.

**g.** Train yourself to get hold of essential personal equipment in the dark. Sleep as nearly fully clothed as conditions permit.

**h.** Always dress warmly. If you have woolen underwear, wear it at all times, whether in tropic or arctic regions. It protects you against both cold air and sunburn.

**i.** Get all the exercise you can. Apply yourself vigorously in any planned exercise or athletics.

**j.** Keep doors to passages and corridors hooked open at all times unless otherwise directed by ship's officers or master. An explosion may slam unhooked doors and change the structure of the ship sufficiently to jam closed doors.

**k.** If on deck when bombs hit the ship, lie flat on the deck to avoid blast and flying fragments. If you cannot lie down, steady yourself against something solid to avoid being thrown.

**28. ABANDON-SHIP CONDUCT.** **a.** Use common sense. When the abandon-ship signal is given, go to your abandon-ship station quietly and quickly and wait for orders. Keep silent so that orders may be heard clearly. Learn all the possible ways of reaching your abandon-

ship station from the various sections of the ship you are permitted to enter. If the usual route is blocked you must be able to get to it somehow even in the dark.

**b.** Do not get into the lifeboat or attempt to lower it. Wait for orders. Normally, several members of the crew are assigned to take charge of each lifeboat. If one or more of the crew assigned to your lifeboat is a casualty, be prepared to assist in lowering the boat (par. 30c); otherwise, keep out of the crew's way. If your lifeboat or raft is damaged do not get into another without permission of the man in charge of your lifeboat. When ordered over the side, use the nets, ladders, and ropes hanging over the side at abandon-ship stations to board lifeboats or rafts which have been lowered. Do not risk injuring occupants by throwing anything down into a lifeboat. Before abandoning ship, listen for announcement of her approximate position, which will normally be given. This information enables you to set a course for the nearest land.

**29. ON YOUR OWN.** Even in extreme emergency, all persons aboard a ship act according to orders until the order "every man for himself" is given. This order means to get into the water immediately and at least 50 yards away from the ship. Jump only as a last resort. Use ladders, nets, or ropes when you can. (See par. 35.)

### **30. ABANDON-SHIP PROCEDURE; IN LIFEBOATS.**

**a. General.** A lifeboat commander and crew are assigned to every lifeboat. This group takes charge of the passengers and has the duty of getting the lifeboat into the sea. In the absence of such a crew or when only one or two ship's members have been assigned to the lifeboat, anyone may be called upon to assist in lowering and launching the lifeboat. The following paragraphs explain the basic elements of such procedure.

**b. Suspension of lifeboats.** (1) Lifeboats are suspended on "davits"—two metal members that extend out over the ship's side. The lifeboat is fastened to the davits by two pairs of blocks, one pair at the bow and

the other at the stern. The line running from each upper block is called the boat's fall. Paying out the falls lowers the lifeboat. These falls are made fast to the ship with various releasing devices. The lower blocks are secured to the lifeboat by means of simple, quick-release devices. To every lifeboat a sea painter (long length of line) is also attached; one end is made fast to the boat and the other to the ship at a point well forward of the lifeboat.

(2) Ordinarily ships are equipped with skids. Skids are made of wood or other suitable material and are fitted over projections and openings in the way of lifeboats, between the ship's deck and her light load line. In the absence of skids, the lifeboats are provided with skates (made of wood) which slide over the ship's projections and openings as boat is being lowered, thus protecting her from damage. Skates are easily detached once the boat is in water. It may sometimes be necessary to improvise skates; know how they are made and installed.

**c. Lowering lifeboats.** (1) Place all passengers in boat except two men at each fall; one to see that falls are kept clear and one to lower.

(2) Have two men in boat ready to fend off from ship's side. Have another man place the steering oar in readiness.

(3) Have the sea painter led well forward of davits.

(4) Lower away on both falls evenly until boat is just above the surface of the water. At this point lower away on stern fall so *stern enters water first*. Always remember this. Lowering bow first will capsize boat.

(5) As soon as lifeboat is waterborne, trip the releasing devices immediately.

(6) When ship is still underway, the lifeboat will lag alongside until sea painter is taut. Have man at steering oar so steer that boat will not sheer into the ship's side or sheer away from ship's side until ready. The sea painter aids the steersman in this maneuver. (See fig. 32.)



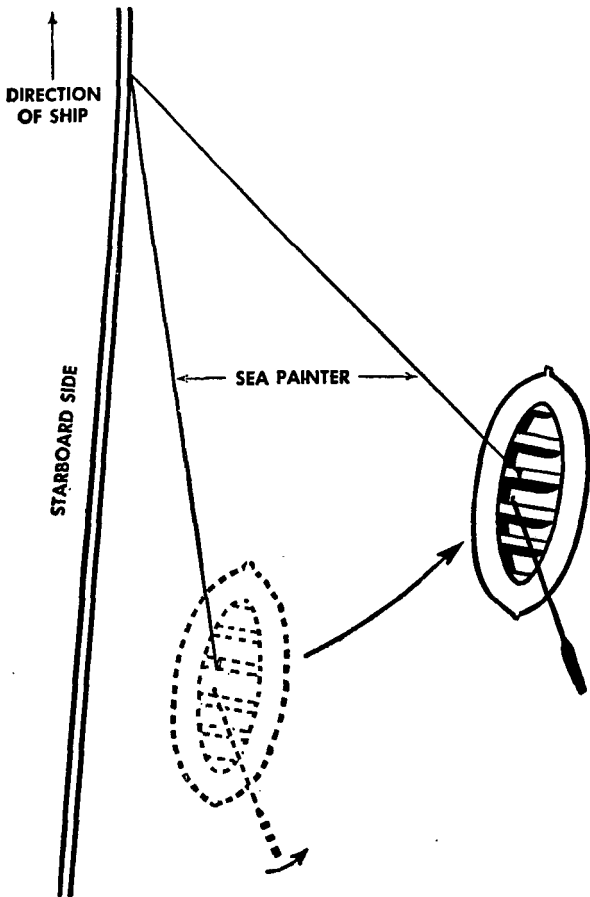


Figure 32. Action of sea painter in lifeboat. Pull of sea painter on lifeboat forces boat away from ship's side. Sea painter is released before it forms a right angle to ship's side.

(7) Have remainder of crew come aboard by the most expedient means.

(8) Order the oars readied for rowing; direct steersman to point bow away from the ship.

(9) When lifeboat is well away from ship, order the painter released. The painter is secured to lifeboat by a toggle pin with a chain lanyard. A pull on the lanyard should release toggle pin; if it is stuck, cut the sea painter. (See fig. 33.)

(10) As soon as sea painter is released, row away from the ship.

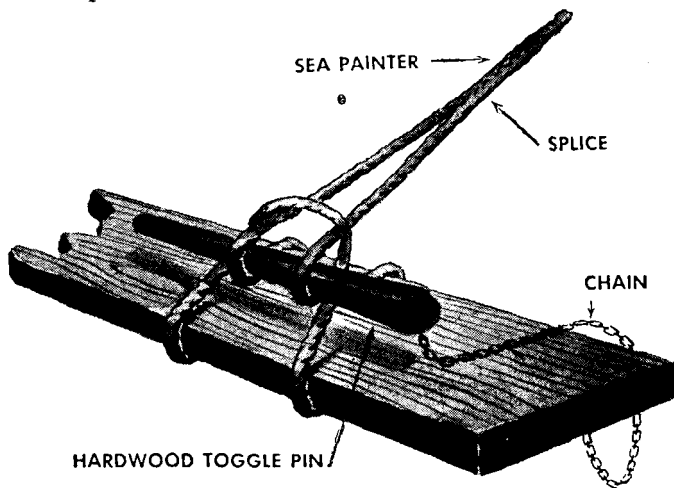


Figure 33. Toggle-pin attachment for sea painter. Pull on chain or lanyard to release sea painter. Toggle-pin attachments are also used to suspend life floats.

**31. ABANDON-SHIP PROCEDURE; LAUNCHING RAFTS AND FLOATS.** **a. Rafts.** Rafts are stowed on skids, launching ways, or other means to provide quick release of the rafts directly into the water, and arranged so they have the best chance of floating free if there is no time to launch them.

(1) Each skid or launching way is provided with a

releasing device, usually a pelican hook. Pulling on a line attached to pelican hook trips it and releases the stops holding the raft.

(2) Before releasing raft be sure sea painter is fastened to it and the ship. The sea painter in this instance prevents raft from floating away before survivors can reach it.

**b. Floats.** Floats may be suspended along the ship's sides or inboard on deck. In either case suspension is by toggle pin and lanyard. (See fig. 33.) Before releasing overboard be sure each has a sea painter.

**32. LEAVING THE SHIP.** **a.** When the lifeboat is being lowered into the water all occupants who are not aiding the crew should remain low in the boat and out of the way. All men must be quiet and take orders only from the man in charge. The lower ends of all ladders, nets, or ropes down the ship's side should be pulled out and away from the ship to aid men descending into the boat. The lifeboat must be kept away from the ship's side to prevent its being crushed or capsized. The lifeboat should be moved rapidly at least 50 yards from the ship to escape the suction of the sinking ship. Once out of the danger area, the sea anchor should be dropped and all men should remain low in the boat until the confusion is over. The mast and sails are rigged only when the men have quieted down, because in their excitement they may fall overboard. Without endangering the entire boatload as many survivors as possible should be picked up from the water. Men may hang on to the life line around the lifeboat. If there is room, men on rafts should shift over into the lifeboat. All boats and rafts should stay together to increase the chances of rescue and bolster morale.

**b.** Before the signal to abandon ship is sounded, all persons are given the following information: the ship's approximate location, the direction and distance to the nearest land, and the result of SOS signals. If a rescue ship has answered the SOS, lifeboats remain near the spot where the ship sank. Otherwise, the location of the

ship and the distance and direction to land can be used to steer a course.

c. If the lifeboat capsizes, five or six men can right it by reaching over from one side and pulling down on the keel or girth lines—ropes running across the bottom of the boat. (See fig. 34.)

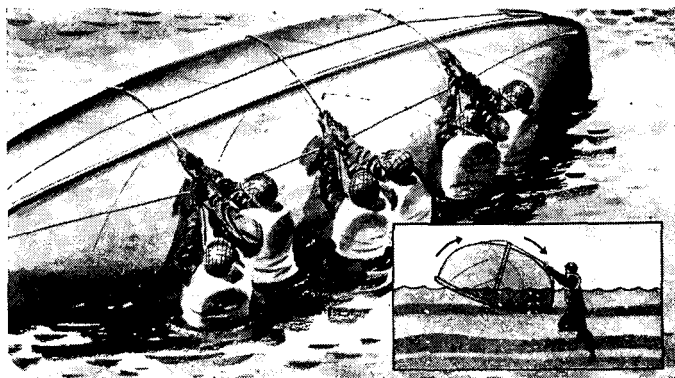


Figure 34. Right capsized lifeboat by pulling down on girth lines.

### 33. BOARDING LIFEBOATS AND RUBBER BOATS.

**a. Lifeboats.** (1) Because of their high sides and general shape lifeboats should be boarded from the center of one side. Face the boat squarely, hook the arms over the side, wait for the next swell to raise your body, and with a kick roll into the boat.

(2) A man in the lifeboat should aid the survivor by lifting him above the edge of the boat until his body can be bent at the waist. This brings the head and shoulders into the boat. (See fig. 35.) The rescuer then grasps a leg and pivots the rest of the body into the boat.

**b. Rubber boats.** A lone survivor should board a rubber boat over the bow or stern. With more than one man, entrance over the side is recommended. One man clings to the side of the boat. The other, on the op-



*Figure 35. Help survivor into boat by lifting him until body can be bent at waist; grasp leg and pivot rest of body into boat.*

posite side, places one arm in the boat and locks it against the side. He then grasps the top of the side with his other hand, lifts his leg on the same side as the arm in the boat and hooks the foot inside the boat. (See fig. 36.) As the next swell lifts the boat, he pulls with the arm and leg in the boat, kicks down with the foot in the water, and rolls into the boat. The other survivor then boards the same way.

**34. ENEMY STRAFING.** Enemy aircraft may strafe the boat. Because of its high speed, the airplane's attack will be brief. Bullets from low-flying airplanes either ricochet off the water or penetrate no more than 24 inches below the surface. Hence, all who are physically able should go overboard prior to attack and bob under the water 24 inches. If sails are set, lower them or boat will sail away by herself. Another defense is to swim away from boat at right angles to airplane's line of

flight. All men who cannot get into the water should drop to the bottom of the boat. If all men go over-



*Figure 36. Board rubber boat over the side when there are two or more survivors. One man clings to side of boat. The other, on opposite side, places one arm in boat and locks it against side. He then grasps top of side with other hand, lifts leg over side and hooks foot inside boat. As next swell lifts boat, he pulls with arm and leg in boat, kicks down with foot in water, and rolls into boat.*

board, the strongest swimmers should grasp ropes from the boat to keep it from drifting away with the current or wind. Immediately after the attack plug up all bullet holes with the wooden plugs and cloth.

### **35. ABANDON-SHIP PROCEDURE; OVER THE SIDE.**

Observe the following precautions when ordered to abandon ship over the side:

**a.** Enter the water with the idea of reaching a boat, raft, or other object which will support you. If possible, choose your objective first.

**b.** Avoid entering the water—

(1) Where there is oil or flame.

(2) Between the ship and a boat or raft close to it, which might crush you against the side.

(3) Near the propellers, if the ship is under way.

(4) Amidships, as your vessel may have a bilge keel at that point which cannot be seen under water but may cause serious injury if struck by you when falling.

**c.** Enter the water—

(1) From the part of the ship nearest the water, fore or aft if possible.

(2) On the windward side. An exception to this may arise when ship has been struck on the windward side and is losing oil or gasoline on that side. Under these circumstances, enter water on opposite side and immediately row or swim away from ship, beyond her stern if possible.

(3) At a spot free of debris.

(4) Where barnacles are fewest.

**d.** Follow the instructions in paragraphs 17 through 20.

### **36. JUMPING WITHOUT OIL. a. Precautions; jumping**

**with life jacket.** When all other means of leaving the ship are being used to capacity or are out of order, jump, don't dive, and look before you jump. Observe the following precautions in addition to those outlined in paragraph 10:

(1) Take a deep breath before jumping.

(2) With the downward roll of the ship, step forward as though taking the next stride, and, springing from the other foot, bring the legs together in the air. Drop vertically into the water. When lower side of listing vessel also is windward side, take care to avoid being washed back against vessel.

(3) Do not look down. Keep your head up.

(4) Jump as far from the ship as you can.

(5) Do not try to break your fall with the hands or arms.

(6) Keep legs together. After entering the water open them to check depth of plunge.

(7) *Use of arms.* (a) *Without life preserver.* Hold the nose and protect the face.

(b) *With life preserver.* See paragraph 15b.

1. Jump, holding the jacket in one hand; if it is jerked from your hand when you hit the water, recover it when you come to the surface. (See fig. 37 [1])

2. Secure jacket to your belt with a short length of line; enter water as in (a) above. (See fig. 37 [2]). Recover it when you come to the surface.

3. Secure jacket tightly to body by straps; with arms on top of it, press down hard with forearms, one hand holding the nose (fig. 9); exert plenty of muscular force to hold down jacket and prevent its striking your chin when you hit the water.

**b. Shirt as support.** To use shirt as support in the water, button it completely before jumping. Draw the front out of the trousers, and hold it down and forward with arms fully extended, 6 to 10 inches from the body.

(See fig. 38.) This causes the shirt to fill with air, and it will aid in bringing your body rapidly to the surface. By assuming the breast-stroke position on the water, an air pocket is formed in the back of the shirt. This provides some support for a short time.



**c. Trousers as support.** Remove and wet or dampen your trousers. Tie a knot at or near the end of each leg. Button the fly. Grasp the trousers by the waist,



*Figure 37. Jumping with life preserver from high freeboard. [1] Hold life preserver in one hand. [2] Secure it to your belt with a short line.*



*Figure 38. Jumping to use shirt as support in water. Button shirt before jumping; draw shirt front out of trousers and hold it down and forward to scoop up the air.*

legs down, and hold in front of your body. (See fig. 39 [1]). Flip the trousers over and behind the head, arms extended, wrists flexed so that the backs of the hands are down. (See fig. 39 [2].) Jump, and, as the



*Figure 39. Jumping to use trousers as support in water. [1] Tie knot at end of each trouser leg; button fly, [2] Flip trousers over head.*

feet hit the water, snap the hands forward from the wrists to get the waist of the trousers under water. (See fig. 39 [3].) The air which is trapped in the legs helps return you quickly to the surface. For surface support, take a prone position and place a leg of the trousers on

either side of your body, below the arm pits. (See fig. 39 [4].)



*Figure 39. Jumping to use trousers as support in water—continued.*

*[3] As feet hit water wrists flip forward bringing knuckles up as body enters water. [4] Take prone position and place one leg of trousers under each arm pit.*





*Figure 40. Jumping to use barracks bag as support in water. a. Wet or dampen bag and jump as with trousers in figure 39. b. Hold bag to prevent its overturning.*

**d. Barracks bag or pillow case.** Wet or dampen the bag and proceed as with trousers. (See fig. 40a.) After entering the water, hold the bag with both arms to prevent overturning. (See fig. 40b.) If sufficient air has not been trapped, take a big breath, submerge, exhale into the mouth of the bag, and rise to the surface.

**e. When jumping with sheet, poncho, squares of canvas.** Gather or knot the four corners to form a bag. Proceed as outlined above.

**37. JUMPING INTO OIL OR FLAME. a. General.** Ships normally carry their fuel oil in tanks around the sides which may be burst by bombs or torpedoes, releasing the oil over the water. Oils are classified as thin oils and thick oils. Fuel oil for ships is heavy oil, but thin oil may be on board and be spread by the explosion. Thick oils generally are not inflammable, but are extremely difficult to move through, whether swimming or in a boat. Never jump into or try to swim through thick oil. Distance from the ship to which oil or flames spread depends upon the following:

(1) *Speed of ship.* If the ship is making headway the oil will stream off to the rear. If the ship is still, the oil may surround the ship.

(2) *Wind.* The wind may blow the oil or flame away from or back to the ship.

(3) *Part of ship hit.*

(4) *State of sea.* Whether smooth or rough.

(5) *Temperature of water.* In cold water the oil may congeal and remain in one area.

(6) *Amount of oil on the water.* As the oil layer spreads it gets thinner until it can no longer spread.

**b. Precautions.** When necessary to jump from a ship and there is surface oil or flame, observe the following precautions in addition to those outlined in paragraphs 10 and 35.

(1) Remove your life preserver and anything else which might carry you to the surface into oil or flame. Take off your shoes, but keep shirt, trousers, and socks.

The carbon-dioxide life belt may be retained if it has not been inflated.

(2) To prevent trapping air under your clothing, fasten all buttons on shirt and trousers, and tuck trouser legs into the socks.

(3) If necessary to jump into oil or flame, jump to windward and swim to windward. The wind will tend to blow the oil or flame away from you, instead of driving them with you.

(4) Close your eyes and mouth before entering the water.

**38. SWIMMING AWAY FROM THE SHIP.** *a.* Once in the water, immediately move away from the ship, using the elementary back stroke to protect against injury from explosions from the ship, torpedoes, or bombs. (See par. 64b.) If there are no lifeboats or rafts to swim to, move at least 50 yards from the ship to escape the suction of the sinking ship. When you are beyond this danger zone, remember that buoyancy is the main thing; the distance you swim is relatively unimportant unless land is in sight. Use any debris or wreckage as support. Lash yourself to it if possible. Retain clothing and shoes as protection from the weather, salt, and oil.

*b.* It may be necessary to undress in the water either to remove the weight of clothing and equipment or to inflate the clothing as support. To undress, take a deep breath, assume the jellyfish float with the arms hanging relaxed, and proceed in a natural manner to remove equipment or clothing. When a fresh breath is needed a stroke or two, as in a modified breast stroke, will bring your mouth above the surface. Make all movements slow and deliberate. Do not discard any clothing unless forced to, as it may be useful later. Shoes can be tied together and hung around your neck. (See fig. 41.)

**39. SWIMMING THROUGH UNIGNITED OIL.** After entering the water, open your eyes and swim away from the ship. While under water, look for thin spots or breaks in the oil, indicated by lighter areas. If your



[1]

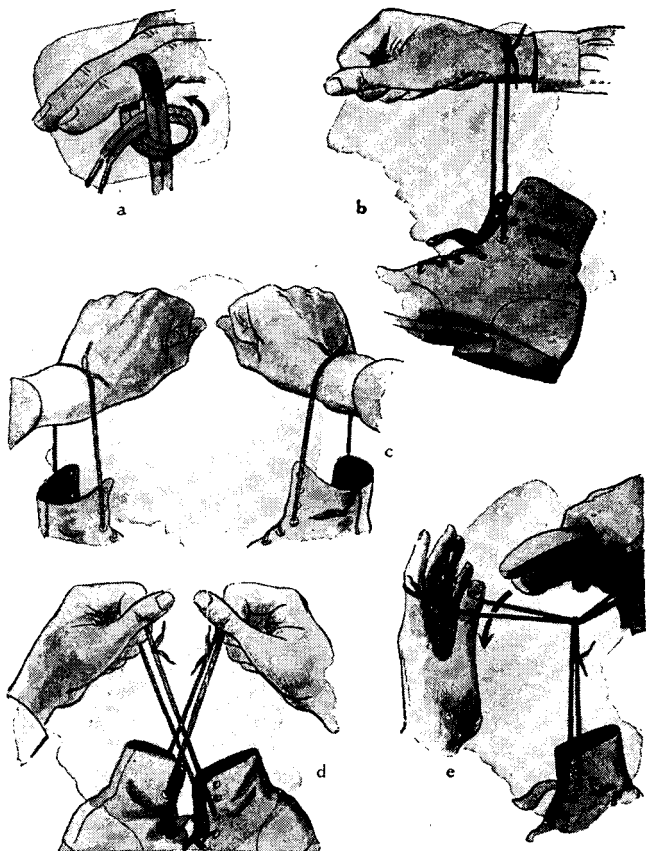
*Figure 41. Removing shoes in water. First take up the jellyfish float; draw one leg up and with both hands untie shoe lace; loosen lace and remove shoe.*

breath becomes short before you have found a break, come to the surface with hands and arms preceding the head, and eyes closed. Scatter the oil by a pushing and sweeping arm motion as in a modified breast stroke. Kick your feet hard, to rise as far as possible above water before breathing. Open eyes and try to locate the nearest clear spot before again submerging. While above the surface, keep sweeping the oil aside. Close your eyes before submerging. Remove oil from eyes as explained in paragraph 65.

**40. SWIMMING THROUGH FIRE.** *a.* Jump feet first to windward of ship or airplane. (See fig. 9.) If jumping with life vest from a moderate height, as from an airplane, cover eyes, nose, and mouth with both hands as in figure 42. Take a deep breath; hold breath until you rise to the surface.

*b.* Before reaching the surface look for thin spots or





[2]

Figure 41. Removing shoes in water—Continued. *a.* Wind both ends of shoe lace once around index finger and draw ends through loop, forming a knot. *b.* If lace is short, slip hand through loop so shoe will hang from waist; this leaves hand free. With long lace, bend loop over itself to form a slip noose for wrist. *c.* Remove other shoe in the same way. *d.* Tread water and pass one shoe-lace loop through other. *e.* Pass either shoe through its own loop thus securing laces of both shoes. Hang shoes around neck and continue swimming.

breaks in the fire where a breath may be obtained. These spots can be recognized by their relative dulness; bright spots mean hot, strong fire. If a break is found, rise into it; if no break is found, rise into the thinnest spot available.

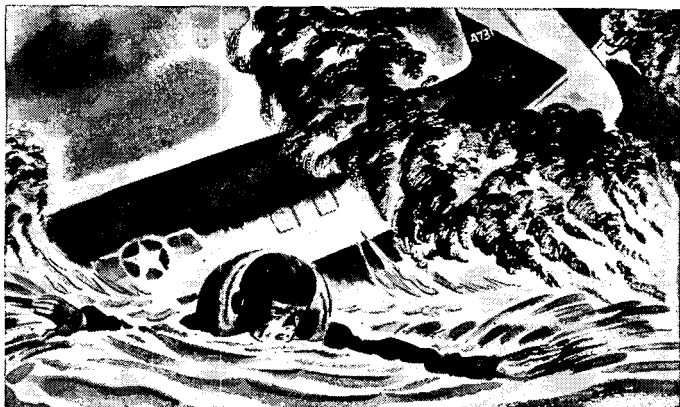
c. Just before breaking through the surface, cross your arms on forehead, palms up, and push upward with a strong kick. When breaking the surface, swing



*Figure 42. Jump feet first to windward of ship or airplane. As you jump, cover your eyes, nose, and mouth with both hands. Take a deep breath. Hold breath until you rise to the surface.*

your arms overhead to splash flames away from head, face, and arms. (See fig. 43.)

d. Swim into the wind. (See fig. 44.) Use the breast stroke. Before taking each stroke splash water ahead and to the sides. Keep mouth and nose close to the water. Duck your head every third or fourth stroke to keep it cool. If there are several men, swim single file. Let the strongest swimmer splash a path so the rest can follow safely in his wake.



*Figure 43. Just before you pop to surface, make a breathing hole in flames by swinging arms overhead, splashing flames away from head, face, and arms.*



*Figure 44. Swim into the wind. Use breast stroke. Splash water ahead and to side before taking each stroke. Keep your head cool by ducking underwater every third or fourth stroke.*



*Figure 45. Swimming under water through fire. Splash flames away from body; hold head near water level; if wearing life vest, deflate it by releasing valves. Take a deep breath but do not inhale fumes; sink beneath surface, feet first. Swim upward as far as possible. Splash away flames in coming to surface; take deep breath and resubmerge. Repeat procedure until beyond fire.*

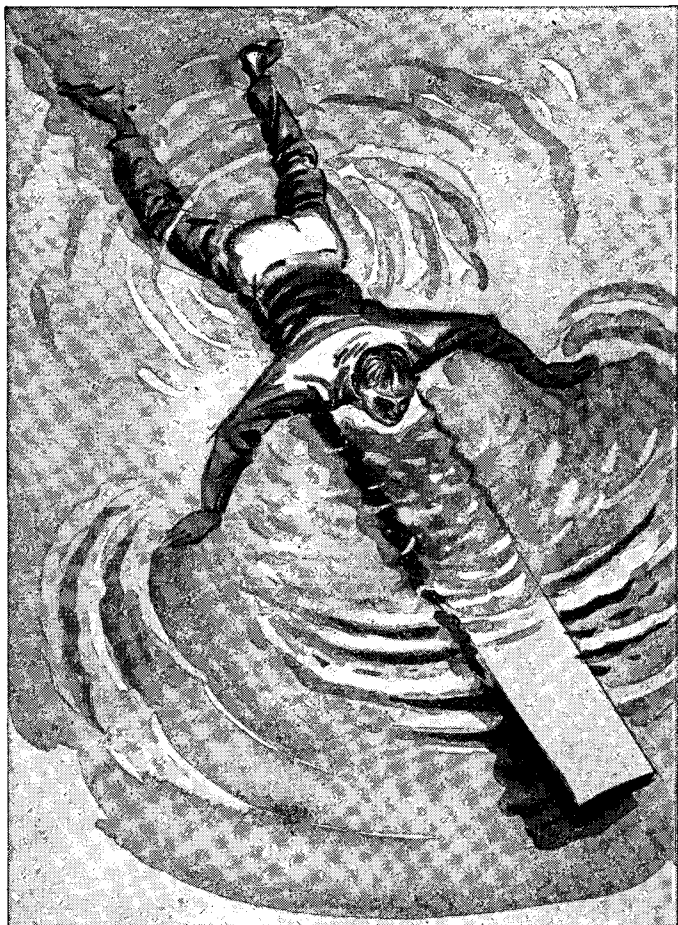
**41. SWIMMING UNDERWATER THROUGH FIRE.** If the heat is too intense or flames too high, swim under water. (See fig. 45.) To do this:

- a. Splash flames away from body.
- b. Hold head near water level.
- c. If wearing life vest, deflate it by releasing valves.
- d. Take a deep breath but do not inhale fumes.
- e. Sink beneath the surface, feet first.
- f. Swim upwind as far as possible.
- g. Splash away the flames as you come to the surface. Take a deep breath and submerge again. Repeat procedure until you are beyond the fire.
- h. If wearing life vest, reinflate it by mouth. If you cannot continue to swim under water, as a last resort come to the surface as described above, and use the breast stroke.

**42. EMERGENCY FLOTATION IN WATER.** When in the water without a life preserver improvise expedients.

**a. Use debris.** Any floating debris and wreckage should be used, shared with the greatest number of men. It is better to cling to planks, boxes, and other floating articles than to climb upon them. Clinging to floating debris adds its buoyancy to that of your body. Lash yourself to debris if possible. Trying to climb up on an object often leads to frustration and rapid exhaustion. Only objects large enough for full support should be boarded. Resting the hands or elbows on an object or throwing the arms around it may provide sufficient support. A plank can be used as a surfboard by lying on it, spreading the legs for balance, and using the arms and legs for propulsion. (See fig. 46.)

**b. Use shirt.** Fasten all shirt buttons, including those of collar and cuffs. Take a deep breath and assume the jelly-fish float. With the fingers, form an opening in the shirt front between the second and third buttons, bring the lips to the opening, and expel the air into the shirt. This action may be repeated. When the prone position is resumed, an air pocket forms at the back of the shirt. (See fig. 47.)



*Figure 46. Lie on plank for flotation; use arms and legs for propulsion.*



*Figure 47. Use shirt for flotation. Fasten all buttons. Take deep breath and assume jellyfish float. Expel air into shirt between second and third buttons. Repeat procedure if necessary.*

**c. Use trousers.** Remove the trousers, tie a knot at or near the end of each leg, and button the fly. While treading water, hold the trousers above water by inserting one arm in each leg. (See fig. 48 a.) This allows air to fill each leg. Drop the arms quickly, pulling the waist band under the surface. This traps air in each leg. (See fig. 48 b.) The support can then be used in the prone position by placing one trouser leg on each side of the body under the arm pits. (See fig. 48 c.) If enough air has not been trapped in the legs, take a deep breath, submerge holding the waist band below the surface, and expel the air into the trousers.



*Figure 48. Use trousers for flotation. a. Remove trousers, tie knot at end of each trouser leg, and button fly. Insert one arm in each leg while treading water. b. Drop arms quickly pulling waist band under surface. If more air required, take deep breath and expel it into trousers. c. Place one trouser leg on each side of body under arm pits.*



## SECTION V

# OPERATION OF LIFEBOATS, RAFTS, AND FLOATS

---

**43. HANDLING LIFEBOATS. a. Rowing.** Orders and instructions for rowing a lifeboat will be given by the boat's commander. In the absence of an assigned boat commander or any other officer or specialist similarly qualified, the following basic instructions for pulling an oar should be used:

(1) Command: OARS. Sit erect in lifeboat, eyes directly astern, oar horizontal to water, and blade flat. Position of hands on oars is with wrists down to get blade flat.

(2) Command: STAND BY TO GIVE WAY. Lean well forward, arms straight, wrists straight, eyes directly astern, and blade of oar vertical and just clear of water. Hands are in natural position for a heavy pull. This is beginning of stroke.

(3) Command: GIVE WAY TOGETHER (STARBOARD, PORT). Lower blade into water and pull oar by leaning back. Arms are still straight, eyes astern. This is middle of stroke.

(4) Give a final pull with arms; this is end of stroke. Blade is pulled out of water at finish of pull.

(5) As blade comes out of water, in (4) above, wrists are bent down causing blade to lie flat with water. This is known as *feathering the oar* and always is done to lessen wind resistance or resistance due to spray. From

this position repeat positions (2, 3, and 4) above in a smooth, unbroken sequence.

**b. Sailing.** Sailing or operating a motor-powered lifeboat should be left to the experienced hands aboard; in their absence proceed with greatest care. In the hands of unskilled operators, the lifeboat may broach to and capsize in a matter of seconds. Even when sailing under the direction of an expert, keep your eyes open for an accidental jibe—the sudden shifting of the boom from one side of the boat to the other. Jibes have injured men seriously and thrown others overboard. Don't rig sails when in doubt about the weather; never attempt to sail or use power in heavy seas and high winds; wait for calmer weather. Remember, the duty of everyone aboard is to conserve strength to stay afloat until rescued and not to promote exhaustion by struggling with unknown and otherwise avoidable hazards.

**44. HANDLING LIFEBOATS IN SURF.** It is of little value to be in a lifeboat if you do not know how to handle one safely in surf. The following paragraphs are devoted to this and apply to all lifeboats whether under sail, oars, or motor driven.

**a. Running before a breaking sea or surf.** The one great danger when running before a broken sea is "broaching to." The utmost attention must be directed against such a disaster. Broaching to is the sudden swerving of a boat from her course onto her side and into the trough of a sea.

**b. Action of boat in running before a breaking sea; safe passage.** The motion of the boat and the sea being in the same direction, the boat makes no resistance to the sea but is carried before it. If running in bow first the surf on overtaking her will lift the stern and bury the bow. If the boat has sufficient inertia (which is proportional to weight) to allow the sea to pass her, she will pass through the descending, the horizontal, and the ascending positions in succession as the crest of the wave passes beneath her stern, midships, and bow.

**c. Action of boat in running before a breaking sea; unsafe passage.** If the boat is overtaken by a breaking sea and does not have enough inertia to allow it to pass, only the first of the three positions occurs. The stern is elevated high in the air and the wave carries the boat before it with the bow sharply depressed and deeply immersed in the hollow of the sea. The water here is comparatively stationary and it offers a resistance while the crest of the sea having the actual motion forces the stern of the boat forward. A boat in this position may sometimes run a considerable distance until the wave has broken and expended itself. However, the boat must be skillfully steered to accomplish this. More often a boat in this position will:

(1) *Be broached to or completely capsized.* This happens when the bow is high and does not become submerged. The resistance forward acting on one bow will turn the boat's head slightly. The force of the surf is transferred to the opposite quarter and the boat will be turned broadside to the sea and be thrown on its beam ends or capsized. This is the way most boats are upset in a surf, especially on flat coasts.

(2) *Be thrown end over end.* This happens when the bow is so low it is driven under water and the forward buoyancy is lost and the sea presses on the stern.

**d. Effecting safe passage before a breaking surf.** There are different methods of procedure and the situation will govern which to use. In all instances the boat should be steered by an oar over the stern or on one quarter. Heavy weights should be kept out of the extreme ends of the boat. When rowing in a heavy sea the best trim is by the stern as this prevents the stern being driven off by the sea.

(1) Before entering broken water turn a boat's bow to the sea. Do this where the surf is lighter, as in the relative lee and quiet of a point or bulge in the shore line. Such a spot will most probably be found where there is a gully or break in the shore line or a row of cliffs behind the beach. Back in stern first, pulling a few strokes ahead to meet each wave and then again

backing astern. This is the safest procedure if the boat is small and the sea unusually heavy. It cannot be used when under sail or power.

(2) Row to shore bow first by backing all the oars on the approach of a wave and rowing ahead again as soon as it has passed to the bow of the boat. Another way is to have the aft oarsmen face the bow and start rowing back at the approach of every wave.

(3) Row in bow first by towing astern a sea anchor, drogue, or a makeshift drag weighted down by the boat's anchor to give firmest hold on the water and thereby prevent broaching.

**e. Rowing to seaward (away from land).** General rules for rowing to seaward are:

(1) Control the boat to avoid breaking seas; that is, handle the boat so each wave breaks ahead of her. If the shore is flat and the broken water extends a good distance off shore this will often be impossible.

(2) Against a head gale and a heavy surf, get all possible speed at the approach of every wave which cannot be avoided.

(3) If more speed can be given a boat than is necessary to prevent her from being carried back by surf, the movement forward may be checked on the surf's approach and therefore the boat will make an easier passage over it.

**f. Beaching lifeboat.** Running before a surf or broken sea and beaching or landing of a boat are two distinct operations. The handling of lifeboats described in b above has exclusive reference to running before a surf where the shore is so flat the broken water sometimes extends 4 or 5 miles from the land. On an extremely steep beach the first heavy fall of broken water will be on the beach itself. The outermost line of broken water on a flat shore where the waves break in 18 or 24 feet of water is the heaviest and most dangerous. Once inside this line the danger lessens because as the water shoals its force is spent. Never forget the handling of lifeboats is quite different in beaching on flat and steep shores.

(1) *Beaching on flat shore.* Whether a lifeboat is brought bow end in first or backed in (stern first), she is kept at right angles to the sea until almost aground. Each surf takes her closer to shore. In this situation the boat must be rowed or backed in, using oars. The crew will jump out grab the sides and drag her in. Take in sail before attempting passage.

(2) *Beaching on steep beach.* A boat of any size can be sailed right onto the beach whether under oars or sail. When landing turn the boat's bow halfway around toward the direction of the surf which will cause the boat to be thrown over on its side. Everyone should get out before boat is rolled in the wash on the beach. The strongest crew members should jump out first and hold the boat to prevent her from washing back into the surf. When landing this way never back a boat in stern first.

**g. Beaching power lifeboat in a heavy surf.** (1) A lifeboat should enter the surf at a moderate speed with the rudder unshipped, a steering oar lashed in place, and an oar out on each quarter to assist in steering. If the surf is dangerous and breaking close to the beach it is safest to stop the engine and land under oars.

(2) Approach to shore should be deliberate and all effort directed toward keeping the stern aimed directly at overtaking seas. To obtain this slow approach and certainty of aim, throw astern a sea anchor, drogue, or makeshift drag weighted down by the boat's anchor to give firmest hold on the water. This will check boat's headway and hold her stern directly into the crest of overtaking seas and is the foremost protection against a sea breaking into and overturning her. In addition to the use of sea anchor, check forward motion by reducing or reversing the engine or back water with the oars. If circumstances warrant, have a man ready to cut the tripping line and the sea-anchor rope. Keep a strain on the rope because slack rope may foul the propeller.

(3) Reversing the engine in a surf is dangerous and should be done only to check the forward motion of the boat.

(4) Weight should be distributed to trim the boat by the stern, causing it to drag.

(5) Use storm oil. (See par. 22ai.)

**h. Summary.** In the approach to the beach it is important the boat be kept stern to the sea regardless of any course. Outside the surf it is more important to make a particular course. Instructions in the foregoing paragraphs are general. It is impossible to learn these operations from a manual but the instructions serve to alert everyone to the existing hazards and to offset complete surprise and helplessness in an emergency.

**45. HANDLING OF RAFTS AND FLOATS.** This equipment is designed essentially to provide flotation for survivors until they are rescued. It is too exhausting even under normal conditions of wind and sea to attempt any headway in such craft. Save your strength to keep afloat and not to make good any distance.

## SECTION VI

### LIVING ABOARD LIFE CRAFT

---

**46. GENERAL.** Once you are safely aboard a life craft, whether a ship's lifeboat or float, your chances of being rescued are increased considerably. Remember that rescue parties start out immediately the ship's sinking is made known. Until rescued, make the most of living with limited physical comforts and in crowded quarters. Survival depends on everyone carrying out routine tasks cheerfully and promptly; sharing hardships equally and without complaint.

**a. Command.** Command aboard lifeboat is assigned and takes precedence over rank. If boat commander becomes a casualty or in the absence of an assigned commander, the next senior officer or senior noncommissioned officer aboard then assumes command.

**b. Responsibilities of command.** The responsibilities of a boat commander are very great. He should appoint at least two others as his assistants. Almost everything depends on the bearing and conduct of the men in charge. They must be able to assume responsibility, enforce strict discipline, assign jobs, deal with emergencies, and take charge of rations, navigation, and boat work. Some of the specific duties of this command are to—

- (1) Place a man in charge of all arms and ammunition as a precaution against insanity or mutiny.
- (2) Place a man in charge of all water and provisions

as a precaution against contamination, spoiling, and pilferage.

(3) Assign tasks to all men except those severely exhausted or seriously wounded.

(4) Arrange living and sleeping accommodations.

(5) Divide all equipment, whether general or personal, to obtain an equal share of comfort.

(6) Ration water and food.

(7) Arrange suitable diet for each person per day—depending on the provisions aboard.

(8) Schedule the number of meals and time for each.

(9) Examine all equipment aboard for serviceability; supervise repairs.

(10) Set a definite course and maintain it.

(11) Take charge of first-aid equipment and supervise administration of first aid.

(12) Maintain morale and faith; schedule and conduct or supervise regular periods of worship if circumstances permit.

**47. CARE OF EQUIPMENT. a. Boat's equipment.** Lash down everything aboard. Nothing should be discarded unless sure it will be of no further use. Try to keep all equipment as dry as conditions permit. Every effort should be made to dry the boat and keep her so.

**b. Clothing.** As soon as possible, squeeze out all your wet clothing but do not take off all your clothes unless the weather is warm and dry, with a moderate wind. Undress and dry clothes layer by layer.

**48. WATER. a. General.** Water is the most important item for survival. Man can exist only about 7 days without water. Loss of body moisture is hastened by heat and exercise. *Do not drink salt water* as it will cause diarrhea, weakness, and unbearable thirst. Delirious men may have to be forcibly restrained from drinking salt water. *Never drink urine*; never forget this. If water is not available do not eat. Elimination of food wastes absorbs water from the kidneys and decreases water in the body.



**b. Sources.** (1) *Boat's supply.* This is the primary source of drinking water. (See par. 22m.) To keep water from freezing in breaker, remove the plug. Insert a stick in the breaker. The lower end of stick should be weighted and upper end should protrude a foot or more. Movement of boat will keep the stick in motion so ice will not be able to form.

(2) *Canteens.* All canteens are commandeered by the boat's commander and the water in them made a part of the boat's supply.

(3) *Rain water.* Use cups, tin cans, sea anchor, boat cover, sails, strips of clean clothing, and all canvas gear in the boat to collect rain water. Be sure this equipment is free of salt; wash it off with the first fall of rain.

(4) *Ice.* In the cold regions icebergs are a source of fresh water. In freezing weather, fresh water can be obtained from sea water. Collect some sea water in a container. The fresh water will freeze first. The salt will collect in high concentration as slush in the core of the frozen piece. Remove the ice and throw away the slush. The melting ice will produce water sufficiently free of salt to sustain life. "Old" ice also is a source of fresh water. It has rounded corners due to rains and thaws, is bluish in color, has a glare, and splinters easily with a knife.

(5) *Chemical kits.* Chemical kits may be provided in boats or rafts to remove the salt and alkaline from salt water.

(6) *Coral-reef water.* On coral reefs brackish water suitable for drinking can be found by digging a 6-inch hole, 6 to 8 inches deep. Surface water will collect after a short time. Do not dig deeper because you will penetrate the layer of fresh water and reach salt.

**c. Storage.** Water is stored in every container that might be utilized for this purpose. It also may be stored in carbon dioxide life jackets and in the lifeboat's air tanks.

**d. Issue.** (1) An inventory is taken of all water aboard. Plan the issue of water with regard to all circumstances present: total supply of water, number of

men in lifeboat, time likely to be adrift, chances of replenishing supply, and the extra water needed for the sick and wounded.

(2) The average ration is 18 ounces—3 cups. A gallon contains 128 ounces. To compute the number of days the water will last, divide the total ounces of water by 18 and divide this by number of men in the boat. For example:

Amount (quarts) of water (par. 22m equals 15 times passenger capacity of boat (marked on sides); 15 passengers for example; 14 passengers actually present.

$15 \times 15 = 225$  quarts

$225 \div 4 = 56$  gallons

$56 \text{ gallons} \times 128 \text{ ounces} = 7,168 \text{ ounces}$

$7,168 \text{ ounces} \div 18 \text{ ounces (ration)} = 398 \text{ rations}$

$398 \text{ rations} \div 14 \text{ men} = 28 \text{ days}$

(3) Control of issue starts immediately and continues until survivors are rescued.

**49. FOOD. a. General.** A responsible person must be put in charge of all food supplies. He must divide all food fairly and schedule the meals. A complete inventory of provisions must be taken before any food is distributed. On dry days the food should be checked to see what is on hand and if anything has spoiled. Special food should be kept to bolster morale in gloomy periods. In one lifeboat from the Robin Moor, biscuit crumbs, moistened with cold water, seasoned with sea water and mixed with canned tomatoes provided a feast which raised morale considerably.

**b. Sources.** (1) *Boat's supply.* This is the principal source of food supply. Refer to paragraph 22ae for the provisions allotted to lifeboats and rafts.

(2) *Fishing.* Fish can be caught with the equipment in the fishing kit or with improvised gear. (See par. 50.)

(3) *Birds.* All birds are good to eat, cooked or raw. Their blood and livers are also edible. Catch every

bird you can. Use the feathers to make fishing jigs or stuff them under your clothing for warmth.

(4) *Seaweed*. Certain kinds of seaweed may be eaten but not unless you have plenty of water. Chew it well. Seaweed often holds small fish which can be eaten. Lift it out of water slowly and shake it inside of boat. Discard jelly fish, which are poisonous, and crabs, which are too salty.

**c. Issue.** Control of issue starts immediately and continues until survivors are rescued.

(1) *Ration calculations*. To calculate rations, first estimate the number of days before rescue is expected. By dividing this number into the amount of each item of food, the daily ration of each is found. In a boat loaded to capacity there are 56 ounces of food, or about 8,000 calories, for each man. Provisions weigh as follows:

1 biscuit equals  $\frac{1}{2}$  ounce; total 56 biscuits.

19 malted-milk tablets equal 1 ounce; total 226 tablets. (Suck tablets slowly; do not chew them.)

$\frac{1}{4}$  can of pemmican equals 1 ounce; total 4 cans. (Pemmican is concentrated meat; eat pemmican and biscuits together.)

*Example:* If rescue is expected within 10 days, the ration for 1 day will be:

5 biscuits.

22 malted-milk tablets.

$\frac{2}{5}$  of a can of pemmican.

This equals about 5.6 ounces per day, giving a diet of about 800 calories, sufficient to sustain life.

(2) *Eating rations*. Eat slowly and chew thoroughly. Emergency rations should be taken several times a day in small portions.

**50. FISHING.** **a.** Practically all freshly caught sea fish are palatable and wholesome, cooked or raw. In warm regions fish should be bled and gutted immediately after catching. Fish not eaten immediately should be cut in

thin narrow strips and hung to dry in the air and sun. Fish not cleaned and dried may spoil in half a day. Never eat a fish that has pale slimy gills, sunken eyes, flabby skin and flesh, an unpleasant odor, or whose flesh remains indented when pressed by the thumb. Good fish should have pink or red gills, bright clear eyes, firm flesh, and be free from stringy slime. Sea fish should also have a saltwater tang or clean fishy odor.

**b.** Poisonous fish are sometimes found in the tropics. The bodies of these fish are covered with rough or spiny scales, with thornlike spines, or with bony plates. In one poisonous variety the skin is naked or is strewn with soft spines or bristles which look like hair. None have the ordinary scales found on bass, trout, snappers, groupers, and goldfish. Follow this rule: If it does not look like an ordinary fish, if it has unusual appendages, if its mouth looks unusual or lacks teeth, if it is not covered with ordinary fish scales, let it alone. Remember that fresh, nonpoisonous, salt-water fish can be eaten raw; fresh-water fish cannot.

**c.** Fish are attracted by light and may jump into the boat toward a flashlight or the reflection of the moon on a white object hung in the boat.

**d.** The whole meat, blood, and juice of a turtle are edible. Hot sun brings out of turtle fat a clear oil into which food may be dipped. Turtles can be snagged with a hook or turned on their backs and towed in. However, even after a turtle's head has been cut off, the mouth may bite and the claws may scratch.

**e.** Eels are fish and good to eat but do not confuse them with sea snakes. Unlike eels, sea snakes, found in the Pacific and Indian oceans, have scales and swim on the surface of the water.

**51. SLEEP.** **α.** While it is possible to do without sleep for long periods, it is far better to get regular sleep. If you feel cold, crowd together under a canvas cover forward or in a sail cloth or blanket. In calm weather make more room in the boat by lashing oars and spare gear outboard along the gunwale.

**b.** It may be dangerous to drop off to sleep in a Carley float because risk of drowning is thereby increased. Stay awake as long as possible in extremely cold weather.

**52. CONSERVATION OF STRENGTH. α.** Every member of the lifeboat's company possesses a store of energy which, if used, is not likely to be replaced by the rations provided in the boat. Do not waste this strength by useless exertion or by the development of a bad frame of mind.

**b.** Some suggestions for the conservation of strength follow:

(1) Do not exhaust yourself by getting excited.

(2) Do not sing or shout.

(3) Take mild exercise such as a short turn at the oars to prevent body from kinking up.

(4) In hot weather, work on the boat should be done before the sun is up.

(5) It is never justifiable to attempt to make progress by continuous pulling at the oars. Periods of 15 minutes at the oars with 1 hour rest will permit steady progress for long periods with minimum exhaustion.

**53. CARE OF SICK AND WOUNDED. α.** Special care should be given to the sick and wounded. Lash weak or badly injured men to the boat to prevent their rolling about in the boat. If a flat surface is needed for wounded men, several oars can be laid side by side in the boat or across the gunwales. Life preservers make a satisfactory bed. Post a man to prevent the sick from attempting to go over the side; they sometimes imagine they are back home or in the ship. Humor them at all times.

**b.** In case of death, the victim's clothing and equipment should be removed before burying the body at sea.

**54. PROTECTION AGAINST WEATHER. α.** *Protection against cold winds, rain, and spray.* If canvas hood and side spray curtains are available, put them up as soon as possible. (See pars. 22f and 69b.) In freezing weather a blanket dipped in water and allowed to freeze will pro-

vide shelter against spray and wind. Sometimes these measures will not give sufficient protection and you will have to share blankets and huddle together to keep warm. In wet weather, keep waterproof clothing on even if clothes underneath are wet.

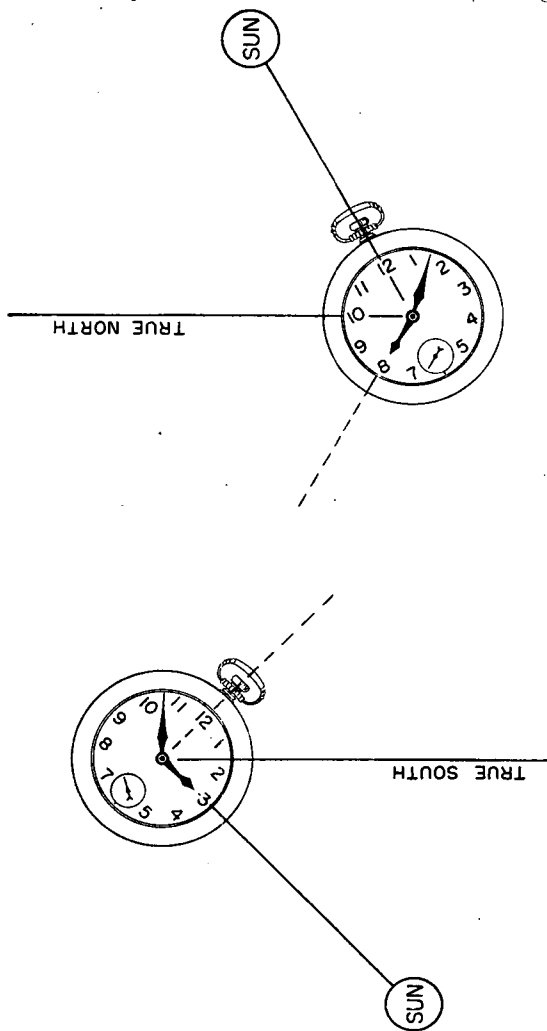
**b. Protection against sun and heat.** Rig up an awning if possible and try to provide some cover for the man at the tiller. Do not take off too many clothes; they will protect your skin against sunburn. This also applies to legs and feet, which should be covered or in the shade. Even in cloudy weather you can get badly sunburned. Protect eyes from glare of sun by improvising some kind of eyeshade. Tie a cloth or bandage over nose; this will cut off glare from the water when you are looking straight ahead.

**55. NAVIGATION. α. General.** Before the ship is abandoned, its location and the direction and distance to land are given to all men aboard. Lifeboats contain simple navigation charts and a compass. Try to reach a sea or air route where there is greater chance of being rescued. If the sea and air routes are not known, it is best to set a course east or west. Keeping on the move helps maintain morale. If a compass is not available, determine direction from the sun and stars.

**b. Determination of direction by using watch and sun.** When the sun is visible, a watch can be used to determine true south or north with an error of less than  $8^{\circ}$ . This method is difficult when the sun is high and is of little or no use in the tropics; furthermore, the watch must be on *standard time*. If it is subject to corrections for war time, daylight saving time, or zone time, it must be set back accordingly.

(1) In the northern hemisphere, turn the watch face up, and point the hour hand at the sun. To aid in correct pointing, hold vertically a pencil or other straight, slender stick so that it casts a shadow across the face of the watch. Rotate the watch to bring the hour hand into this shadow. Draw a line from the center of the watch dial through the midpoint of the smaller arc be-

tween the hour hand and 12 o'clock on the watch face. This line points toward true south. (See fig. 49.)



- ① NORTHERN HEMISPHERE      ② SOUTHERN HEMISPHERE

Figure 49. Using watch and sun to determine direction.

(2) In the southern hemisphere, point toward the sun the 12 o'clock mark on the watch. North lies halfway between this mark and the hour hand. (See fig. 49.)

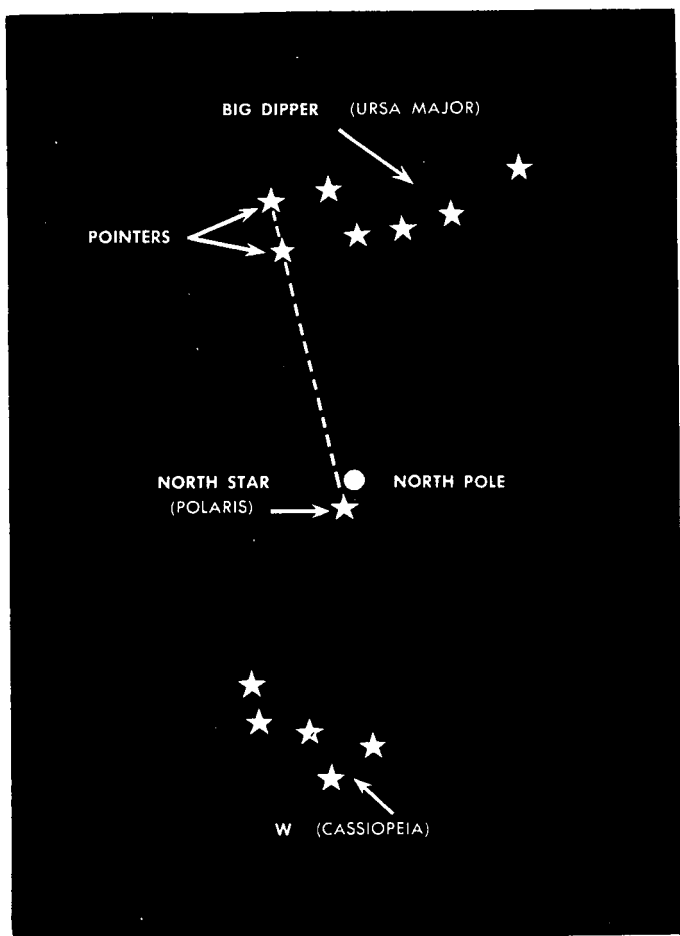


Figure 50. Relation of Big Dipper and W to North Star.



**c. Determination of direction by stars.** (1) *Northern hemisphere.* In the northern hemisphere, the North Star, Polaris, is the best star for finding direction. This star is almost vertically above the North Pole and any sight on it is within  $1^\circ$  of true north. The following are methods of identifying Polaris:

(a) *By means of the Big Dipper.* The Big Dipper is a star group easily recognized by its shape. (See fig. 50.) The two stars forming the side opposite the handle are called pointers, because a line through them always points to the North Star. From the lip of the Big Dipper to the North Star is about 5 times the distance between the pointers. Anyone having difficulty in locating the North Star can do so by using the fingers. (See fig. 51.) Hold one finger in front of the eye, and adjust its distance from the eye until one pointer is at each side of the finger. Add five more fingers. The North Star when is just outside the last added finger and on a line with the pointers. Once identified it is easily recognized by its brightness in comparison with the other stars nearby.

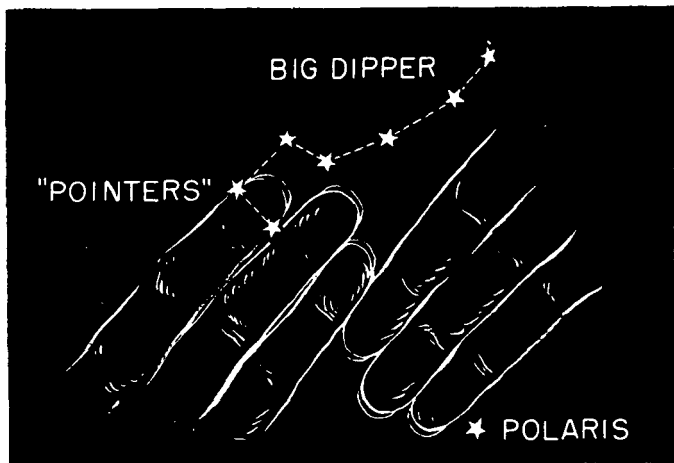


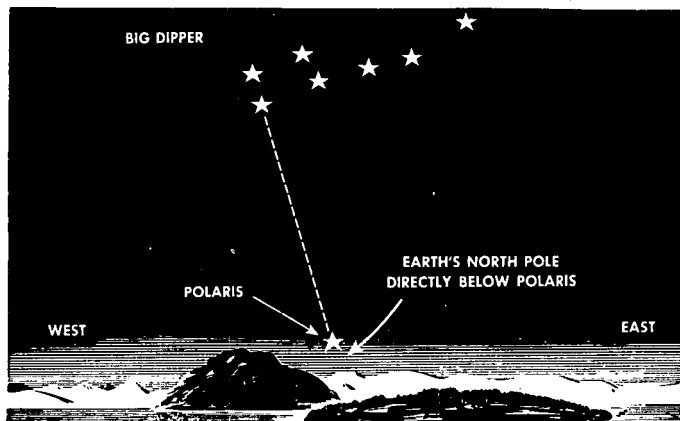
Figure 51. Using the Big Dipper and fingers to locate North Star.

(b) *By means of Cassiopeia (W).* When the Big Dipper is not visible, another star group may be used to identify the North Star. On the opposite side of the North Star, and at about the same distance from it as the Big Dipper, is a group of five stars, called Cassiopeia, which forms the letter *W*, or *M* if the group is above the North Star. The relation between the North Star and the *W* is shown in figure 52. This should be memorized.

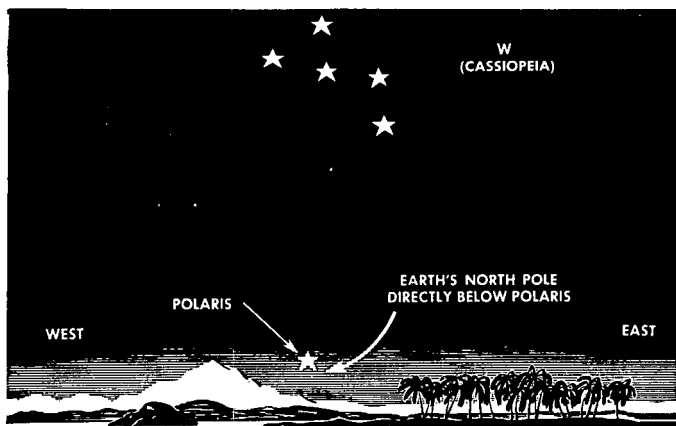
(2) *Behavior of stars.* At the North Pole, the North Star appears directly overhead, and both the Big Dipper and *W* are visible and seem to rotate around the North Star. To one going south from the North Pole toward the Equator, these stars appear to lose elevation; they are seen nearer the horizon. The 40th parallel of north latitude, which passes through Pennsylvania, Spain, Greece, and Japan, is the most southerly point from which both the Big Dipper and *W* are always visible. South of this parallel only one of these star groups is visible at a time; so half the time it is identified by the Big Dipper. (See fig. 52.) And half the time by *W*. (See fig. 52.)

(3) *Southern Hemisphere.* There is a faint star called Sigma Octantis above the South Pole and  $1^\circ$  from it. However since it is sometimes difficult to recognize and use this star, the Southern Cross is usually used to determine direction. Four bright stars form the cross. It is identified by its shape and relative brilliance, and by the two bright pointer stars shown in figure 53. The Southern Cross appears to rotate about the South Pole just as the Big Dipper seems to rotate about the North Pole, but in the opposite direction. The groups are about the same distance from their respective poles. To locate the South Pole, consider the Southern Cross a kite. Extend its long axis  $4\frac{1}{2}$  times in the direction of the tail. (See fig. 53.) The point in the sky thus fixed is approximately over the South Pole. Use this point for true south direction. Under favorable light conditions the South Pole star may be identified and used. From the vicinity of the Equator, both the Southern Cross and the Big Dipper are sometimes visible, sometimes only

one of them. When both are visible, they are about equally high above the horizon, but in opposite parts of

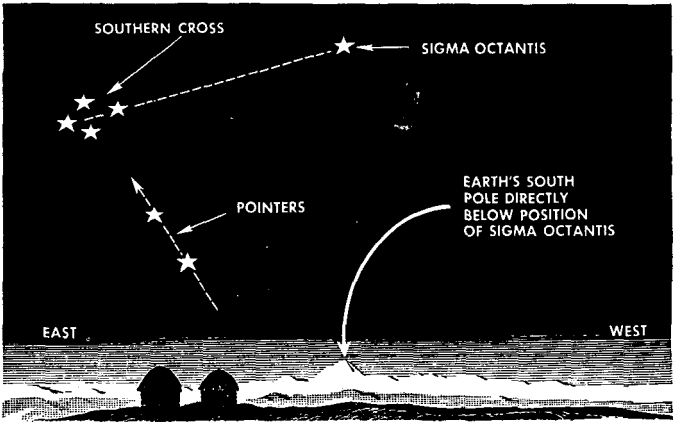


[1]

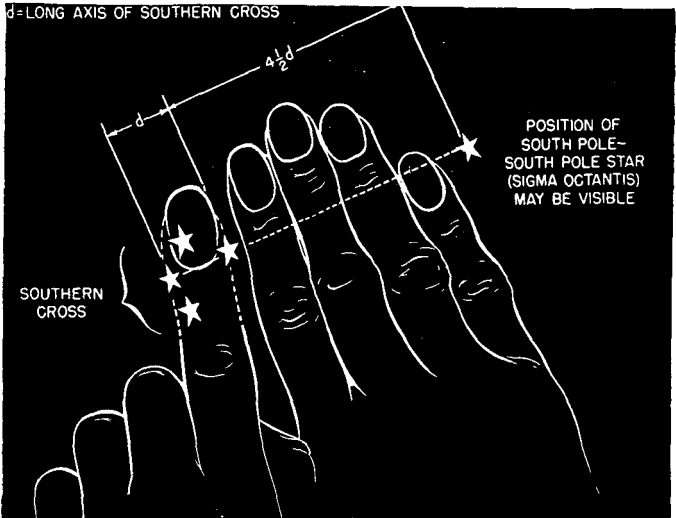


[2]

Figure 52. View of North Star, Big Dipper, and W from Equator.



[1]



[2]

Figure 53. Relation of Southern Cross, "pointer stars," and celestial South Pole.

the sky. As one moves south from the Equator the Southern Cross becomes visible for a greater part of the night. South of the 33d parallel of south latitude, which runs through Uruguay, Cape of Good Hope, and Southern Australia, the Cross is visible all night. For night observation south of the Equator, where the South Pole star cannot be identified and the Southern Cross is not continuously visible, the following procedure may be used. Determine direction at sunset just before the Southern Cross disappears by methods already described. Then select a star in the vicinity of the South Pole, preferably one just rising, and memorize the appearance and position of this star. Use it to maintain direction for the remainder of the night.

**d. By rising and setting of sun.** Observe the times of rise and set of sun on the same day, or the time it sets one day and the time it rises the following morning. Divide by 2 the time elapsed between rising and setting. In the northern hemisphere the answer, added to the time of the sun's rise, will give the hour when the sun is true south.

$$\begin{array}{r}
 \text{Example: Sunrise} \quad 0600 \\
 \text{Sunset} \quad 1900 \\
 \hline
 1900 - 0600 \\
 \quad \quad \quad 2 \\
 \hline
 0600 + 0630 = 1230, \text{ time sun is at true} \\
 \text{south.}
 \end{array}$$

The same procedure applies for the southern hemisphere, except that the direction to the sun is true north.

## 56. PHYSICAL INDICATIONS OF LAND. **a. General.**

The following paragraphs describe certain signs that will aid the alert helmsman in steering toward land. These signs will not of themselves be positive evidence of the proximity of land; yet, correlated with other observations, they will strengthen the probability of finding land nearby.

**b. Clouds.** Clouds and certain distinctive reflections in the sky are the most reliable indications of land.

(1) Small clouds hover over and a little to lee side of atolls. Color of lagoon is sometimes reflected from the clouds and indicates an atoll beyond the horizon.

(2) Small clouds may also hover over coral patches and hidden reefs thus acting as warnings of shoals.

(3) Fixed clouds or cloud crests often appear around the summits of hilly islands or coastal land. Fixed clouds are easily recognized by moving clouds passing by them.

(4) Lights from cities are usually reflected in the sky, especially by high clouds.

(5) In tropical regions, lightning from one particular direction in early hours of morning is usually a sign of mountainous land.

(6) In polar regions, a sharply defined patch of brightness in otherwise gray sky is a sign of areas of floe or shore ice in the midst of open water.

**c. Sounds.** Sound from land is affected by the strength and direction of the wind. This fact must be applied to any sound from land to be useful to the navigator. By shutting the eyes and turning the head to get equal volume of sound in each ear, it is possible to obtain close approximation of bearing of the sound.

(1) Continued cries of sea birds from one particular direction signify roosting place on land.

(2) In fog, if ship's whistle or siren is heard, vessel is moving; but if bell is heard at regular intervals, the sound is coming from a ship at anchor or from a bell buoy.

**d. Birds and insects.** An increase in the number of birds and insects indicates land nearby.

**e. Odors.** Land odors are carried out to sea by the wind. Detection of such odors in fog, mist, rain, or at night is very important as you may be drifting past a nearby shore without seeing it.

**57. WATCH.** Maintain a continuous watch aboard lifeboat, raft, or float. This duty is similar to sentry duty. The man on watch (sentry) looks for rescue parties, steers the boat to prevent its capsizing, main-

tains designated course or changes it as necessary, and informs the boat commander of all that has occurred during that watch. This duty is rotated and should be shortened as necessary when the boat's company becomes exhausted.

**58. ATTRACTING ATTENTION.** Do not waste signaling equipment on the chance someone may see your signal. A real chance of being rescued may be lost a few hours later. Refer to paragraphs 22 and 23 for description of signal equipment aboard lifeboats or rafts. In the absence of such equipment, make yourself conspicuous by churning up the sea with oars or paddles. If an airplane is heard in the vicinity, wait until it is heading in your direction and fairly close to you before firing a signal. Remember, you can hear an airplane long before you can see it or the airplane's crew can see you. Be prepared to fire a second signal to confirm the first. Be sure you are signaling a friend, not an enemy.

**59. RESCUE AT SEA.** **a.** Rescue at sea is the transfer of survivors from one craft to another; it is nothing short of that. Failure to recognize this will result in additional hazards to the survivors.

**b.** Order must be maintained and navigation on a chosen course must continue without interruption even if land or rescue parties are sighted. Though land is sighted a boat may drift away before she can be beached; rescue parties which you see may not see you, may turn out to be other survivors unable to help you, or may be enemy craft. Remember the following points:

(1) *Don't change your course to reach a sighted craft.* If it is a friendly rescue party it will make for your craft and probably be in far better circumstances to do so.

(2) *Don't drink up all the water and eat all the food even if it appears that rescue is possible.*

(3) *Don't consider yourself rescued until you are actually aboard the other craft or are placed under the orders of her commander.*

## SECTION VII

### FIRST AID AT SEA

---

**60. FIRST AID. a.** This text covers only the first aid generally necessary after disasters at sea. The discussion of cases and their treatment is intended for survivors of a shipwreck who must attempt to give medical care to a fellow survivor in the cramped exposed quarters of a lifeboat with the emergency first-aid equipment usually available. To use the following information to the best advantage, you must know the general principles of first aid and their application as covered in FM 21-11. Also refer to paragraphs 21 and 22n.

**b.** In so far as practicable, the various cases will be discussed separately as follows:

- (1) Cause.
- (2) Prevention.
- (3) Symptoms.
- (4) Treatment.

With all cases, remember to use common sense; no two cases are alike; people react differently under hardships.

**61. IMMEDIATE ACTION.** Aid the survivor from the water and place him in reclining position with his head low and his feet raised. Examine him for injuries, swelling, immersion foot, burns, frostbite, numbness, paralysis, shock, and any internal pain or tenderness. Handle him gently. Keep him warm but do not apply heat directly to his body. After making him as comfortable as possible, and if his condition permits, ask



him questions as to the period of exposure, underwater explosions, general conditions during exposure, the amount of sea water drunk, if any, and the amount of food and fresh water he has had. From this information, apply first aid as prescribed in the following paragraphs:

**62. ARTIFICIAL RESPIRATION. a. General.** Aid to breathing may be necessary with patients who have been under water, received concussion shock, or been overcome by smoke or oil fumes.

**b. Procedure.** (1) Lay the victim on his stomach, one arm extended overhead, and the other arm folded under the head. Turn the face toward the extended arm. Wipe water and mucous and loose objects out of the mouth and pull the tongue forward.

(2) Extend and spread the legs. Kneel astride the thigh on the side to which the head is facing to be able to observe the face. Your knees must be far enough away from the victim's hips so that pressure can be applied to his lower ribs. With your arms straight place the palms of your hands on the patient's lower ribs so that the little fingers just touch his lowest rib, the thumbs and fingers are in their natural position, and the tips of the fingers are out of sight just around the sides of his chest. The heels of the hands should be placed as far as possible from his backbone without slipping off. (See fig. 54[1].)

(3) (a) With arms held straight, swing forward slowly so that the weight of the body is gradually brought to bear upon the drowned person (fig. 54[2].) This procedure should take long enough for the count of "one thousand one, one thousand two, one thousand three." Do not bend the elbows while giving artificial respiration.

(b) Now swing backwards so as to remove all pressure completely and suddenly for the count of "one thousand one, one thousand two." Leave the hands in place if possible.

(c) Repeat.



[1]



[2]

*Figure 54. Schaefer method of artificial respiration.*

**63. SHOCK. a. Cause.** In every severe injury the body suffers from a certain amount of shock. This often is more serious than the wound itself and may cause death.

**b. Symptoms.** Symptoms of shock are pallor, rapid and weak pulse, and nausea. Breathing is irregular and similar to sighing. The body may be cold and clammy and chills may be present. The eyes may be glassy and have a fixed stare.

**c. Treatment.** (1) Keep the patient in a horizontal position with feet elevated and head low except when there is an injury to the head. With a head injury the head must be elevated.

(2) Keep warm with sailcloth, blankets, or other means.

(3) Administer stimulants—ammonia inhalant from first-aid kit.

(4).Relieve pain. Give morphine from abandon-ship kit. Dosage: one syrette immediately. May be repeated after 3 hours, if needed.

**64. BLAST CONCUSSION INJURY. a. Cause.** Blast concussion injury is often incurred by swimmers in an area where depth charges, torpedoes, or aerial bombs are exploding. The blast, transmitted through the water, is likely to cause injuries to the lungs, stomach, or intestines.

**b. Prevention.** If expecting blasts described above, float on the back, cross the legs, tense the body, tighten the anus, and keep as near the surface of the water as possible. Get out of the danger area and out of the water as soon as possible.

**c. Symptoms.** If lungs are injured, breathing will be difficult. The patient may spit or cough up frothy blood and may feel abdominal pain. The stomach may be swollen or rigid. Shock may be present.

**d. Treatment.** Lay the victim down with his head low. Keep him warm. Give morphine to ease the pain. Give fresh water in small doses.

**65. EYE INFLAMMATION. a. Cause.** Shipwreck victims are often covered with a heavy coating of dirty oil. The chief danger is eye inflammation. Wind and sun glare will also cause eye inflammation.

**b. Prevention.** Keep eyes covered with a cool, damp cloth during the day or improvise an eyeshade. Keep eyes closed or above water when swimming in oil-covered water.

**c. Symptoms.** Eyes look oil-stained and dirty. They are red, bloodshot, overflowing with tears, and sometimes painful; often there is a sticky crust on the lids. Looking at a light causes pain.

**d. Treatment.** Cleanse with eye dressing from first-aid kit or drop mineral oil into the eyes. To relieve pain cold compresses can be placed over the eyes 10 minutes out of every hour if there are no ulcers in the eyes.

**66. BLEEDING.** Bleeding must be controlled at once. Application of a pressure bandage will be all that is necessary in the majority of cases. If bleeding persists or the bleeding is from a large artery in the arm or leg, a tourniquet must be applied. The tourniquet can be made from strips of cloth torn from shirts or trousers, handkerchiefs, belts, or other similar material. **THE TOURNIQUET MUST BE LOOSENED FOR A FEW SECONDS EVERY 20 MINUTES.**

**67. WOUNDS. a. General.** Stop bleeding by a compress bandage applied to the wound or by application of a tourniquet when necessary. Cover the wound with a sterile dressing and treat for shock.

**b. Chest wounds.** Any wound which penetrates the chest and allows air to enter it may cause collapse of a lung and possible death. To prevent this, immediately apply a dressing to the wound and make airtight by applying folded pieces of relatively impervious material such as sailcloth or raincoat.

**68. FRACTURES OF ARM OR LEG.** In case of fracture only, the broken limb can be fixed in position by splints.

If the broken bone has penetrated the skin do not try to push the bone into place. Cut the clothing away from the fracture site, apply bandage, then splint the limb. Handle the limb gently. Maintain a slow steady pull on the limb as the splints are being applied.

**69. FROSTBITE AND FREEZING. a. Cause.** Insufficient shelter from the wind or water or prolonged exposure to cold may cause frostbite. Frostbite is the freezing of single parts of the body, most often the nose, ears, cheeks, fingers, and toes. If tight clothing reduces the circulation, the extremities may freeze.

**b. Prevention.** Rig up all available shelter from the wind and water. In temperatures below freezing, wet blankets can be frozen and used as protection. If possible dry the clothes. Stimulate circulation by movement and exercise. Stay out of the water. Keep low in the boat and out of the wind. Keep huddled together. Do not expose the extremities to the wind. Storm oil may be used to coat the body to protect against the wind.

**c. Treatment.** If breathing has ceased give artificial respiration. In cases of frostbite do not rub the frozen parts. Thaw frozen parts by applying cool wet cloths at first and increase the temperature of compresses gradually until the skin color is normal. Blisters that appear should be kept clean.

**70. IMMERSION FOOT. a. Cause.** Immersion of the feet in uncomfortably cold water for several hours or more causes immersion foot. It may be made worse by keeping knees bent to conform with the cramped quarters in the boat.

**b. Prevention.** Keep feet dry and warm. Remove tight shoes. Straighten out the legs and elevate the feet. Grease the feet and wrap them loosely, in cloth to protect against cold and moisture. Storm oil may be used to oil the feet.

**c. Symptoms.** The first thing noticed is pain in the feet, followed by swelling of the feet and legs. The skin becomes discolored and blood or water blisters or ulcers

may develop. The feet feel numb and may become paralyzed.

**d. Treatment.** Do not apply heat, avoid rubbing, and never allow any weight to rest on feet or legs. Raise the legs and feet above the level of the body being careful not to damage the skin. Keep the rest of the body warm. Apply cold to the feet and legs but do not let the skin get wet. Either a cold compress separated from the skin by a layer of waterproof material or cold, dry air blown over the skin is effective. Sulfanilamide can be dusted into any ulcers, cuts, or sores on the limbs. Continue treatment and rest until swelling and pain disappear.

**71. BURNS AND SUNBURN. α. Cause.** Burns may be caused by swimming in burning oil, by an explosion, or by exposure to the sun.

**b. Prevention.** Keep the body completely covered even in cloudy weather.

**c. Symptoms.** The skin is highly red in color, irritated and usually blistered. A burning sensation is felt. The skin is sensitive to the touch. Fever. Shock.

**d. Treatment.** Cover burned area with tannic-acid jelly from first-aid kit. Dab, do not rub. Treat for shock. For fever make patient rest and give him cold fluids to drink, preferably water.

**72. HEATSTROKE (SUNSTROKE). α. Cause.** Heatstroke results from exposure to heat and sun.

**b. Prevention.** Retain all clothing and headgear. Rig up awnings from sail, canvas cover, or other material. Take an occasional short swim.

**c. Symptoms.** Symptoms are dizziness, nausea, vomiting, diarrhea, fever, headache, mental confusion, and unconsciousness.

**d. Treatment.** Loosen all clothing. Bathe the head, face, wrists and body in cool sea water. Give small sips of fresh water. Place the patient in a reclining position protected from the sun. Fan and keep cool. Apply cold water to head and extremities.

**73. DEHYDRATION AND THIRST.** **a. Cause.** The body loses water by breathing, evaporation from the skin, and internally through the kidneys.

**b. Prevention.** Refer to paragraph 48 on water.

**c. Symptoms.** Symptoms are loss of weight, rapid pulse, fever convulsions, shock, and inability to urinate. Dryness causes cracks and sores on lips.

**d. Treatment.** Give small amounts of sweetened water if the individual is conscious. Treat for shock.

**74. STARVATION.** **a. General.** Most survivors after long exposure suffer from starvation.

**b. Prevention.** Refer to paragraph 49 on food.

**c. Symptoms.** Symptoms are loss of weight, fever, and shock. Breathing may be shallow and fast. Prolonged malnutrition may cause swelling of the feet—not to be confused with immersion foot.

**d. Treatment.** Give small amounts of soft and liquid foods. Rest. Keep warm. Treat for shock.

**75. CONSTIPATION.** With such little food and water you will have few or no bowel movements. Do not worry about it. Constipation in itself is not harmful in this case. No first-aid treatment is necessary. Do not take laxatives. Laxatives only absorb water from the body and increase the process of dehydration (drying up) of the body.

**76. FAINTING OR UNCONSCIOUSNESS FROM ANY CAUSE.** **a.** Lay the patient flat on stomach, head turned to one side.

**b.** Loosen clothing.

**c.** If he is breathing, use ammonia inhalant.

**d.** If he is not breathing, use artificial respiration. Use inhalant as soon as breathing starts.

**77. MENTAL DISTURBANCES.** **a. Cause.** Usually mental disturbances are caused by severe hardships, prolonged exposure, thirst, starvation, or drinking sea water;

but sometimes they develop when rescue seems probable and the victim becomes overexcited and happy.

**b. Symptoms.** Symptoms are irrational thinking, melancholy, a fixed stare, delirium, and convulsions.

**c. Treatment.** Give victim rest, warmth, and quiet. Prevent the man from injuring himself or leaving the boat. Lash him to the boat if necessary.



## SECTION VIII

### PROTECTION AGAINST WATER ANIMALS

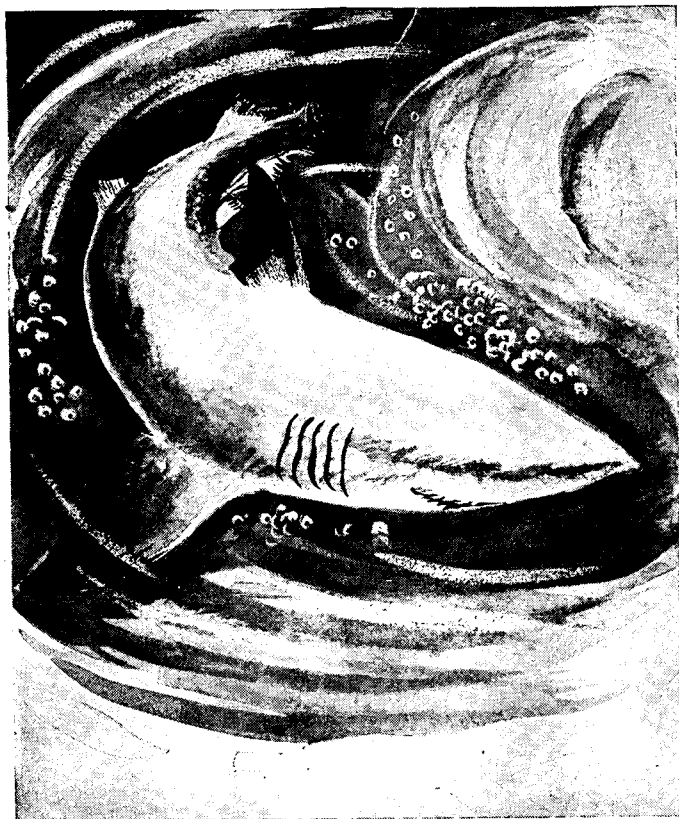
---

**78. GENERAL.** Some water animals attack man only in self-defense; others may attack if attracted by blood, shiny objects, and light colors such as that of a man's skin. Don't drag your hands or feet overboard. The best defense against water animals is to look for them and detour around them. Observe underwater, on the bottom of shoals, among rocks, and at the surface. Swim slowly and quietly. Keep your clothing on if dangerous fish are known to infest the water. Move away from any blood in the water. It is important to remain calm, especially when stung by water animals; their stings will wear away.

**79. SHARK** (fig. 55). **a.** Sharks are distributed widely but are most common in warm seas. They have long, round, slender bodies with the upper lobe of the tail fin longest, and with five distinct openings to the gills along the side of the head. The most dangerous sharks have unsymmetrical tails. The body normally measures not more than 11 feet. The mouth is large and armed with cutting teeth; the nose usually is conical, bluntly pointed, and protrudes well in front of the mouth. Sharks usually attack on the surface and are revealed by their fins, which break the water like a periscope.

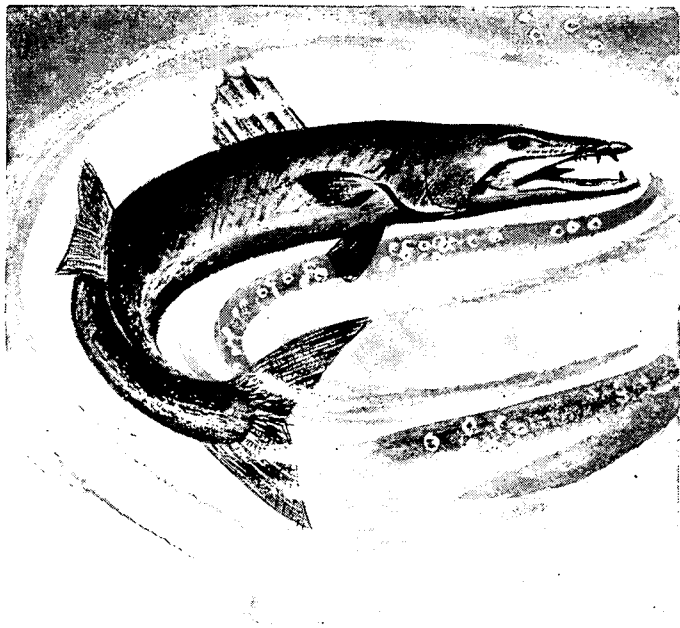
**b.** Defense against a shark attack consists in splashing, moving the arms and legs rapidly, and making a great deal of commotion underwater. Metallic noises such as

striking a canteen under water are best. Avoid display of skin, underclothing, or shiny objects. The snout is



*Figure 55. White shark—"man-eater."*

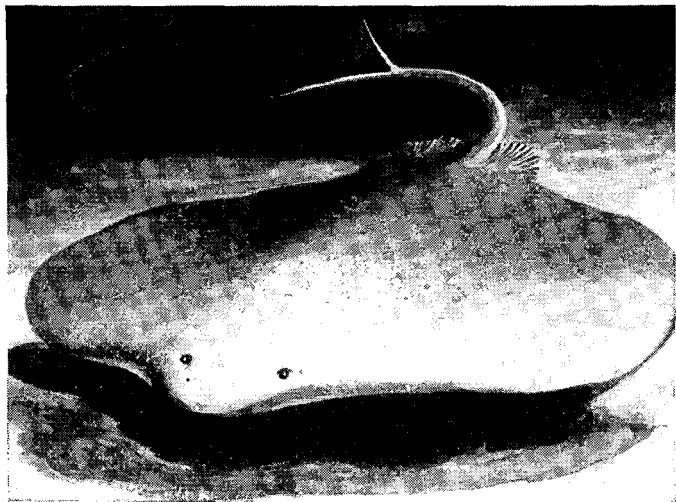
the most sensitive part of the shark's body; by striking a blow on the snout you may drive him away. Treat in the ordinary manner any wounds received.



*Figure 56. Barracuda.*

**80. BARRACUDA** (fig. 56). The barracuda is found only in the warm seas. It is a long, grayish, pikelike fish with long, pointed jaws lined with sharp teeth. It is about 6 feet long and usually is attracted by anything that moves but especially by light-colored or shiny objects. It attacks quickly from below the surface. Creating noise underwater may frighten it away. Treat in the ordinary manner any wounds received.

**81. STING RAY** (fig. 57).  $\alpha$ . Sting rays, found in all warm seas and in some fresh water rivers, are disk-



*Figure 57. Sting ray.*

shaped, flattened fishes with one or two long, barbed spines. The disk is made up of both body and fins. Sizes range from that of an ordinary dinner plate up to 10 feet across. The tail may be as long or longer than the disk. Since they conceal themselves in muddy or sandy flats, they are frequently stepped upon and lash out with their tails, driving the spine into the flesh and injecting a highly venomous substance. Treat wounds like snake bites.

b. When walking in turbid or muddy water, poke ahead of you with a stick and slide your feet along. If stick or feet touch a hidden sting ray it will swim away.

**82. SAW-FISH.** The saw-fish has a body similar to the shark's and, in addition, a swordlike snout is armed with spines on the sides giving the impression of a large double-edged saw. The saw-fish may reach a length of from 10 to 20 feet but it is not vicious. It lives over sandy and muddy bottoms. The saw-fish can swing its

saw back and forth with power enough to break a man's leg. The most tender parts of the saw-fish are the areas around the eyes and at the base of the saw. Defense consists of striking area of eyes and avoiding the saw.

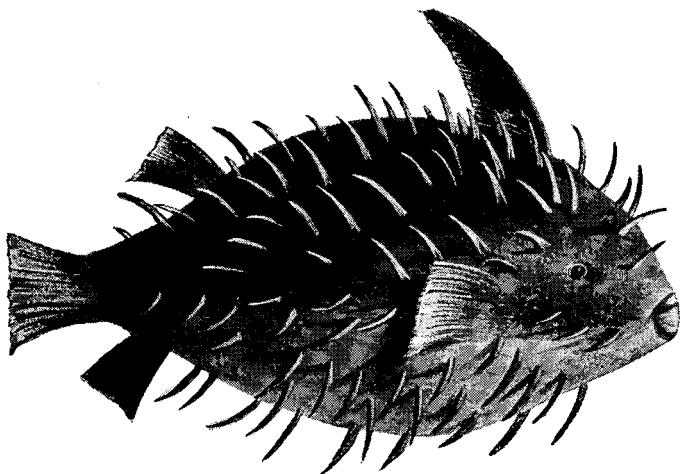
**83. MORAY EEL** (fig. 58). The moray eels are found in all warm seas, especially in crevices about coral reefs. Most morays are brownish or blackish colored with peculiar patterns of varied spots. Some morays reach a length



*Figure 58. Moray eel.*

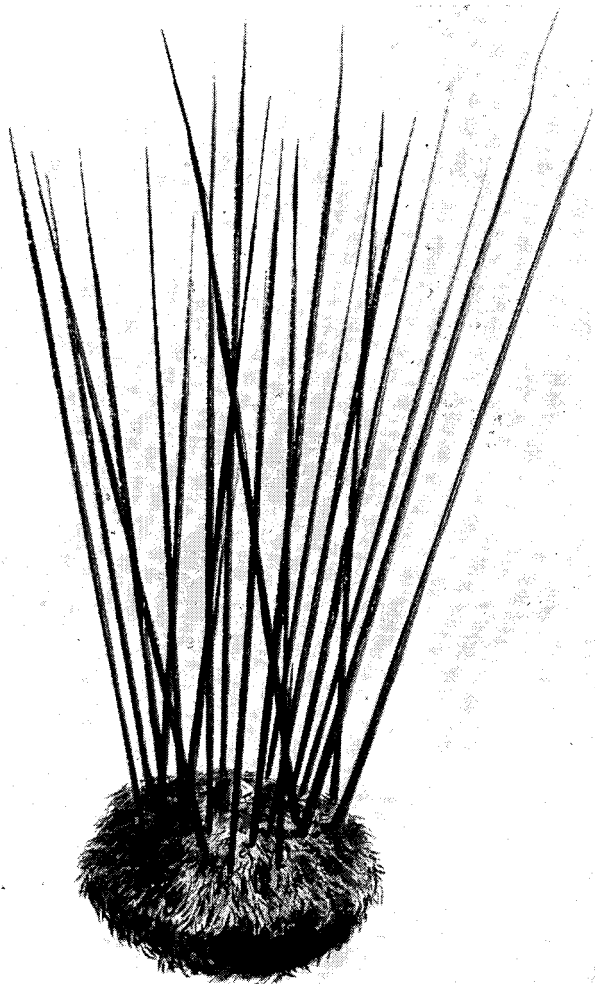
of 6 feet. A knife or spear may be used in defense against the moray. Keep your hands and bare feet out of rock crevices. Treat in the ordinary manner any wounds received.

**84. SEA PORCUPINE** (fig. 59). Found in warm seas, the sea porcupine is recognized easily by its covering of erectile spines. This fish swells itself up by swallowing water or air. It is not ferocious. Its jaws are like the beak of a parrot and powerful enough to bite off a finger if they are molested. Defense consists of keeping out of their way.



*Figure 59. Sea porcupine.*

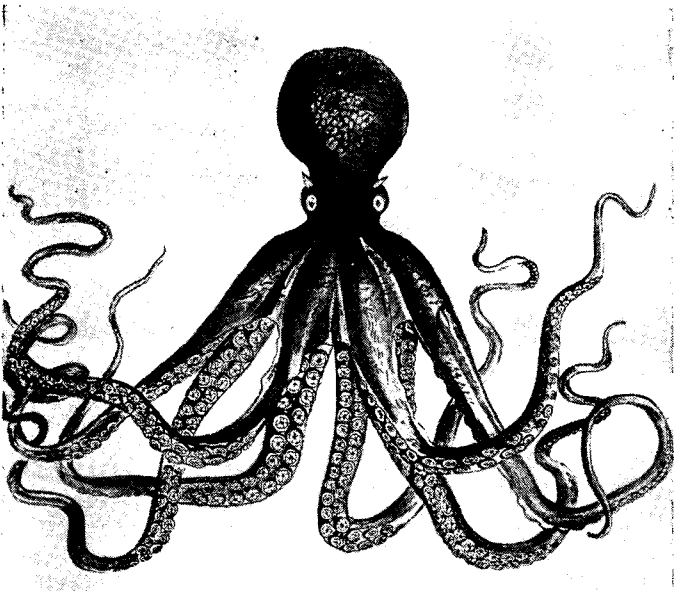
**85. SEA URCHIN** (fig. 60). The sea urchin occurs abundantly on rocks, reefs, and among coral and looks like a pincushion full of long needles. Some sea urchins are covered with numerous movable spines of two different sizes. Sea urchins with short, stout spines are not poisonous. The shorter and finer spine is highly venomous; if it touches the skin gently the poison is injected into the flesh causing sharp, severe pain. Remove the spine and apply iodine. Be suspicious of anything that resembles a sea urchin; don't handle it.



*Figure 60. Sea urchin.*

**86. GIANT CLAM.** Found on the coral reefs in the Pacific and Indian Ocean, giant clams are similar to the ordinary clam but of tremendous size, sometimes weighing more than 500 pounds. The clam is edible, but care must be taken that no part of the body is trapped within the shell, which clamps on to anything that enters it.

**87. OCTOPUS** (fig. 61). Commonly found in the Mediterranean and the Southwestern Pacific, the octopus has a round body and eight arms or legs on each of which



*Figure 61. Octopus.*

are numerous suction cups. The octopus may grow to over 10 feet from tip to tip of the tentacles. It has large keen eyes which shine in the dark. When attacked it emits an inky fluid into the water to screen its actions





*Figure 62. Portuguese man-of-war*

while escaping. The octopus is not a vicious animal and when attacked will try to escape. They occur most frequently along rocky shores and on reefs. Some kinds live at considerable depths in the sea.

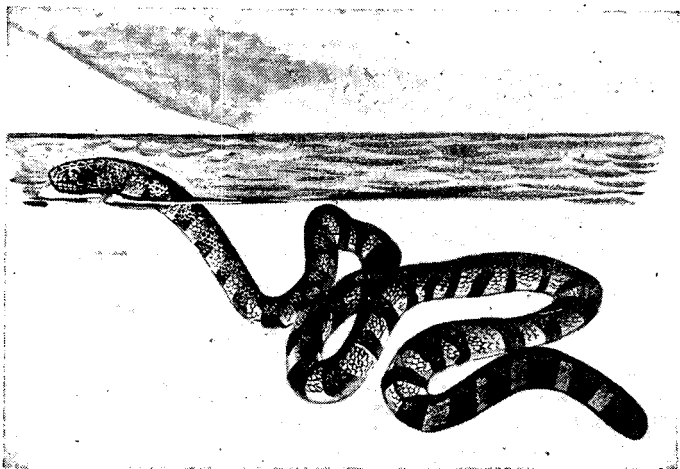
**88. ELECTRIC RAY.** In shape the electric ray is similar to the sting ray except that its tail lacks the sting. On being touched, the animal imparts a severe electric shock from batteries located along its back. If shocked, remain calm and quiet and wait for the shock to wear off.

**89. BLUEFISH.** Bluefish are unusually active game fish abundant in the Atlantic Ocean and English Channel. They are generally 2 to 3 feet long and blue in color. They have razor-sharp teeth and will attack any moving object. Schools of bluefish are dangerous to a swimmer. Treat inflicted wounds in the usual manner.

**90. JELLYFISH.** Found in all seas but more numerous in the tropics, the jellyfish is an umbrella-shaped animal of jellylike substance, with numerous tentacles hanging down from the under side. Jellyfish vary from a few inches to 2 or 3 feet across. Contact with a tentacle causes severe stinging sensation. Application of slightly diluted ammonia water gives immediate relief. If stung while swimming remain calm and swim slowly until the effects wear off. The jellyfish cannot follow you. Clothes give full protection to all parts of body so covered.

**91. PORTUGUESE MAN-OF-WAR** (fig. 62). Commonly found in most war seas, the brightly colored Portuguese man-of-war has a large bladder-like body with long tentacles hanging down from the under side. It usually floats on the surface. It imparts a more severe sting than a jellyfish, but the sting is treated in the same manner. Watch for the floating bladder and keep away from it.

**92. SEA SNAKE** (fig. 63). Sea snakes can be distinguished from eels because they are covered with bony plates or rectangular-shaped scales. They are found in the warm waters of the Indian and Pacific Oceans and, a fresh-water variety, in the Philippine Islands. The sea snake is usually banded with bright colors. The tail is flattened to form a paddle. Sea snakes rarely bite without provocation but stay away from them. Their venom



*Figure 63. Sea snake.*

is poisonous; treat wound immediately. First apply a tourniquet between the bite and the heart. Next with a knife make a criss-cross out of each fang prick and suck out the blood and poison by mouth and spit. Finally apply iodine. If your mouth contains any open wounds have someone else suck the poison.

**93. CROCODILE AND ALLIGATOR.** Crocodiles and alligators are found in fresh water in Africa, Asia, Australia, and America. However, the largest and most dangerous crocodiles take to the open sea in the Indo-Australian region. Crocodiles and alligators are long, thick-skinned reptiles with a vicious, lashing tail and a long snout with big teeth. Stay away from them.

## SECTION IX

### SAFETY MEASURES AND EMERGENCY PROCEDURE IN LANDING CRAFT

---

**94. GENERAL.** **a.** The success of an amphibious operation, assaulting enemy-held beaches, depends chiefly on two elements: surprise and physical fitness of troops. Most landing operations are carried out during darkness to maintain the element of surprise.

**b.** Counterintelligence, safety measures, and emergency procedures will be a command decision but no general rules can hold for every wave nor for *H-1 minute*. Use your common sense. If the operation started in a calm sea on *D day*, by *H-10 minutes* the sea may be 4 or 5 feet; common sense then should tell you not to discard your life belt until absolutely sure you will not need it. Under such circumstances even equipment may have to be lightened to combat essentials.

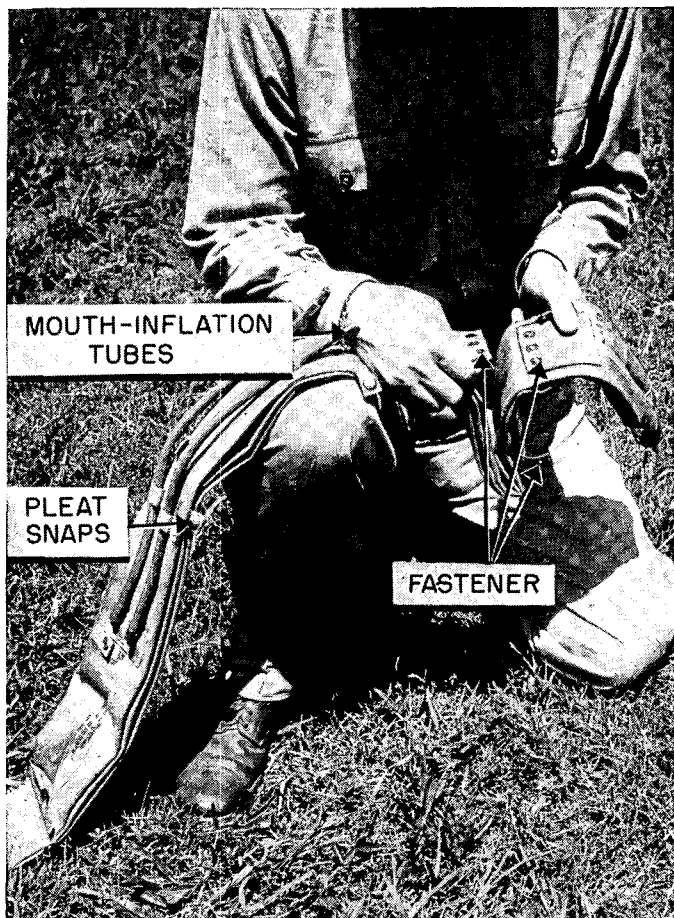
**c.** An amphibious operation consists of three stages:

(1) *Embarkation*. Embarking into landing craft from ship or shore.

(2) *Crossing*. Assembling the landing craft, proceeding to the rendezvous area, and preparing to leave the line of departure.

(3) *Attack*. Crossing the line of departure, approaching the enemy beach, landing, and debarkation.

Individual safety measures for each of the phases are described in the following paragraphs.



*Figure 64. Shorten belt by forming loop and snapping three fasteners. Move loop to point opposite mouth-inflation tubes and snap the tab fasteners.*

## 95. SAFETY EQUIPMENT: CARBON-DIOXIDE LIFE BELTS.

**a. General.** Carbon-dioxide life belts are generally issued to amphibious assault troops. However, other life preservers may be issued. This belt is a rubberized fabric life preserver inflated by two carbon-dioxide bulbs or by mouth. It is put on and worn like a cartridge belt.

**b. To prepare for wearing.** (1) Close valve at end of each mouth-inflation tube.

(2) Secure pleats in belt by snapping two fasteners placed on opposite sides of belt about midway between ends of mouth-inflation tubes.

(3) Shorten belt by forming loop and snapping three fasteners. (See fig. 64.) Move loop to point opposite mouth-inflation tubes and snap the tab fasteners.

(4) Unscrew caps of inflation mechanism and insert a filled carbon-dioxide bulb into each compartment, with slender portion of bulb pointing toward removable caps. (See fig. 65.) Never reverse position of carbon-dioxide bulbs.

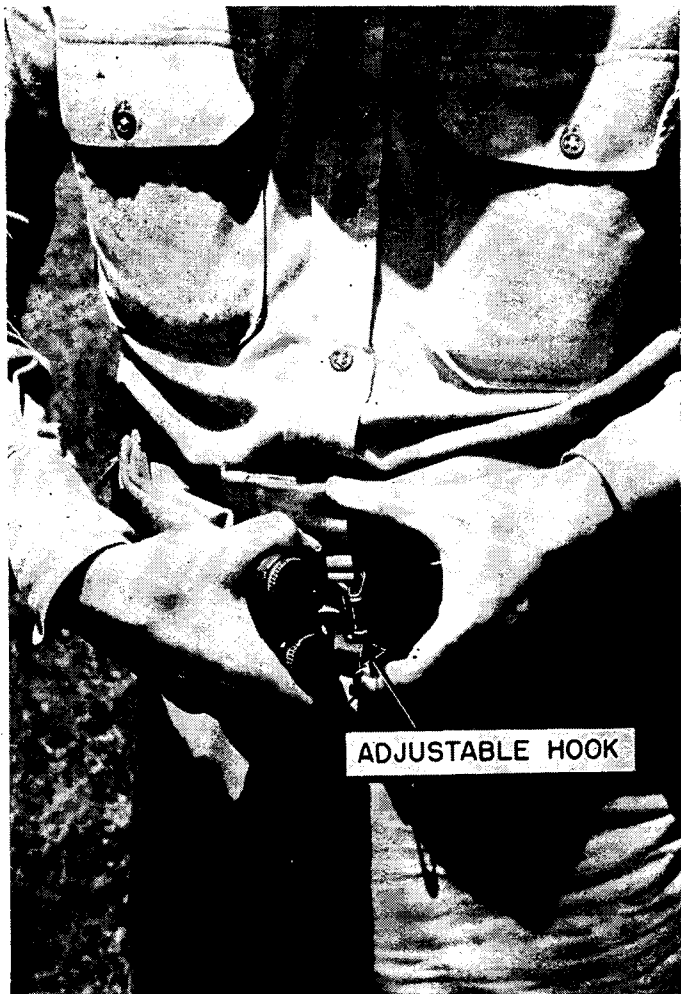
(5) Replace caps and, *using finger pressure only*, screw down tightly to prevent loss of gas when belt is inflated.

**c. To put on belt.** Grasp inflating mechanism with right hand and put on like a cartridge belt. Hook ends together with slotted tongue on inflating mechanism. (See fig. 66.) Do not turn belt *in* against body. Accidental inflation in such a position makes it impossible to remove without injuring belt. It should fit comfortably about waist. Hook may be adjusted by rotating it to unclamp it, moving it to desired position and reclamping it. Small metal rings are set into belt for attaching improvised rope suspenders, if desired. Suspenders are not furnished with belt.

**d. To inflate belt.** Grasp belt to right of inflating mechanism as shown in figure 67. Close hand firmly and quickly and then release it. This movement makes a pair of levers press carbon-dioxide bulbs against firing pins in removable caps. Diaphragms of bulbs are punctured and carbon-dioxide is released, inflating belt. If additional buoyancy is required in either or buoyancy



*Figure 65. Insert carbon-dioxide bulbs with slender part pointing toward removable caps. Never reverse this position.*



ADJUSTABLE HOOK

*Figure 66. Grasp inflating mechanism with right hand and hook ends together with slotted tongue on inflating mechanism.*





*Figure 67. To inflate belt squeeze it with a hard, quick grip at a point marked by two arrows and immediately relax grip.*

tubes, reach around with left hand, pull out desired mouth-inflation tube, unscrew valve, and inflate by mouth. (See fig. 68.) Valve *must then be screwed tight by hand*. To deflate, unscrew caps of inflation mechanisms. The belt may be inflated solely by mouth. In this case, all snap fasteners must first be disengaged by hand.

**e. Use.** The following general rules apply to the wearing of the carbon-dioxide life belt unless otherwise directed by command decision:

(1) When issued, the belt will be worn at all times until the far shore has been reached.

(2) The life belt should be partially inflated by mouth at all times.

(3) It will be worn under the personal equipment. (See fig. 68.) The wearer may discard his equipment without removing the belt when, for example, he finds his equipment is too heavy for the belt to support in the water.

(4) Except for jumping into burning oil, it should be inflated before going overboard.

(5) Life belt normally should be worn high under the armpits so if wearer is stunned or injured his head will be kept above water.

**96. WEARING OF INDIVIDUAL EQUIPMENT. a. General.** Equipment must be worn loosely and with cartridge belt unfastened so it can be removed quickly and easily. If the carbon-dioxide life belt is issued on the ship, it is partially mouth-inflated before leaving the ship and worn until the far shore is reached. If the life jacket is issued on the ship, it too is worn until the far shore is reached.

**b. Equipment with infantry pack.** Troops in the first few waves usually carry the combat pack but may, under some circumstances, be equipped with arms and ammunition only. Succeeding waves carry full field packs. (See fig. 69.) With full field packs, first the gas mask is slung over the left shoulder. The gas mask waist belt is not used; it is tucked into the gas-mask cover. The pack is then slung in the usual manner. The cartridge



*Figure 68. To inflate belt by mouth, pull out mouth-inflation tube, unscrew valve, and force air into tube.*



*Figure 69. Method of wearing equipment with infantry pack for quick removal (but not when in first few assault waves).*

belt is not fastened. This allows the equipment to be removed quickly in an emergency. The front belt suspender on the left side is not attached to the cartridge belt. It hangs loose. The rifle is slung over the left shoulder, butt in front of the shoulder, muzzle down. Slinging the rifle in this manner keeps it from fouling the net while its wearer is climbing up or down. The sling at the shoulder is hooked over the bayonet handle. If the carbon-dioxide life belt has been issued, it is worn under all individual equipment. If life jacket has been issued, it must be put on before individual equipment is slung over it.

**c. Equipment with musette bag** (fig. 70). The gas mask is worn in the prescribed manner except that the shoulder strap is slung over the left shoulder—the waist belt is used. The cartridge belt is fastened. The carbon-dioxide life belt is worn high up under the arm pits. The rifle is slung loosely over the left shoulder, butt in front of the shoulder, muzzle down. Left-handed men can sling the rifle over the right shoulder. The suspenders are carried in the musette bag, which is slung over the right shoulder by the single carrying strap. Wearing the equipment in this manner makes it possible for the soldier to discard his equipment piece by piece. For quick removal paraboats should be worn with only the three bottom holes laced and with the loose lace wound around the boot and tied on the top outside in a double bow knot. (See par. 15c.)

**97. THE EMBARKATION. α. From ships.** Most embarkations will be in total darkness. The time schedule of this operation must be maintained rigidly; speed and silence are essential.

(1) Nets are used for leaving ship. (See par. 17.) The first men in the boat hold the net inside the boat to prevent it from slamming against ship's side and to prevent men falling between boat and ship. Once inside the boat, don't point the muzzle of your rifle straight up; a man falling on it will injure himself seriously.

(2) Crew-served weapons are lashed by two lines, a



*Figure 70. Method of wearing equipment with musette bag for quick removal.*

lowering line and a guide line. The guide line is dropped into the landing craft and is used to guide the weapon away from the net as it is being lowered by the lowering line. As soon as the weapon is aboard, both lines are detached and stowed out of the way of personnel.

**b. From shore.** Arrival of landing craft is synchronized with arrival of troops and supplies. Loading of landing craft cannot be delayed one second. File into your assigned boat quickly and quietly. Footing on docks and aboard landing craft may be wet and slippery; watch your step.

**c. In the landing craft.** Troops are arranged in landing craft in a specified manner depending upon the composition of the team, the type of craft, and the mission the boat team is to perform upon landing. As soon as the soldier reaches his position in the landing craft, he will make himself as comfortable as possible. Equipment is never removed for more than the few minutes required to unkink the muscles unless a longer period is authorized by the boat-team commander. See that your rifle and other equipment are protected from spray; be sure crew-served weapons and supplies are stowed properly against the pitching and tossing of the landing craft. *Smoking is strictly prohibited.*

**98. THE CROSSING. a. Assembly area.** The first stage of the crossing is the assembling of loaded landing craft into formations which can be controlled during the crossing.

**b. Passage to rendezvous area.** This phase of the crossing may require travel over a long distance. Remember, attack during an amphibious operation is always imminent. Be alert. Make yourself as comfortable as conditions permit; stretch frequently, exercise if possible. Take every precaution to maintain your fighting efficiency.

**c. Rendezvous area.** Within the rendezvous area final preparations and check-ups are made on the readiness of troops, equipment, and wave formations for the

final run to the enemy beaches from the line of departure. Remember, the line of departure is the enemy-side limit of the rendezvous area and may be located within range of shore artillery. Silence and secrecy are imperative. Pay strict attention to the final orders of the boat-team commander.

**99. THE ATTACK. a. Crossing line of departure.** Landing craft cross the line of departure in attack formations. Waves are spaced in time intervals and that schedule cannot be changed once the wave has crossed the line of departure. Troops crouch low in the boats for protection. Life jackets are removed (par. 94b) unless the carbon-dioxide belt is being worn. Fix bayonets and check and adjust equipment for combat.

**b. Approaching the enemy beach.** The boat-team commander will warn troops when boat is within effective range of enemy small-arms fire from shore. Enemy attack during this phase is most imminent.

(1) If strafed or bombed by hostile aircraft or fired at by enemy artillery during the approach to the beach, all men must crouch down in the boat behind its armored sides. Gun crews man the machine guns in the boat and return the aircraft fire.

(2) If the boat is disabled, all men remain in it and the coxswain raises a signal flag to notify the following waves. If forced to abandon the landing craft while still in deep water, all men must immediately discard their equipment and put on life preservers. Floorboards or other removable buoyant articles can also be used to keep afloat until picked up. Go overboard to windward. Once in the water, keep out of the way of oncoming boats; there is little chance they can see you.

(3) Protection against strafing is provided by ducking under the surface of the water. Airplanes are so fast and their angle of fire so low that protection is provided by merely bobbing (fig. 1) under the water to a minimum of 24 inches and returning to the surface. Remove life preserver and hang on to the straps while bobbing. Protection against bombing and blast concussion injury



is provided as described in paragraph 64. The best protection is gained by getting out of the water onto a floating object.

**c. Landing.** (1) When the landing craft reaches a point 15 to 20 yards off the beach, the boat-team commander warns his men that the boat is about to hit, so that they can brace themselves against the shock of landing. Debarkation begins as soon as the boat is beached and the ramp lowered, *d* below. However, extreme precaution must be taken to avoid a premature lowering of the ramp. There is danger of such a mistake if the boat slides over a sand bar, giving the impression that the landing craft has been beached though actually it is some distance from dry ground.

(2) If it becomes necessary to take to the water near shore but in water too deep to get a footing, certain precautions must be observed. The infantry pack is relatively buoyant but additional ammunition, the rifle, and the helmet may quickly fatigue even a strong swimmer. Before leaving the boat, equipment is checked for ease of discarding—the cartridge belt is unhooked and rifle is slung diagonally across the back. Also the helmet chin strap is securely fastened under the chin, not on the point of the chin. *When entering the water, one must prevent the helmet from snapping his chin upward.* This is done either by clapping the helmet on the head (fig. 71) or by pulling down on the chin strap (fig. 71) while entering the water.

**d. Debarkation.** (1) *On dry beach.* (a) To escape the great volume of hostile fire that must be expected, rapid debarkation from the landing craft to the beach is essential. Each man disembarks straight over the front corners of the ramp.

(b) When the landing craft is beached, the coxswain keeps the engines running ahead and the propellers engaged to keep the boat headed onto the beach and prevent it from turning sideways. This sometimes causes sudden forward movement of the boat without warning as, for example, when a minor obstruction gives way allowing the boat to lurch forward. If a man is caught



*Figure 71. Methods of keeping the helmet on the head when entering water.*

directly in front of the ramp in the face of such a sudden lurch, he will be seriously injured. Therefore all men must disembark over the front corners of the ramp. The chains which secure the ramp and allow it to be lowered

prevent disembarking over the side of the ramp. Men on the right-hand side of the landing craft disembark over the right-front corner of the ramp and step off to the right oblique. Similarly, men on the left-hand side step off to the left oblique over the left-front corner of the ramp.

(c) Not all types of landing craft are equipped with ramps, and sometimes the ramps may become damaged and jammed. Therefore all men must know how to disembark over the side of a landing craft. In this type landing the same requirements of speed, precision, and safety prevail. One or two men at a time go over each side of the boat near the bow—not over the bow. The rest of the men remain low in the boat below the gunwales, moving forward in the boat as the men in front go over the side. Men who disembark over the right-hand side of the boat hold their rifles in the right hand. They grasp the handrail along the side of the boat with the left hand, the thumb pointing toward the bow of the boat. This is extremely important. If a man grasps the handrail with the thumb pointing toward the stern of the boat, he will be unable to release the rail and will get a broken wrist when his body goes over the side.

(d) Men must lower themselves to the water and not jump from the boat. If they jump they may lose their footing and fall into the water. Men going over the left-hand side of the boat hold the rifle with the left hand, and grasp the handrail with the right hand with the thumb pointing toward the bow of the boat.

(e) Members of weapons' teams disembark in the same manner as riflemen and when they have a firm footing their weapons are handed to them by other members of their crew still in the boat. After receiving their weapons they immediately start across the beach. The remaining members of the weapon crew immediately disembark and follow.

(2) *Into water; wading ashore.* The condition of the beach may be such that the landing craft cannot reach dry land, in which case the boat team will have to wade ashore. Men must not run until they are on dry land.

The insecure footing and the drag of the water against their legs cause men to stumble and fall if they run. In such falls men may be injured and equipment damaged. Men should crouch low to present a small target and move at a rapid walk until they reach dry ground; then they should run rapidly across the beach to the first available cover from which they can engage the enemy.

(3) *Into surf near shore.* Surf is treacherous because it may cause men to stumble and fall. Movement through surf is similar to wading, except that every man must look behind to observe the size of approaching breakers. If they are small, a man can brace himself by standing with his side to the surf and his feet spread for maximum stability. The rifle should be held high to keep it dry. If a large breaker approaches, men must dive or duck into it rather than let it hit them.

## SECTION X

### SAFETY MEASURES AND EMERGENCY PROCEDURE IN RIVER CROSSINGS

---

**100. GENERAL.** **α.** River crossings are similar to landing operations except that in river crossings troops take an active part in operating the boats, distances are shorter, and smaller boats are used. Equipment, tactics, and technique of river crossings are described fully in FM 5-6, 5-10, and TM 5-271. This chapter deals only with the problem of taking care of yourself on or in the water during a river crossing.

**b.** Nonstandard boats such as civilian rowboats or canoes are handled much the same as engineer assault boats but with additional precautions. For example, a canoe is relatively frail and unstable and care must be taken to avoid capsizing it or damaging its skin.

**101. INDIVIDUAL EQUIPMENT.** Individual equipment is worn loosely so it may be slipped off easily if necessary. It is not, however, worn so loosely that it causes noise. All noise and talking except to whisper instructions is prohibited.

**102. ROWING ASSAULT BOATS** (fig. 72). **α.** Passengers without paddles crouch low in the boat, holding their own and the paddlers' rifles upright against the bottom. Men with paddles kneel on their outside knees along the sides of the boat. They hold paddles with the

inner hand on the top of the paddle and the outer hand, back of the hand out, grasping the shaft near the top of the blade.

**b.** Paddle as rapidly as possible without striking the sides of the boat, placing the entire blade in the water. Never stand up in the boat. Do not fire from the boat. The engineer in charge kneels in the stern and steers the boat. Normally the boat is pointed directly at the far bank, by compass if necessary; no effort is made to counteract drift.



*Figure 72. Correct position of passenger and paddlers in assault boat M2.*

**103. ABANDONING THE BOAT.** **a.** If necessary the engineer in charge of the boat will give the order to abandon it. Each man will discard all unessential equipment and jump overboard, stepping on the gunwale and steadying himself with the inner hand on the gunwale as he jumps. Once in the water, swim to the far bank; men must accomplish their primary mission by reaching the far bank with their arms and ammunition.

**b.** Most rivers and streams will have a noticeable current. In swimming across such waters, don't swim against the current as it will exhaust you quickly. Mark

some point downstream on the far bank, diagonally from the place where you enter the water; swim downstream toward this mark.

**104. STORM BOATS.** All personnel except the motor operator lie on the bottom of the storm boat. (See fig. 73.) The engineer operator kneels so he can see to steer. Personnel must not lie immediately in front of the motor, which may pivot into the boat when beaching under power. Upon nearing the far shore, the motor operator warns the boatload personnel so they may prepare to disembark and may brace themselves if the boat is to be beached under power. Disembarking from and abandoning storm boats is the same as described in paragraph 103.



*Figure 73. Correctly loaded storm boat; personnel lie on bottom facing bow.*



## INDEX

	<i>Paragraph</i>	<i>Page</i>
Abandoning ship:		
Conduct .....	28	53
General .....	26	52
Individual safety procedure.....	27, 29	53, 54
Jumping .....	36, 37	62, 69
Leaving the ship.....	32	58
Abandon-ship kit. ( <i>See Kit.</i> )		
Abandon-ship procedure:		
In lifeboats .....	30	54
Launching rafts and floats.....	31	57
Over the side.....	35	62
Alligator .....	93	122
Ammonia inhalant .....	22n	42
Animals, water .....	78-93	112
Back stroke, elementary.....	9	11
Bandage .....	22n	42
Barracuda .....	80	114
Belt, life, carbon dioxide:		
Description .....	95	125
Equipment worn with.....	96	129
Birds for eating.....	49b (3)	89
Blast concussion injury.....	64	106
Bleeding, treatment of.....	66	107
Bluefish .....	89	121
Boat: ( <i>See also safety measures and emergency procedure.</i> )		
Boarding, lifeboats and rubber boats..	33	59
Rubber, carbon dioxide.....	25	51
Bobbing .....	5, 99b	3, 135
Boom ladder .....	18	29
Breast stroke .....	6b	7
Bullet-hole plugs .....	22am, 34	47, 60
Burn, treatment for.....	21, 71	35, 109
Cargo net. ( <i>See Net, life.</i> )		
Casualty:		
Cradle for .....	17e	27
First aid for.....	53, 60	92, 103

	<i>Paragraph</i>	<i>Page</i>
Chart, pilot .....	22g, 55a	40, 93
Clam, giant .....	86	119
Cold, exposure to.....	69	108
Compass .....	22h	40
Compress, first-aid .....	22n	42
Conservation of strength.....	52	92
Constipation .....	75	110
Counterintelligence .....	26c, 94b	52, 123
Crocodile .....	93	122
Currents .....	13a, 103b	15, 141
Dehydration .....	73	110
Distress signals. (See Signal.)		
Dog paddle .....	6a	5
Drill, abandon-ship .....	26d	52
Eel, for food.....	50e	91
Electric ray .....	88	121
Equipment:		
Abandon-ship kit .....	21	35
Belt, life, carbon dioxide.....	95	125
Boat, rubber, carbon dioxide.....	25	51
First-aid kit .....	22n	42
Floats .....	24	51
Individual, wearing .....	14b, 27, 96, 101	18, 53, 129, 140
Individual, with life belt.....	15	18
Inspection aboard ship.....	26b	52
Jacket, life .....	15	18
Lifeboat .....	22, 47a	39, 87
Life net .....	17	24
Light, life-preserver .....	16	20
Raft .....	23	49
Rope, methods of descending.....	20	29
Whistle .....	15	18
Explosion, protection from.....	27k, 64	53, 106
Eye inflammation .....	21, 65	35, 107
Fainting .....	76	110
First aid:		
Abandon-ship kit .....	21	35
Artificial respiration .....	62	104
Blast concussion injury.....	64	106
Bleeding .....	66	107
Burns (see also Sulfadiazine).....	71	109
Constipation .....	75	110
Dehydration .....	73	110
Equipment .....	21, 22n	35, 42

	<i>Paragraph</i>	<i>Page</i>
Eye inflammation . (see also Oil, cleaning solution) .....	65	107
Fainting .....	76	110
Fractures .....	68	107
Freezing .....	69	108
Frostbite .....	69	108
Heatstroke .....	72	109
Immediate action .....	61	103
Immersion foot .....	70	108
Kit .....	22n	42
Mental disturbance .....	77	110
Oil injury (see also Oil, cleansing solution) .....	65	107
Pain. (See Morphine.)		
Sea snake, bite from.....	92	121
Shock (see also Heating pad).....	63	106
Starvation .....	74	110
Sunburn .....	71	109
Sunstroke .....	72	109
Thirst .....	73	110
Unconsciousness .....	76	110
Wounds (see also Sulfanilamide).....	67, 68	107
 <b>Fish:</b>		
Barracuda .....	80	114
Bluefish .....	89	121
Catching .....	49b (2), 50	89, 90
Eating .....	49c (2), 50	90
Eels .....	50e	91
Electric ray .....	88	121
Fresh .....	50	90
Giant clam .....	86	119
Jellyfish .....	90	121
Moray eel .....	83	116
Octopus .....	87	119
Poisonous .....	50	90
Portuguese man-of-war .....	91	121
Saw-fish .....	82	115
Sea porcupine .....	84	117
Sea snake .....	92	121
Sea urchin .....	85	117
Shark .....	79	112
Sting ray .....	81	114
Fishing kit .....	22c	40
Flag, signal .....	22ai	45
Flame, surface, from oil.....	37	69
Flotation, emergency .....	42	76
Floating (see also Treading water).....	5	3

	<i>Paragraph</i>	<i>Page</i>
<b>Food:</b>		
Birds for eating.....	49b (3)	89
Eel .....	50e	91
Fish, eating .....	49c (2), 50	90
Lifeboat .....	49	89
Pemmican .....	49c	90
Seaweed .....	49b	89
Turtle .....	50d	91
Fracture, bone .....	68	107
Frostbite .....	69	108
Heating pad .....	21	35
Heatstroke .....	72	109
Iceberg, water from.....	48b	88
Immersion foot .....	70	108
Infantry pack, wearing.....	96b	129
Iodine .....	22n	42
<b>Jacket, life:</b>		
Description .....	15	18
Jumping with .....	36b	63
Storing water in.....	48c	88
Wearing .....	15b	19
Jacob's ladder .....	19	29
Jellyfish .....	49b, 90	89, 121
<b>Jumping:</b>		
From landing craft.....	99c	136
From net .....	17d	24
From ship .....	36, 37	62, 69
Method .....	10, 35	11, 62
Oil or flame.....	37	69
<b>Kit:</b>		
Abandon-ship .....	21	35
First-aid .....	22n	42
Fishing .....	22c	40
<b>Ladder:</b>		
Boom .....	18	29
Jacob's .....	19	29
Land, physical indications.....	56	100
<b>Landing:</b>		
In landing craft.....	99c, d	136
In lifeboats .....	44f, g	83, 84
In storm boats.....	104	142
Landing craft ( <i>see also</i> Safety measures and emergency procedure) .....	81, 85	114, 117
Lashing equipment .....	47a	87

	<i>Paragraph</i>	<i>Page</i>
<b>Lifeboat:</b>		
Abandon-ship procedure in.....	30	54
Beaching .....	44f, g	83, 84
Boarding .....	33a	59
Command .....	46a, b	86
Equipment .....	22	39
Food .....	22ac, 49	44, 89
Handling .....	43, 44	80, 81
Leaving ship in.....	32	58
Lowering .....	30c	55
Navigation .....	55	93
Righting capsized .....	32c	59
Sailing .....	43b	81
Strafing .....	34	60
Suspension .....	30b	54
Water in .....	48b	88
Life belt. ( <i>See Belt, life.</i> )		
Life float. ( <i>See Equipment: Floats.</i> )		
Suspension of .....	31b	58
Life jacket. ( <i>See Jacket, life.</i> )		
Life raft. ( <i>See Raft, life.</i> )		
Suspension of .....	31a	57
Life preserver. ( <i>See Preserver, life.</i> )		
Lifesaving .....	12b	14
Light ( <i>see also Signal</i> ):		
Life preserver .....	15	18
Living aboard life craft.....	46-54	86
Mental disturbance .....	77	110
Moray eel .....	83	116
Morphine .....	21	35
Musette bag, wearing of.....	96c	132
Navigation .....	55	93
Net, life .....	17, 97a	24, 132
Octopus .....	87	119
<b>Oil:</b>		
Burning on water.....	37	69
Cleansing solution .....	21	35
Injury from .....	65	107
Jumping into .....	37	69
Storm .....	22ai	45
Swimming through .....	39, 41	70, 73
"On your own".....	29	54
Paraboot, wearing of.....	96c	132
Plug, bullet-hole .....	22am, 34	47, 60
Poisonous fish .....	50b	91
Portuguese man-of-war .....	91	121

	<i>Paragraph</i>	<i>Page</i>
Preserver, life:		
Belt .....	95	125
Emergency .....	36b, c, d, e, 42	63, 64, 69, 76
Jacket .....	15	18
Jumping with .....	36b	63
Wearing of . . .	15, 27a, 36b, 37b (1), 94b, 95, 99a, b	18, 53, 63, 69, 123, 125, 135
Provisions, lifeboat .....	22ae, 49	44, 89
Raft, life:		
Equipment, standard .....	23b	49
Handling .....	45	85
Launching .....	31	57
Strafing .....	34	60
Rationing:		
Food .....	49c	90
Water .....	48d	88
Rescue at sea.....	59	102
Respiration, artificial .....	62	104
River crossings. (See Safety measures and emergency procedure.)		
Rowing lifeboats .....	43a	80
Safety measures and emergency procedure:		
Attracting attention; signaling.....	58	102
First aid .....	60-77	103
Individual safety procedure.....	27	53
In landing craft.....	94-99	123
In river crossings.....	100-104	140
Protection against water animals.....	78-93	112
Protection against weather.....	54	92
Saw-fish .....	82	115
Scissors, first-aid .....	22n	42
Sea anchor .....	22ah	44
Sea snake .....	92	121
Sea porcupine .....	84	117
Sea urchin .....	85	117
Seaweed .....	49b	89
Shark .....	79	112
Shock .....	21, 63	35, 106
Side stroke .....	8	11
Signal:		
Flag .....	22aj	45
Lights .....	22j	41
Mirror .....	22ak	45
Pistol .....	22al	47
Smoke .....	22i	41

Sleep, aboard lifeboat.....	51	91
Snakes:		
Eels and .....	50e, 83	91, 116
Sea .....	92	121
Splint-wire, first-aid .....	22n	42
Stars, navigation by.....	55c	96
Starvation .....	74	110
Station, abandon-ship .....	26a	52
Stimulant, ammonia .....	22n	42
Sting ray .....	81	114
Storm:		
Oil .....	22ai	45
Riding out .....	22ah	44
Strafing:		
Landing craft .....	99b	135
Lifeboat .....	34	60
Water .....	34	60
Submerging .....	5	3
Sulfadiazine .....	21, 22n	35, 42
Sulfanilamide .....	21	35
Sunburn ( <i>see also</i> Burns).....	54b, 71	93, 109
Sun, navigation by.....	55d	100
Sunstroke .....	72	109
Surf .....	13, 44, 99d (3)	15, 81, 139
Survivor, immediate treatment.....	61	103
Swimming .....	4-13	3
Back stroke .....	9	11
Basic skills .....	4	3
Breast stroke .....	6	5
Currents .....	13c	17
Definition .....	4	3
Dog paddle .....	6	5
Floating .....	5	3
From ship .....	38	70
Oil or flame.....	39, 41	70, 73
Side stroke .....	8	11
Surf .....	13a	15
To shore .....	13	15
Treading water .....	7	9
Underwater .....	11, 41	12, 73
Tannic acid .....	21, 22n	35, 42
Thirst .....	48a, 73	87, 110
Tourniquet .....	22n	42
Treading water .....	7	9
Turtle .....	50d	91
Undertow .....	13a	15

	<i>Paragraph</i>	<i>Page</i>
Unconsciousness .....	76	110
Undressing in water.....	38b	70
Wading ashore .....	13b, c, 99d (2)	17, 138
Water:		
In lifeboat .....	22m, 48b	42, 88
Salt, injury .....	48a	87
Sources .....	48b	88
Whistle .....	15	18
Wound .....	21, 67, 68	35, 107