

RESTRICTED

PERSONAL

EQUIPMENT

A MANUAL FOR B-29 CREWS

PREPARED BY HDQ. AAF OFFICE OF FLYING SAFETY

PERSONAL

Equipment

A MANUAL FOR B-29 CREWS

PREPARED BY HEADQUARTERS AAF,
OFFICE OF FLYING SAFETY

MARSHALL-WHITE, CHICAGO
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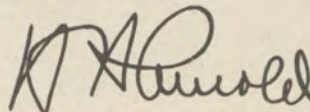
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WAR DEPARTMENT
HEADQUARTERS OF THE ARMY AIR FORCES
WASHINGTON, D. C.

SUBJECT: Personal Equipment Manual

TO : All B-29 Crew Members

1. Pilots and crews of the United States Army Air Forces are not expendable. We want every man to return from every mission in the best condition and with the highest morale possible.
2. To that end much time, effort, and money have been expended to provide you with excellent personal and emergency equipment designed for your protection and comfort.
3. Care and intelligence are required in the use of such equipment. The information in this manual will help to make your missions successful and to bring you back safely.



General, U. S. Army
Commanding General, Army Air Forces

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The success of the mission depends on. . . .

If there was ever an overworked phrase in the Army Air Forces, that's it!

According to the tactical experts, the success of the mission depends on holding the formation. The technical specialists say it depends on the performance of the individual airplane. The armament boys swear that the outcome of the show hinges on fire power. The depot group tells you that supply makes or breaks the mission. And the docs say "physical condition"; the altitude lads say "proper use of oxygen"; A-2 says "combat intelligence"; and so on and on. . . .

Therefore, following precedent, this publication adds with all the authority of bold face type: **"The success of the mission depends on**

the proper knowledge and use of personal and emergency equipment!"

Because it's true!

They are completely right, from the tactical experts down to the administrative clerk who believes his paper forms win battles.

The success of the mission actually does depend on every one of these things and a great many more. Ignorance or neglect of any essential detail may mean inefficient individual performance, aborted missions, casualties.

About the Equipment

The personal and emergency equipment described in this booklet was developed and provided for you because you can't do your assigned job without it.

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Some of it—oxygen equipment, altitude clothing, life vests, among other things—helps protect you against forces of nature which you have challenged by operating out of man's natural element.

Other equipment—including flak suits, flak helmets, and first-aid kits—helps protect you against the forces of the enemy.

Much of the equipment is already long familiar to you, and you are inclined to take it for granted. For example, your heavy awkward parachute or your uncomfortable life vest may seem like a highly overrated nuisance—if you've never had to use it.

It is obvious that none of this stuff is a Little Daisy, Sure-Fire, Never-Fail, Good Luck Charm that will shield you from all harm like a magic cloak. But it offers considerable aid and protection if you exercise intelligence and care in the use of it. The amount of good it will do you—or to put it more plainly—your chance of coming back safely, is directly proportionate to your knowledge of equipment and procedures.

This booklet is an attempt to collect, sort out, and simplify equipment information for your personal use.

The Personal Equipment Officer

Combat experiences showed long ago that the importance of personal and emergency equipment to overall Air Force success is so great as to require the full-time attention of a specially trained officer.

This Personal Equipment Officer, as he is now known, is responsible for supervising the care and upkeep of this equipment, and for instructing you in its proper use.

His activities do not relieve engineering and supply sections of any of their usual functions, although he works in close coordination with these sections as well as with the Flight Surgeon.

Your Responsibility

The fact that Tables of Organization designate officers to handle personal equipment does not mean that you can consider yourself relieved of your responsibility. The PEO can instruct you, and can inspect and care for the material

between missions, but he can't use it for you.

If, in the middle of a flight you suddenly discover that you neglected to learn a vital procedure or forgot to check some faulty equipment, the PEO won't be available to help you!

The Personal Equipment Officer provides regular instruction in emergency procedures and use of equipment, and he will gladly give you any additional information you need. Study his exhibits of equipment; learn how to work unfamiliar gadgets, like the signaling mirror, or the emergency radio.

Use this manual as a reference, and learn the check lists prescribed. Then, practice emergency procedures frequently.

It pays off—just ask the man who's been in combat!

To the Pilot

The ultimate responsibility for emergency equipment and procedures is yours, along with responsibility for all other operations during flight.

Don't take it for granted that all your crew members are well versed in emergency matters. Check each man and see that he knows what he's supposed to know; the safety of every man on the airplane depends on it.

Before each flight, assemble the crew and inspect the equipment of each man to see that he has with him everything required on the flight. The Personal Equipment Officer will furnish you with a check list like the one reproduced on the following page. The required items of equipment for the mission will be noted in the left column. You check off these items as each man exhibits them for your inspection. Only by using the check list can you be sure that nothing is overlooked.

*The Responsibility
is Yours*

TAKE NOTHING FOR GRANTED

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COMBAT CREW PERSONAL EQUIPMENT CHECKLIST

Time _____

Date _____

Airplane Model and No. _____

Pilot's Name _____

Pilot
Copilot
Engineer
Bombardier
Navigator
Radio Operator
Upper Gunner
Right Gunner
Left Gunner
Radar Operator
Tail Gunner

() Jacket, electrically heated																			
() Trousers, electrically heated																			
() Gloves, electrically heated																			
() Shoes, electrically heated																			
() Jacket, intermediate																			
() Trousers, intermediate																			
() Jacket, winter flying																			
() Trousers, winter flying																			
() Gloves, summer or winter																			
() Gloves, rayon insert																			
() Mittens																			
() Shoes, flying																			
() Helmet, flying																			
() Headset																			
() Oxygen mask																			
() Microphone																			
() Bailout cylinder																			
() Parachute—proper type																			
() Parachute first-aid kit																			
() Parachute emergency kit																			
() Life vest																			
() Flak suit																			
() Flak helmet																			
() Goggles																			
() Sun glasses																			
() Pistol, cartridges, clips																			
()																			

Note: Only checked (✓) items are required for this mission.

OXYGEN

Your airplane was designed to operate just as well at high altitude as at low altitude.

Your body wasn't!

All organisms require oxygen to support life. At ground level you get plenty of oxygen from the surrounding air, which is packed down by the weight of the air above it.

As you go up there is less air above you. Therefore, the air you breathe becomes thinner, and your body is less able to get the required amount of oxygen out of it. At 10,000 feet your body is getting barely sufficient oxygen, and you begin to lose efficiency. Somewhere above that altitude—varying with the individual—you'll become unconscious, and then, unless you get some extra oxygen quick . . . that's all, brother!

In a pressurized cabin you can increase the air pressure so that you are breathing air of a simulated lower altitude. As long as the cabin altitude is below 10,000 feet, you're OK. **But remember, when the cabin altitude goes above 10,000 feet, you need oxygen.**

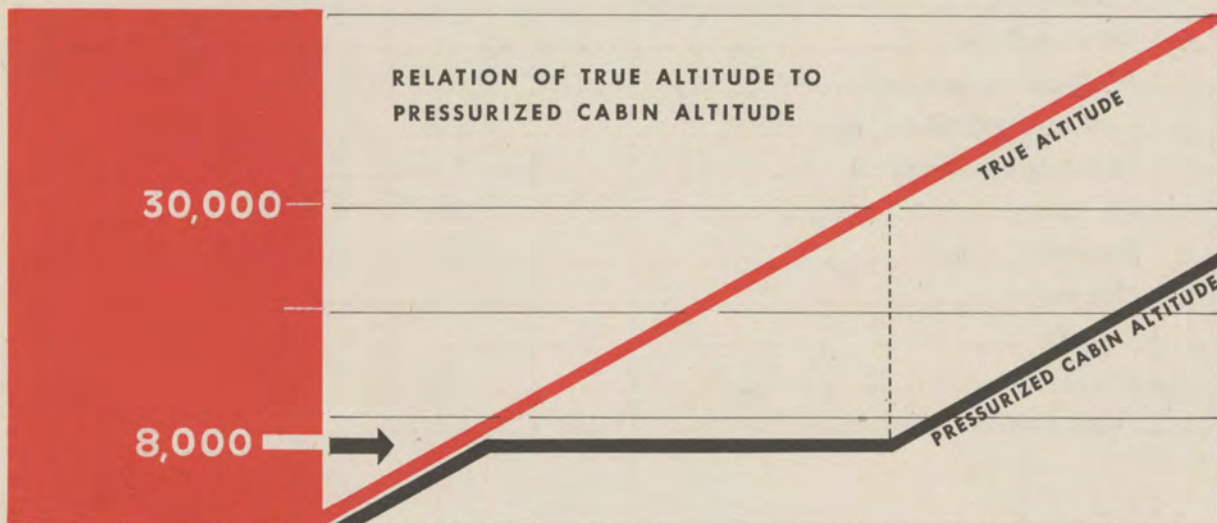
Therefore, your airplane has an oxygen system to meet the requirements of your body and allow you to function normally.

The equipment provided is excellent, simple to operate, and safe for flights up to extremely high altitudes. **But it is not safe unless you understand it thoroughly and follow the rules regarding its use strictly.** You can't take shortcuts with oxygen and live to tell about it!

The lack of oxygen, known as anoxia, gives no warning. If it hits you, you won't know it until your mates revive you from unconsciousness, if they can. Therefore, you must check the condition and operation of your equipment with extreme care, and continue to check it regularly as often as possible during flight.

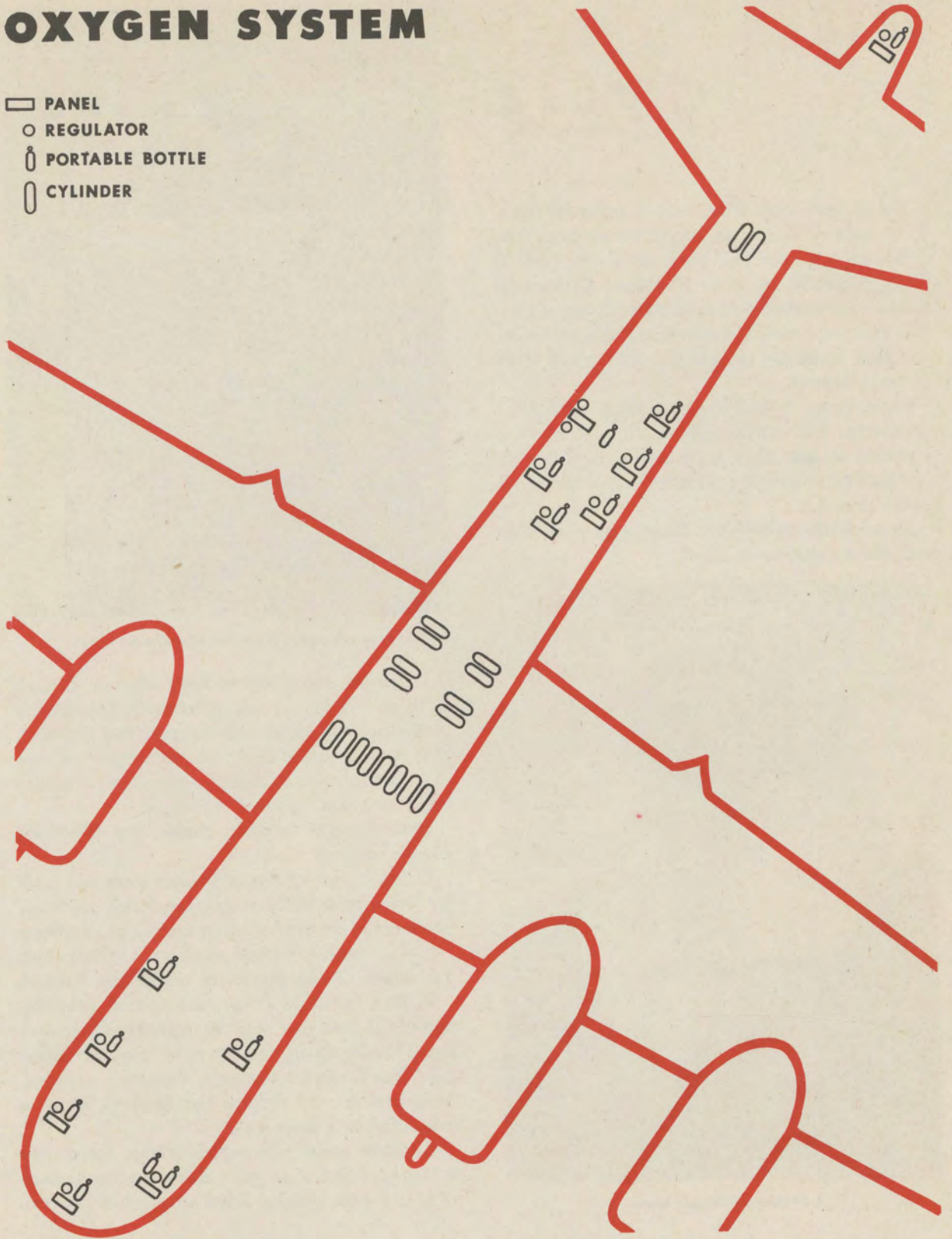
YOUR OXYGEN SYSTEM IS A DEMAND SYSTEM, CONSISTING OF:

- A-14 DEMAND MASK
- A-12 DEMAND REGULATOR
- PRESSURE GAGE
- FLOW INDICATOR
- PRESSURE WARNING LIGHT
- LOW PRESSURE SUPPLY CYLINDERS
- FILLER AND DISTRIBUTION MANIFOLDING



OXYGEN SYSTEM

- PANEL
- REGULATOR
- PORTABLE BOTTLE
- CYLINDER



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OXYGEN

Mask

Your oxygen mask is an item of personal issue. Take care of it. It's as important as your life.

Before you use the mask in flight, have it fitted carefully by your Personal Equipment Officer, or his qualified assistants. They will see that you have the right size, that it fits perfectly, and that the studs to hold it are properly fixed to your helmet.

Then bring it in for re-checking whenever necessary. The straps will stretch slightly after a period of use. It's a good idea to have the fit re-checked regularly whether you think it needs it or not.

Note: Shave every day. Even a short stubble can affect your mask fit.



A-14 Demand Oxygen Mask.



Keep your mask in carrying kit when not in use.

Draw the mask before each mission. Return it to the supply room afterward. Equipment personnel will check it for repair and cleaning. But don't assume that this procedure relieves you of the responsibility of your own regular inspection and care of the mask.

Before each mission, make the following checks on your mask:

1. Look the mask and helmet over carefully for worn spots or worn straps, loose studs, or evidence of deterioration in facepiece and hose.
2. Put the helmet and mask on carefully. Slip the edges of the facepiece under the helmet.
3. Test for leak. Hold your thumb over the end of the hose and breathe in **gently**. The mask should collapse on your face, with no air entering. Don't inhale strongly, because a sharp, deep breath may deform the mask to cause a false seal or a new leak.

Another good test which many flyers use is the sniff test. Ask your Personal Equipment Officer for an inhaler filled with oil of pepper-

mint. Plug the mask into the regulator hose. Turn Auto-Mix to "OFF" position and take several breaths of pure oxygen. Then, with your eyes closed, hold inhaler at various spots around the mask edge. If you can smell the oil, there is a leak. Don't forget to turn the Auto-Mix back to "ON" when you have finished this test.

4. Clip the end of the regulator hose to your jacket in such a position that you can move



Gentle suction test for mask fit.



Sniff test for mask fit.

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Clip hose in position to allow full head movement.

your head around fully without twisting or kinking the mask hose or pulling on the quick-disconnect. Get the Personal Equipment section to sew a tab on your jacket at the proper spot.

5. See that the gasket is properly seated on the male end of the quick-disconnect fitting between mask and regulator hoses. Plug in the fitting and **test the pull**. If it comes apart easily, spread the prongs with the proper spreader tool or a knife blade.

Note: This is only a temporary adjustment. As soon as possible report the difficulty to the equipment men and let them replace the fitting if necessary.

General Tips

Watch carefully for freezing in the mask from the water vapor in your breath at extremely low temperatures. If you detect freezing, squeeze the mask.

Don't let anyone else wear your mask except in emergencies.

Keep it in the kit between flights, and keep it clean.

Report anything wrong with the functioning or condition of the mask when you turn it in after the flight.

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OXYGEN REGULATOR

A demand regulator is mounted at each station in the plane.

There are two types of demand regulators, the Airco and the Pioneer. You may find either one on your plane. They look slightly different but the principle of operation is the same in both.

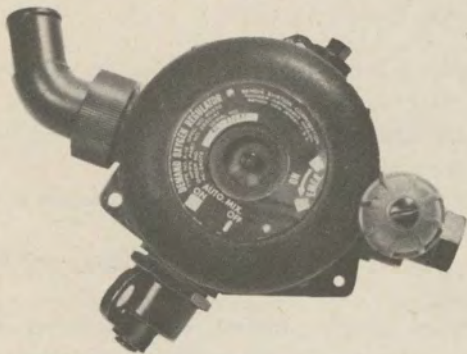
A demand regulator is one that furnishes oxygen on demand, or only when you inhale. No oxygen comes out when you exhale.

The regulator has an Auto-Mix mechanism controlled by a lever on the side of the cover. **The lever should be in the "ON" position at all times** except in certain emergencies. When the lever is in the "ON" position, oxygen furnished below 30,000 feet altitude is mixed with air. The dilution is controlled automatically by an aneroid to furnish the correct amount of oxygen which your body requires for a given altitude. Above approximately 30,000 feet the air inlet closes and you get 100% oxygen although the lever in the regulator is still in the "ON" position.

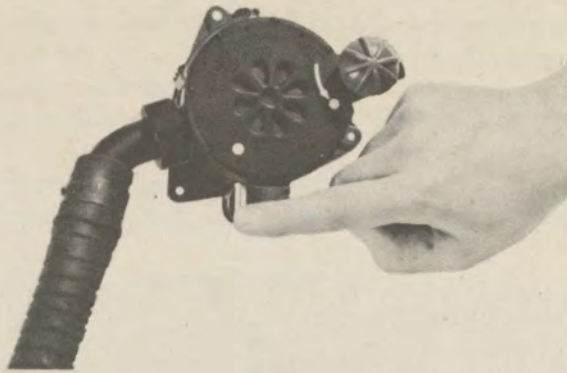
With the lever in the "OFF" position, 100% oxygen is furnished at all altitudes. This wastes oxygen.

Never turn the lever to "OFF" except in the following cases:

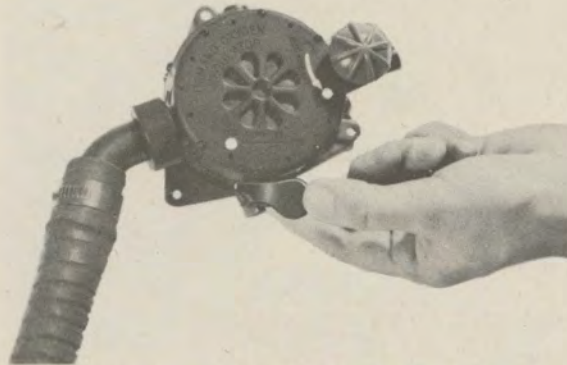
1. To give 100% oxygen to a wounded man below 30,000 feet.
2. If there is poison gas or carbon monoxide in the plane.
3. If the airplane commander prescribes



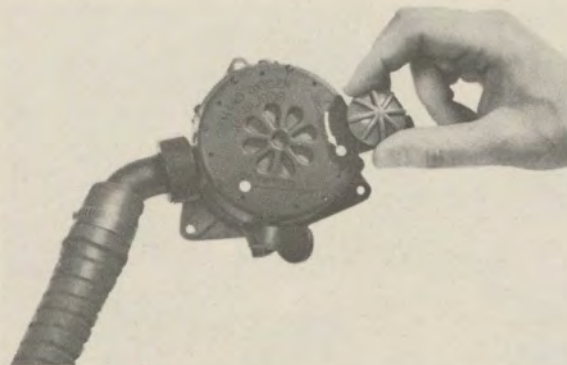
Pioneer Demand Regulator.



Airco Demand Regulator. Auto-Mix "ON."



Airco Demand Regulator. Auto-Mix "OFF."



Operation of Emergency Valve.

breathing 100% oxygen all the way up to high altitude as a protection against the bends.

To operate the Emergency Valve turn the red knob on the intake side of the regulator in the direction indicated on the regulator face.

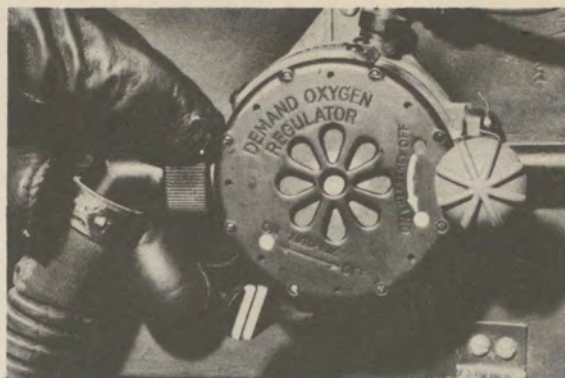
Caution: Never pinch the mask hose or block the oxygen flow when the Emergency Valve is turned to "ON." This action breaks the regulator diaphragm.

Turning Emergency Valve to "ON" causes the oxygen flow to bypass the demand mechanism and to flow continuously into the mask. It is extremely wasteful of oxygen. Leaving the valve "ON" bleeds the entire oxygen supply to the station in a short time.

Never turn the Emergency Valve to "ON," except:

1. To revive a crew member.
2. In cases of excessive mask leakage.
3. Just before momentary emergency removal of your mask at high altitudes, as in vomiting. In such a case unhook one side of the mask and hold it as close to your face as possible.

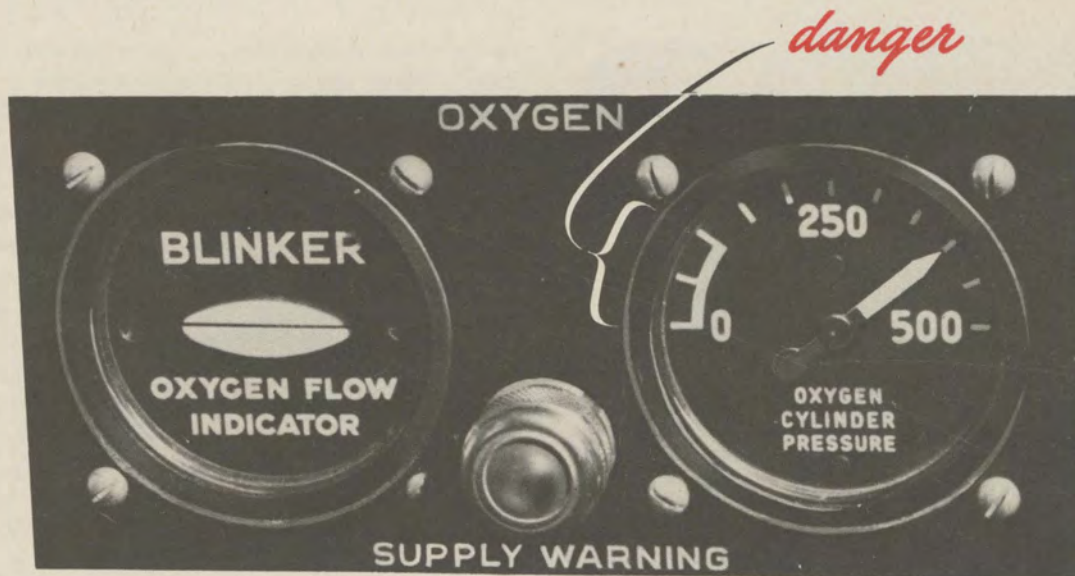
Make the following checks before each flight:



Check tightness of knurled collar.

1. Check the tightness of the knurled collar. It should be so tight that movement of the regulator hose will not turn the elbow.
2. Open the Emergency Valve slightly and see that there is a flow of oxygen. Be sure to close it tight again.

OXYGEN PANEL LOCATED AT EACH STATION



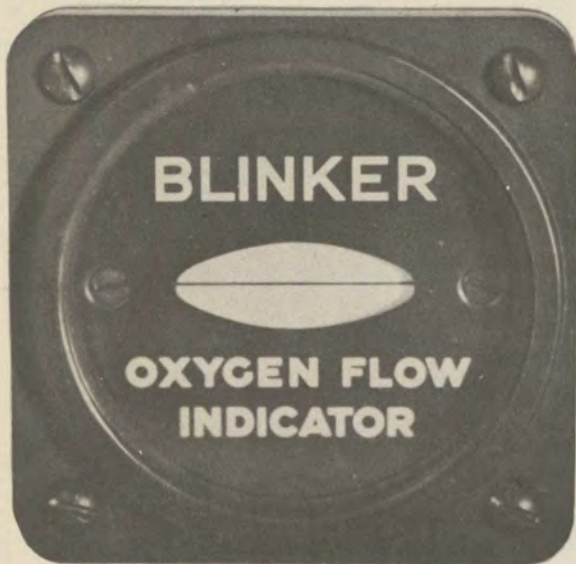
Flow indicator.

Warning light.

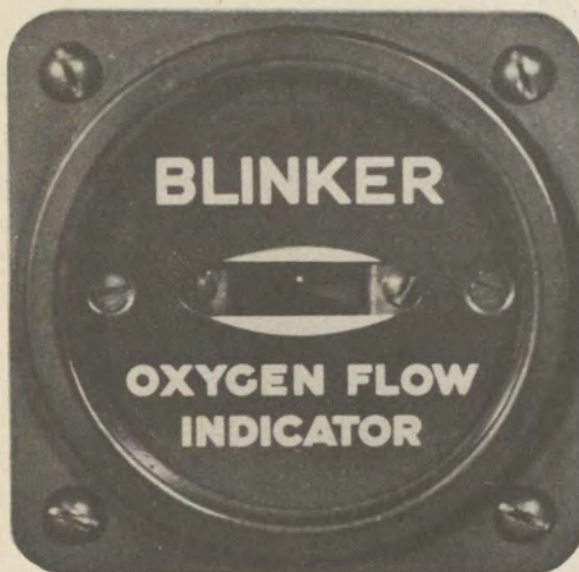
Pressure gage.

Flow Indicator

The flow indicator on the oxygen panel winks open and shut as the oxygen flows. The blinker may not operate normally at ground level with the Auto-Mix lever at "ON," as the blinker operation depends on the flow of oxygen.



Blinker flow indicator, closed.



Blinker flow indicator, open.

Therefore, **before the flight plug in your mask, turn the Auto-Mix lever to "OFF" and see that the blinker works as you breathe.**

Be sure to move the lever back to "ON" before flight.

The blinker does not work when the emergency valve is "ON."

Watch your flow indicator during flight. It is the only indication you have that the oxygen is flowing regularly. If it fails completely, use your portable equipment, notify the pilot, and plug in at another station if possible.

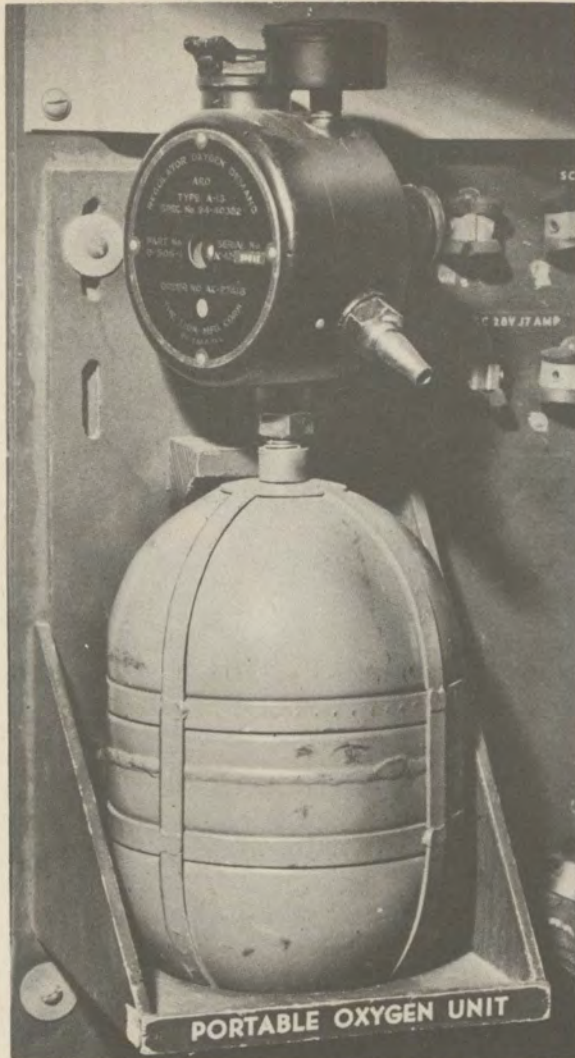
Pressure Gage and Warning Light

Before flight check the pressure gage on your panel. When the system on your plane is full the pressure should be between 400 and 425 pounds per square inch. Check the gage also against the gages at other stations. There may be some variation between stations because of different tolerances in the gages, but if yours is more than 50 lb. sq. in. off the others, report it to the airplane commander.

When the pressure gets down to between 90 and 110 lb. sq. in., the amber warning light in the center of the panel lights up. That means you haven't much of your oxygen supply left. When your light goes on, report this fact to the pilot immediately.

The regulator does not work properly when the pressure gets below 50 lb. sq. in. If you can't get downstairs at that time, use your portable equipment until you can descend.

WALK-AROUND EQUIPMENT



A-4 walk-around bottle on bracket at airplane station.

Two types of walk-around assemblies are furnished on the airplane. One large yellow type D-2 cylinder is provided for each of the following crew positions: pilot, copilot, engineer, navigator, upper and right gunners, and radar operator.

The remainder of the crew positions have the smaller green type A-4 cylinders.

Both types of assemblies are equipped with gages and regulators. The regulators furnish 100% oxygen on demand.

Before each flight, check to see that your walk-around bottle is within easy reach. Look at the gage. If the pressure is more than 50 lb. sq. in. under the pressure of the airplane system, recharge the bottle.

There is a recharging hose at each station. Snap the hose fitting on the nipple of the regulator. Push it home until it clicks and locks. When the bottle has filled to the pressure of the plane system, turn the hose clamp clockwise and remove hose fitting. You can carry out this operation while your mask is plugged into the bottle you are filling.

Suck on the outlet of the bottle to see that it gives an easy flow of oxygen.

Always use a walk-around bottle if you have to disconnect from the airplane system. Hold your breath while you are switching to the bottle. Clip the A-4 bottle to your jacket. Carry the D-2 bottle in the sling provided for it.

The duration of the walk-around oxygen supply is variable. Don't depend on it to last very long, regardless of what you have heard about the capacity. **Keep watching the gage, and recharge the bottle when it needs it.**

Always recharge walk-around equipment after use.



Recharging the D-2 walk-around bottle.

BAILOUT CYLINDERS

The bailout cylinder is a small high-pressure oxygen cylinder with a gage attached, which furnishes a continuous flow of oxygen.

The cylinder comes in a heavy canvas pocket provided with tying straps. Have this pocket sewed and tied securely to the harness of your parachute.

Before flight check to see that the pressure of the cylinder is at 1800 lb. sq. in. Plug the bayonet connection on the hose into the adapter on your mask.

If you have to bail out at altitude, connect your mask to a walk-around bottle, and make your way to the proper exit. Just before jumping, open the valve on the bailout cylinder and disconnect your mask from the walk-around bottle.

For further dope on bailout at high altitude see PARACHUTES.



Keep bailout cylinder hose plugged into mask.

DURATION OF SUPPLY

The oxygen supply of the airplane is carried in 18 type G-1, low pressure, non-shatterable cylinders. The entire system is filled from one filler valve, located on the outside of the fuselage, just forward of the wing root on the left side. Sixteen cylinders are located in the center fuselage section, and two in the interior of the aft non-pressurized section.

The latter two cylinders supply the tail gunner, whose oxygen delivery is separate from the rest of the system.

The duration of oxygen supply varies with the requirements of the individuals, their activity, the temperature, altitude, and charge of the system. It is impossible to make positive statements about how long your supply will last.

Duration charts can be worked out by your Personal Equipment Officer, however, which will offer some basis for computing your remaining supply. The oxygen computer, illus-

trated on next page, will also give the remaining man hours of oxygen fairly closely. The pilot, flight engineer, and navigator carry computers.

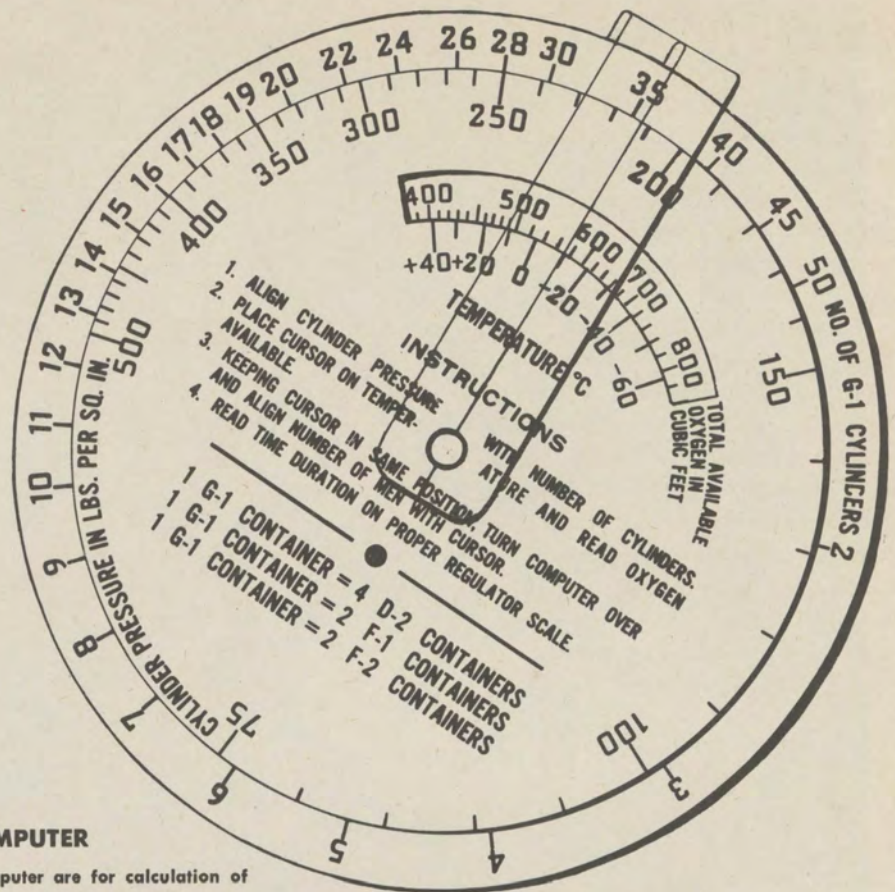
Remember, however, that these computations are theoretical. They are based on averages and only furnish a rough guide. The experience of your own crew with your own airplane will furnish additional information for judging your duration.

In general, with 400 lb. sq. in. pressure, Auto-Mix "ON," there is more than ten hours supply of oxygen for a crew of 11 flying at 15,000 feet.

Both types of regulators are least economical between 20,000 and 30,000 feet. The supply lasts longer above 30,000 feet than it does between 20,000 and 30,000 feet.

The duration differs according to the type of regulator used, Airco or Pioneer.

If any cylinders have been shot out, figure only the remaining number when using duration charts or computer.



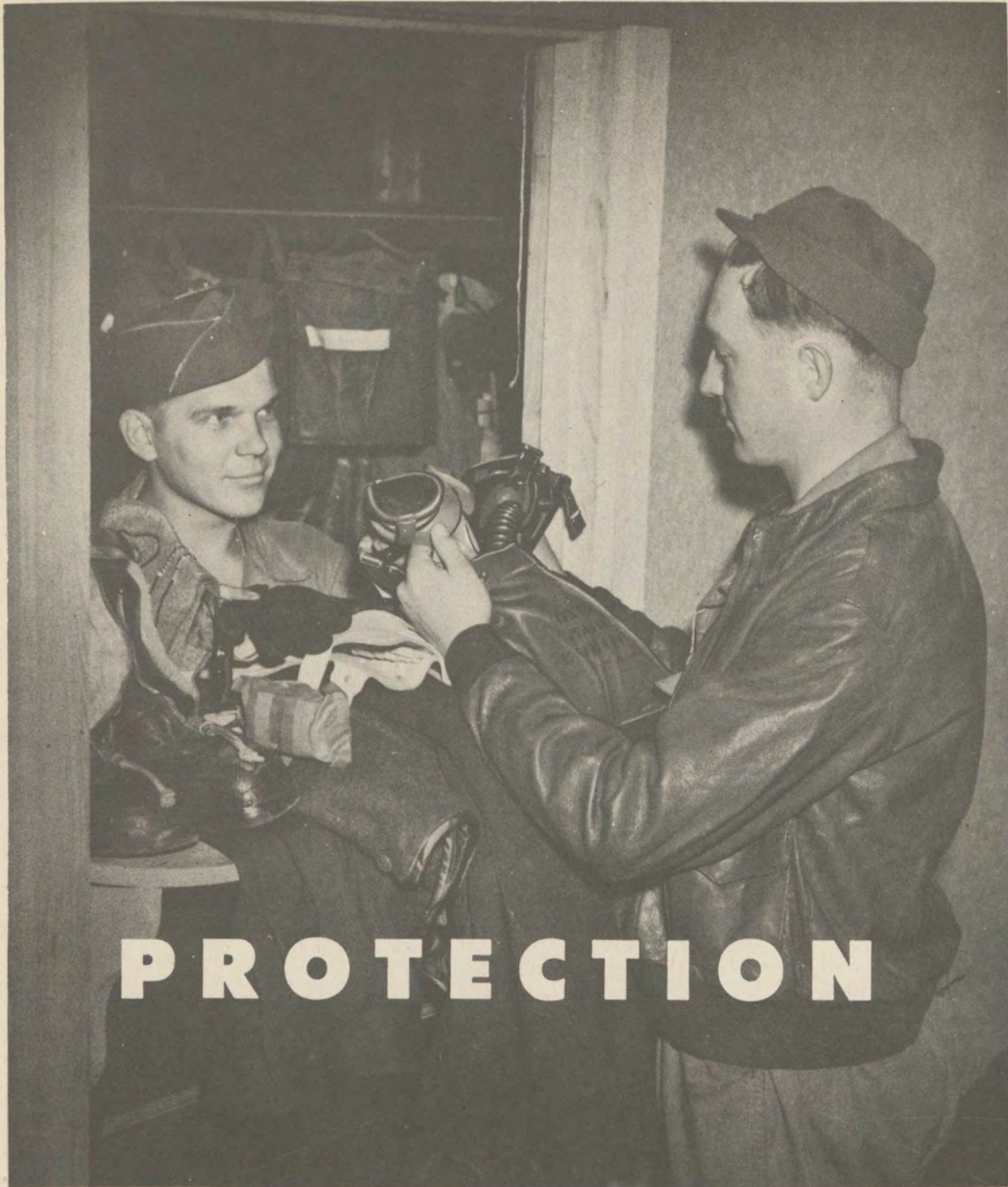
OXYGEN DURATION COMPUTER

The instructions printed on the computer are for calculation of duration of supply in hours. Your Personal Equipment Officer can show you how to compute for any of the variables involved.

Remember

YOUR OXYGEN EQUIPMENT IS YOUR LIFE!

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PROTECTION



Draw all equipment needed from storage room before mission and return it afterward for drying, cleaning, and any necessary repairs. Report anything wrong when you return equipment.

COLD WEATHER CLOTHING

Protection against cold is a vital problem in high altitude flying. **At times frostbite has caused more casualties than combat.**

Most cases of frostbite occur because flyers don't appreciate the seriousness of the problem, or because they misuse the equipment furnished for their protection.

One of the difficulties is that many crew members don't know what frostbite actually is, until they experience it. The name is deceiving. It doesn't sound particularly dangerous, and to many men frostbite means the non-serious numbness which you often feel on face or hands in moderately cold weather.

Actually frostbite involves the complete freezing of body tissue. Depending on the degree of cold and time exposed, the results of frostbite range from serious incapacitating sores, to death. Loss of fingers and toes is frequent in high altitude crews who are careless about their clothing.

Adequate heating of all stations on airplanes is obviously impractical. Therefore your clothing is your main protection against frostbite. And the clothing provided really protects, if you exercise care in the use of it.

Your basic flying suit is the electrically-heated suit. When this suit is insufficient, add the intermediate flying suit over the electric apparel.

Remember to wear extra gloves also when you add extra clothing.

Most of the following precautions concerning use of cold weather clothing pertain to both heated and non-heated apparel.

Keep your clothing dry! Moisture freezes and greatly reduces the effectiveness of all clothing as protection against cold.

Before a mission, dry your skin with a towel and then dress slowly. Don't dress so early that you have to stand around for some time with heavy clothing on. The resulting perspiration

will soak into the suit and freeze later.

If it's raining, wear a raincoat and galoshes over your flying equipment to the plane and let the ground crewmen take them back.

Under the type F-2 electrically-heated suit wear woolen underwear with long sleeves and legs, and a woolen shirt.

When you get the type F-3 electrically-heated suit, wear it over normal GI ground clothing for the theater in which you are operating. Wear the intermediate flying suit over the F-3.

With either electrical suit wear wool socks, electrically-heated felt liners over them, and then your flying boots.

Always wear rayon gloves under your electrically-heated gloves. Never remove your gloves in low temperatures if you can help it. With your gloves on, practice all operations which you may be required to do in flight, so that you won't have to expose your hands.

Keep your clothing clean, particularly your underwear. Soiled clothes lose their insulating qualities. And here's a tip: Wash your own clothes rather than hire a native washwoman. She'll mangle them, but literally!

Have all holes in clothing sewed up immediately. Even a small rip can admit enough cold air to be dangerous.

Don't wear tight clothing. Constriction of circulation hastens frostbite. During flight be sure to ease the restriction of tight seat belts or parachute harness often enough so that circulation of blood is not cut off.

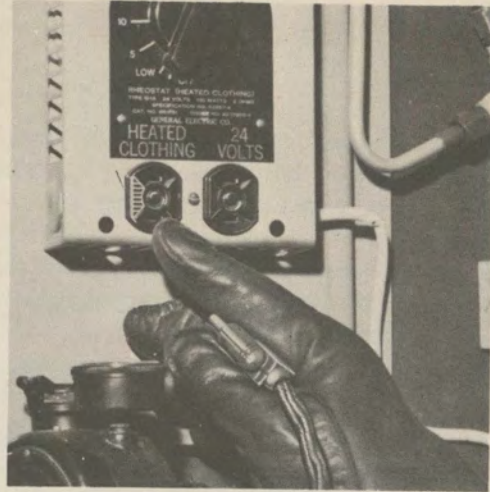
Wear goggles at all times during the mission. They are excellent protection against cold, flash burns, and solid fragments.

Caution: When using the electric suit keep the rheostat at the lowest comfortable heat. Don't climb hot. It will mean perspiration and freezing at higher altitudes.

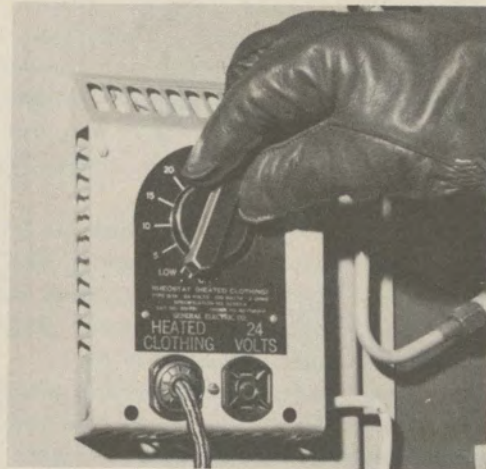
Note: For further dope on frostbite see FIRST AID.



Type F-2 electrical flying suit. Add a wool or silk scarf around your neck to seal the space between collar and helmet.



During warm-up of plane, plug electrical suit extension plug into left outlet. The left outlet works off the rheostat; the right is full current.



Turn up rheostat to see that suit heats; then turn it back off.



Carefully connect all circuits.

LIFE PRESERVER VEST

Wear the vest at all times on flights over water.

When the vest is first issued to you, put it on and inflate it by mouth valves (don't waste a carbon dioxide cartridge doing this) to adjust the fit of the straps. With the vest inflated the waist strap should be fairly tight and the crotch strap snug. Deflate by opening mouth valves and rolling up vest.

Keep the ends of the mouth valves bent down, or cut them off flush with the retaining loop, so they won't poke you in the eye when the vest is inflated.

Wear the collar of your jacket over the collar of the life vest. And, of course, wear the life vest **under** your parachute harness.

Whenever you are wearing the life vest, tie your parachute first-aid packet to the vest strap, not to your parachute harness. When you bail out into water you lose the chute, and you might need the packet.

Before each flight inspect both CO₂ inflators. Always check the mouth inflator valves to see that they are closed. If the valves are even partly open the CO₂ goes right on through and out when you pull the cords for emergency inflation.

Keep the ripcords looped up over the inflators so that they will not catch on something and accidentally inflate your vest during flight.

Notice the sea marker tab on the life vest in the illustration. When rescue planes approach, release the dye by pulling down on the tab. Stir the chemical around to color as large an area of the water as possible.

Life vests must be inspected every six months. Check the date stenciled on the vest. See that it is turned in for inspection at the proper time.

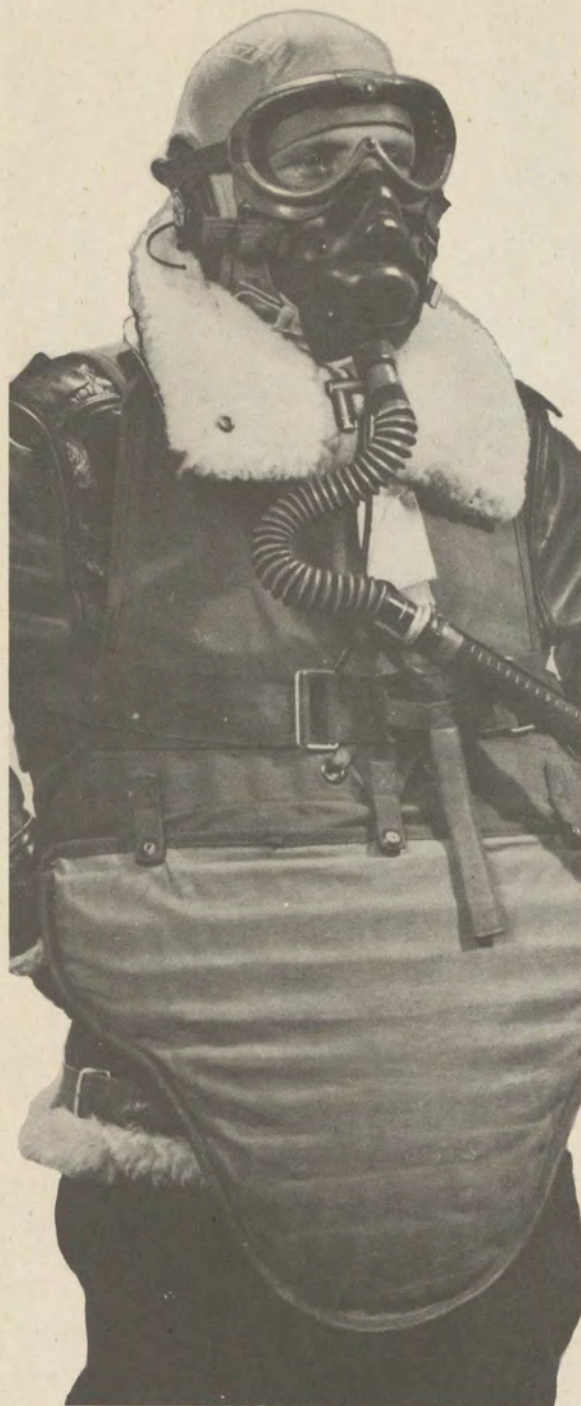
Note: See illustrations under PARACHUTES.



Check CO₂ inflator before flight. See that the cartridge seal is not punctured. The puncturing arm should be in a vertical position, and safetied with light wire. The cartridge goes in with small end down. Screw the cap down tight when you replace it.

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FLAK SUITS



Flak Suit—Pilot's, copilot's, and tail gunner's suits have unarmored back, all others have full armor. Pulling the ripcord at the center of suit causes the whole suit to drop off.

Flak suits consist of armored vest and apron assemblies. They are not personal issue, but they should be delivered to the plane before the flight and picked up afterward for inspection. You couldn't carry one anyway, with everything else you're lugging. Report to the pilot if you don't find a flak suit in the plane for you.

Wear the suit when you approach the target area. It's heavy but it's guaranteed that you won't notice the weight when the fight begins to get hot.

Note: Ask your Personal Equipment Officer to have a tab sewed on your flak suit for your oxygen mask hose clip.

FLAK HELMETS

The flak helmet is personal issue. If you have worn both your flak suit and flak helmet on the mission, you have a good chance of returning the helmet to the supply room **personally** after the flight.



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FIRST AID

Many a crew member is alive and flying today only because one of his buddies knew what to do for him when he was injured.

Would you have known what to do?

Prompt and efficient first aid frequently means the difference between life and death to injured men. Take advantage of every opportunity to learn first-aid procedures and to familiarize yourself with the location and use of the various first-aid kits in the airplane.

Two of your crew members have been given special training in first aid. This fact does not, however, excuse you from further preparation for emergencies. It may be the trained men who need help.

THE GENERAL OBJECTIVES OF FIRST AID ARE:

- STOP BLEEDING
- SUSTAIN BREATHING
- PREVENT SHOCK
- RELIEVE PAIN
- PREVENT INFECTION

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WOUNDS

Don't touch the wound.

Press or tie a small Carlisle bandage tightly against the wound to stop bleeding. Don't touch the sterile side of the dressing.

If bleeding cannot be stopped by firm pressure, apply tourniquet above the wound. Release tourniquet every 20 minutes.

After bleeding has been controlled, sprinkle sulfa powder in wound and reapply a dressing.

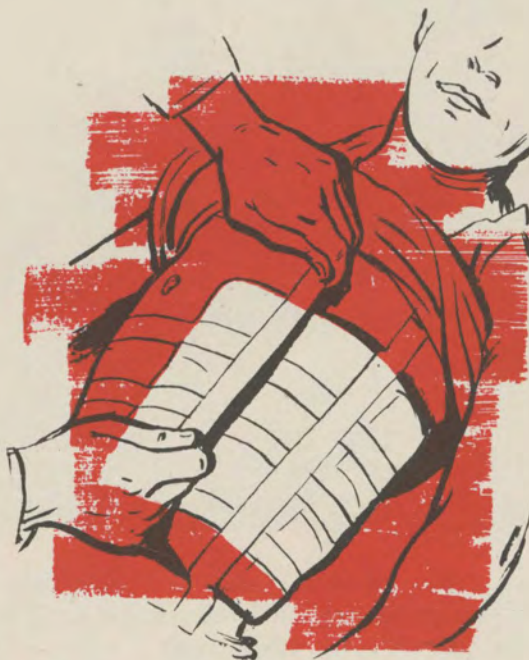
Give 8 sulfa tablets by mouth.

Use morphine for pain.



GAPING WOUNDS

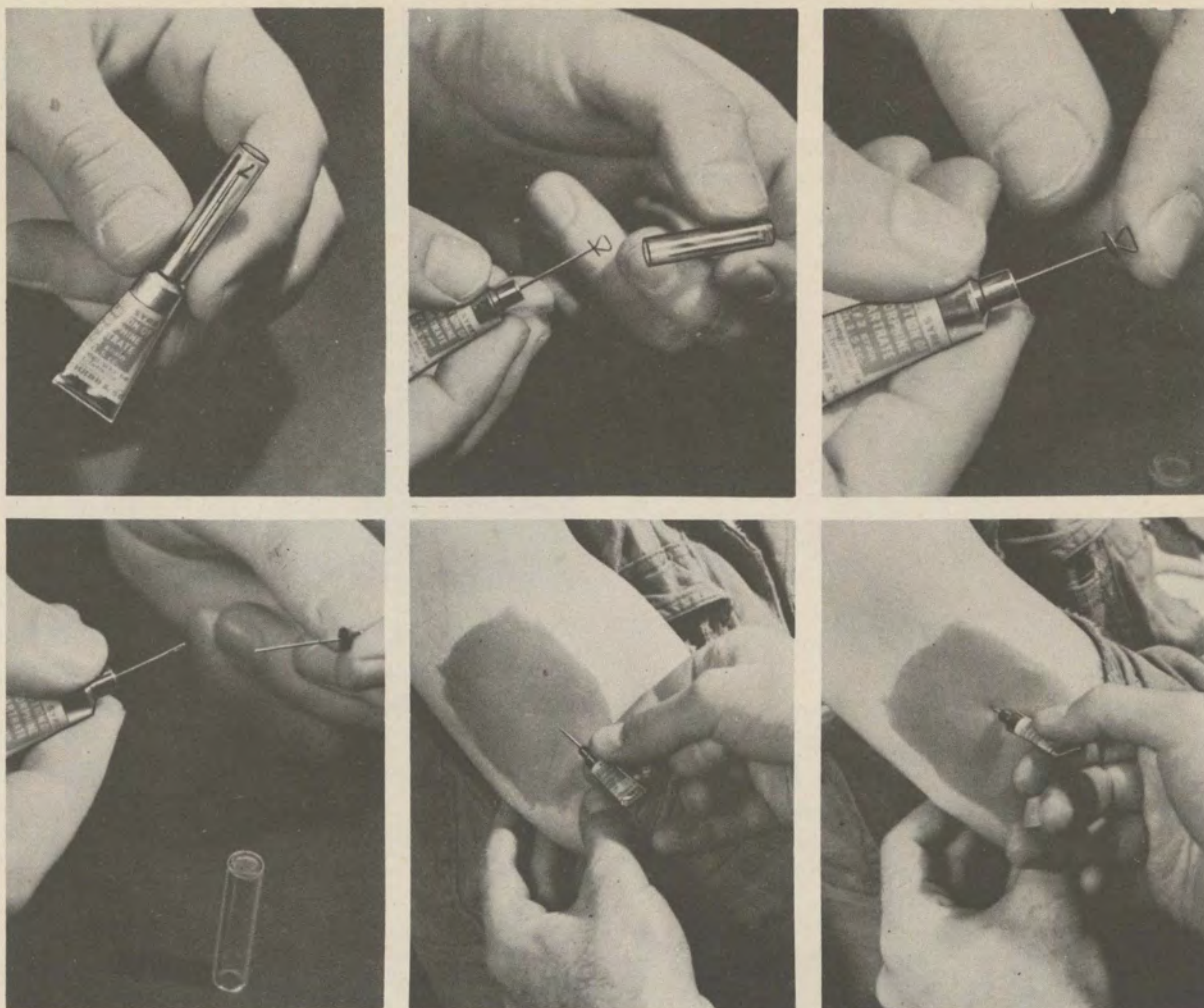
CHEST AND ABDOMEN



Stop bleeding by packing tightly with sterile side of large Carlisle bandage. Smear the dressing with sulfa burn ointment and tape it tightly in place with strips of adhesive tape.

Use morphine for pain.

Treat for shock.



MORPHINE

Paint skin area to be injected (any handy spot) with one coat of iodine.

Remove cover of syrette.

Push wire loop in to break seal.

Remove wire loop from needle.

Hold syrette at metal collar and thrust needle into arm.

Inject morphine by squeezing tube.

Note: Morphine is a powerful drug for the relief of pain. But it is dangerous if too much is given. The danger point is indicated by the injured man's rate of breathing; never give

morphine to a man who is breathing less than 12 times per minute. It takes a while for morphine to take effect; therefore, wait at least one half hour before repeating an injection of one syrette. After that, if the pain is still severe, you can repeat the dose provided the rate of breathing is more than 12 times per minute.

Warning

Don't give morphine to an unconscious man.

Don't give morphine if the man is breathing less than 12 times per minute.

Don't repeat morphine injection for at least 30 minutes.

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BURNS

Smear burn ointment on sterile side of dressing, being careful not to touch it with your hands.

Apply dressing to burned area, tying or taping it in place.

Give morphine for pain.

Treat for shock.



BROKEN BONES

Don't move the man if you can avoid it. Splint the broken limb.

Splinting principle is the same for breaks in lower arm, upper arm, and lower leg. For upper leg, splint the whole leg. Make a long splint by taping or tying shorter ones together, or use a carbine, an oar from the raft kit, or any other handy material.

Compound fractures are those in which a bone and the overlying skin are broken. Treat the break in the skin as you would any wound. Sprinkle sulfa powder in wound. Don't try to push bone fragments back. Apply dressing, then splint.

Give morphine.

Treat for shock.



SHOCK

Shock results from serious wounds, fractures, pain, burns, excessive loss of blood.

Symptoms: Pale, cold, clammy skin. Fast, weak pulse. Shallow breathing.

What to do:

Give oxygen—Auto-Mix "OFF."

Give morphine for pain.

Elevate the man's legs: put parachutes or other equipment under buttocks and legs, except when he has a head wound.

Keep him warm.

Administer blood plasma or similar substance.



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ANOXIA

You won't recognize any symptoms of anoxia in yourself, but sometimes you can spot it in other crew members.

Be suspicious of any unusual or unexpected reactions as possible anoxia effects. Errors of judgment, lack of coordination, or any uncontrolled emotional display could be the result of lack of oxygen.

Whenever you notice any of these effects, or whenever you find a man unconscious, check his oxygen immediately and see that he gets a supply.

If a man is unconscious or nearly so from anoxia, get a mask on him that works and connect it to a working regulator. Turn the Emergency Valve to "ON" until he recovers.

Note: In the case of serious wounds of any kind, see that the man gets pure oxygen—Auto-Mix "OFF"—regardless of altitude.



Give him artificial respiration if you can manage it in the cramped space. Keep the oxygen Emergency Valve to "ON" during artificial respiration.

FROSTBITE

Frostbite occurs in an unbelievably brief exposure of any part of the body to the extreme cold of high altitude. Don't take chances. Never unnecessarily remove gloves, mask or goggles, or any other clothing at low temperatures.

Numbness indicates the onset of frostbite. Wrinkle your face from time to time to see if it's getting numb. If you see whitening of the skin of your own hands or the face of another crew member, it may indicate frostbite.

If frostbite occurs, warm the part gradually by putting it inside your jacket under your armpit. Unless you are a contortionist, warm

your frostbitten foot in the armpit of one of your buddies, or between his thighs.

Never warm a frozen part quickly by artificial heat. Quick warming will increase the damage to the tissue.

Warning

NEVER PUT YOUR BARE HAND ON METAL AT EXTREMELY LOW TEMPERATURES. INSTANTANEOUS FREEZING RESULTS AND YOU WON'T GET IT BACK WHOLE!

FIRST-AID KITS

NOTE: INSTRUCTIONS FOR USE OF COMPONENTS ARE INCLUDED IN EACH KIT



AERONAUTICAL FIRST-AID KIT

Five aeronautical First-Aid Kits are carried in the airplane, in the following locations:

1. Above the flight engineer.
2. On door of navigator's cabinet.
3. On seat pedestal of upper gun sighting station.
4. On rear compartment auxiliary panel forward of bunk area.
5. Tail gunner's compartment.

Each Aeronautical First-Aid Kit contains:

- Iodine swabs
- Adhesive gauze bandages

- Halazone tablets
- Burn-injury set
- Eye-dressing set
- Morphine syrettes
- Sulfa tablets
- Sulfa powder
- Small Carlisle first-aid dressings
- Scissors
- Tourniquet

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The Arctic First-Aid Kit is located under the lower bunk in the rear unpressurized cabin.

The Arctic First-Aid Kit contains:

- Halazone tablets
- Absorbent cotton
- Adhesive tape
- Burn ointment
- Burn-injury sets
- Iodine swabs
- Ammoniated mercury ointment
- Morphine syrettes
- Salt tablets
- Sulfa tablets
- Sulfa powder
- Adhesive gauze bandages
- Compress gauze bandages
- Aspirin tablets
- Aloin compound tablets
- Sodium bicarbonate and peppermint tablets
- Bismuth subcarbonate tablets
- Protein silver tablets
- Multivitamin capsules
- Sulfaguanidine

ARCTIC FIRST-AID KIT



JUNGLE FIRST-AID KIT

The Jungle First-Aid Kit is located with the Arctic First-Aid Kit, under the lower bunk.

The Jungle First-Aid Kit contains:

- Halazone tablets
- Insect repellent
- Suction kit for snake bite
- Iodine swabs
- Morphine syrettes
- Salt tablets
- Sulfa tablets
- Adhesive gauze bandages
- Aspirin tablets
- Aloin compound tablets
- Atabrine tablets
- Sodium bicarbonate and peppermint tablets
- Sulfaguanidine



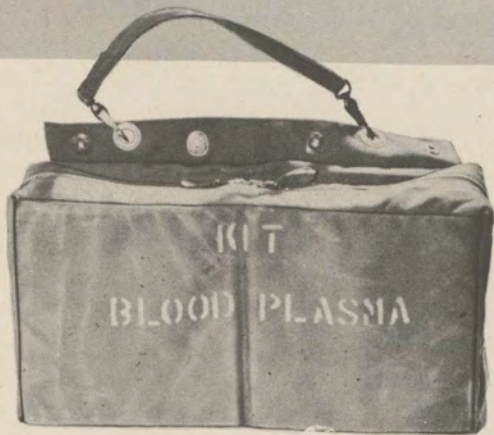
BATTLE SPLINT AND DRESSING KIT

Two Kits, Battle Splint and Dressing, are carried. One is located behind the copilot's seat, and the other under the bunk in the rear pressurized cabin.

Each Kit, Battle Splint and Dressing, contains:

Gauze bandages

Small Carlisle first-aid dressings
 Large Carlisle first-aid dressings
 Serum albumin units for treatment of shock
 Basswood splints
 Adhesive tape
 Safety pins



BLOOD PLASMA KIT

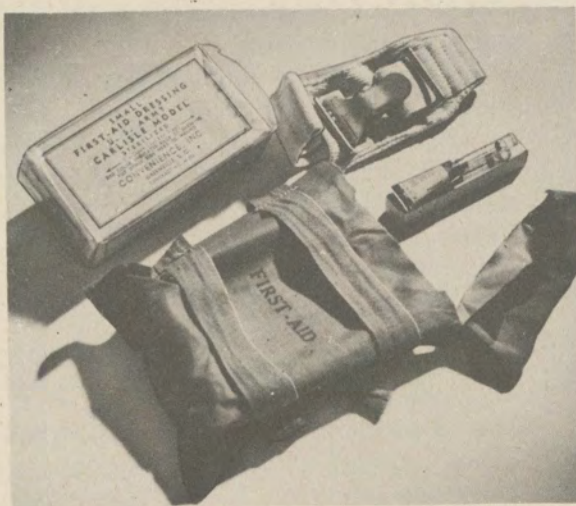
Two Kits, Blood Plasma, are carried. One is located on the ceiling above the flight engineer's head, and the other under the lower bunk in the rear pressurized cabin.

Each Kit, Blood Plasma, contains two complete sets of apparatus for the administration of plasma or serum albumin, concentrated from plasma.



**PARACHUTE FIRST-AID
PACKET**

Tear cover to open.



Contents of packet.

One Parachute First-Aid Packet is issued to each man. Tie the packet to the strap of the life vest when wearing the vest. If you are not going to use the life vest, tie the packet to the shoulder strap of the parachute harness, well down on the lower part of the strap. See illustrations under PARACHUTES.

The Parachute First-Aid Packet contains:

- Tourniquet
- Small Carlisle first-aid dressing
- Morphine syrette
- Sulfa tablets
- Sulfa powder

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A Life Raft First-Aid Kit is included in the accessory kit of each life raft.

Each Life Raft First-Aid Kit contains:

- Morphine syrettes
- Iodine
- Burn ointment
- Compress bandage
- Sulfa powder
- Sulfa tablets



LIFE RAFT FIRST-AID KIT

PARACHUTE FIRST-AID KIT, FRYING PAN INSERT



A Parachute First-Aid Kit, Frying Pan Insert, is included in each B-4 emergency kit, attached to your parachute harness.

Each Parachute First-Aid Kit, Frying Pan Insert, contains;

- Atabrine tablets
- Benzedrine sulfate tablets
- Halazone tablets
- Burn-injury set
- Iodine swabs
- Salt tablets
- Sulfa tablets
- Adhesive gauze bandages
- Compress gauze bandages
- Curved needle, with 120 inches carpet and button thread (for clothing repair)
- Cake soap
- Compressed tea tablets

PARACHUTES

In lots of ways, your parachute is like the Ideal Girl Friend.

Take care of her, treat her right, and she's steady, safe and dependable—you'd be a fool to go out without her!

If you ever have a falling out, she lets you down easy!

But if you've been kicking her around and treating her like dirt, don't expect her to come through just because you happen to need her!

General

Crew members are required to wear a parachute at all times during flight.

Normally the tail gunner wears the seat-type chute and other crew members wear back-type chutes, although quick attachable chest-type parachutes are frequently used during the training period.

Have your parachute harness correctly fitted and tacked by a competent parachute maintenance man. Check the harness fit each time



Back-type parachute with individual type B-4 emergency kit.
Note: If not wearing life vest, tie first-aid packet to parachute harness. When you have the bailout bottle on the right strap, put the first-aid packet on the left strap.



Seat-type parachute with individual type B-4 emergency kit.



Quick attachable chest-type parachute.



Attach chest-type chute like this, ripcord on the right-hand side.

you put it on. Shoulder and chest straps should be snug without play; the chest buckle should be 12 inches below the chin. Leg straps should be snug. In fact, the harness should be comfortably snug when you are seated and disagreeably tight when you stand up.

Pre-Flight Check

Inspect your parachute carefully before each flight. You never know when you may have to use it.

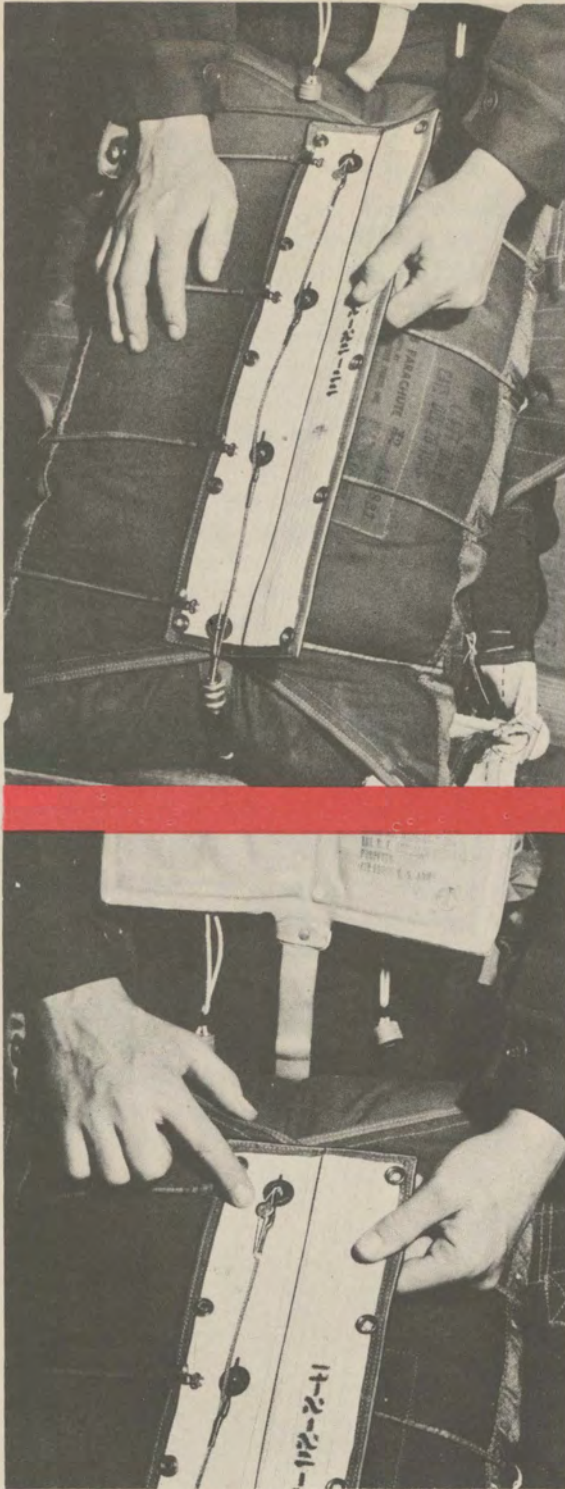
Check the date of the last inspection. The packing interval should not exceed 60 days in the United States or 30 days in tropical climates.

See that an inspection check has been made within the last ten days and entered on the AAF Form 46 in the chute.

Check pack cover for oil, grease, dirt, and worn spots. Turn the chute in if you find any.

See that the opening elastics are tight, and that the corners of the pack are neatly stowed so that no silk is visible.

Open the flap.



Make sure seal is not broken. See that the ripcord pins are not bent. A bent pin or jammed wire may make it impossible to pull the ripcord.

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Carry chute by leg straps, like this.
Or slip harness over shoulders.

THE BAILOUT

The pilot decides whether or not bailout is necessary. Give series of short rings on alarm bell, and order "PREPARE TO ABANDON SHIP" as early as possible so that crew has time to prepare.

Give the crew the warning when an emergency first appears. If it develops that you can handle the emergency safely without bailout, you can cancel the preparation order later.

Climb to altitude, if possible.

The pilot will give the actual bailout order by interphone and by steady ring on warning bell. **Do not leave the plane until you are ordered out!** Each crew member must know when, where, and how he is to leave the airplane. The only way to assure that abandonment will be carried out safely and properly is to go through often repeated bailout drills on the ground. Every step of an actual bailout must be practised as often as possible in dry-runs. Don't forget to include simulating the destruction of designated instruments by specific crew members.

The following diagram shows the exit sequence and the escape hatch used by each man. Learn your part and practice the coordinated procedure with the whole crew.

The drawing shows the recommended exits to be used by each crew member, with the number designating the order in which each man goes out.

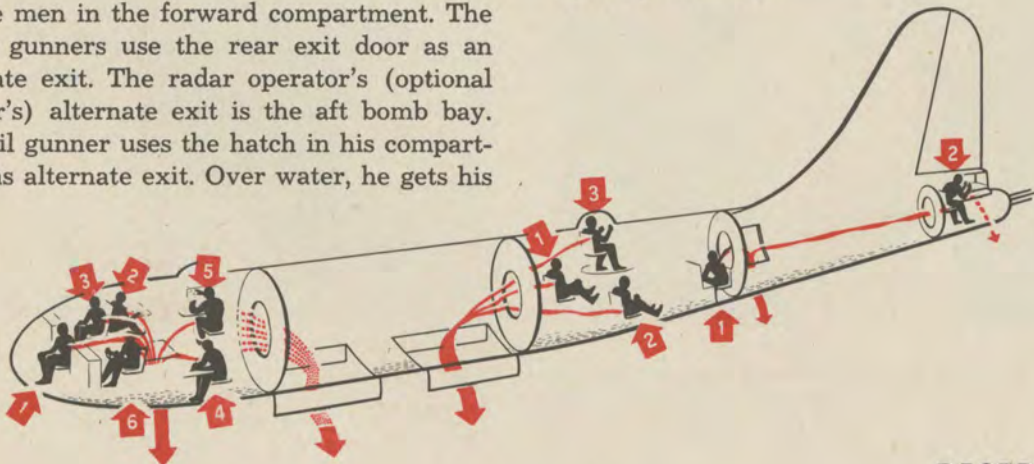
The forward bomb bay is an alternate exit for the men in the forward compartment. The center gunners use the rear exit door as an alternate exit. The radar operator's (optional gunner's) alternate exit is the aft bomb bay. The tail gunner uses the hatch in his compartment as alternate exit. Over water, he gets his

individual life raft from the unpressurized section and goes out the rear exit door.

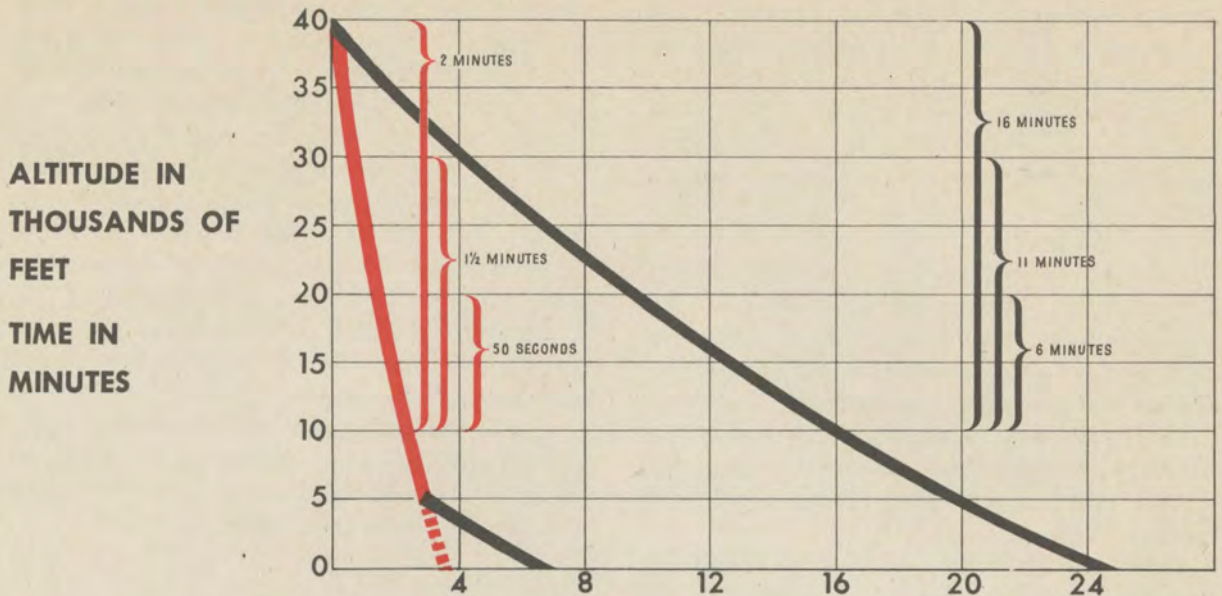
When bailout warning is given over water, remove the individual life raft pack from its position near your station, and snap it onto your parachute harness. Open corner of raft pack cover, pull out end of lanyard, run it **under your parachute harness** and snap it onto the ring of your life vest waist strap. Crew members should check each other to see that all straps and packs are secure and properly adjusted.

Raft packs for pilot and copilot are located behind the armor plate just back of respective seats. Flight engineer's raft is strapped to cabin roof between front upper hatch and aisle dome light. Rafts of the navigator, radio operator, and bombardier are stowed on floor between lower forward turret and wheel well step. Right, left, and top gunners' rafts are fastened to the floor in the left forward section of their compartment. Radar operator's (optional gunner's) raft is strapped to left wall just aft of and level with rear ditching hatch. Tail gunner's raft is strapped to right wall just aft of rear bottom turret.

Note: If you find that any part of this procedure cannot be applied to your particular airplane because of differences of stowage of equipment, loading, or any other reason, change the drill. With the help of your Personal Equipment Officer, work out a bailout drill which you know you can use safely in your own airplane. The important thing is to establish a workable bailout procedure and then learn it by frequent drills.



HIGH ALTITUDE JUMPS



In most cases when you take off from the airplane under your own power, your first requirement after you're away from the plane is to get the chute open and come down in a slightly more dignified manner.

There is a time, however, when to speed through the air for a while without benefit of nylon has definite advantages. That time is when you bail out somewhere between 10,000 and 40,000 feet.

By using the free fall maneuver at high altitude you can minimize these hazards:

1. Intense cold.
2. Lack of oxygen.
3. Enemy gunfire.
4. Excessive opening shock.

The accompanying chart shows you the length of time it takes you to get down to the relative safety of 10,000 feet in a parachute, as compared to the time it takes by free fall.

Remembering that frostbite can occur in a matter of seconds at high altitude, you can see that it is a good idea not to dawdle through that danger area in an open parachute, but to get to lower altitude fast by falling free.

The same advice applies with respect to lack of oxygen. Even if you are using a bailout oxygen bottle, it is possible to exhaust the supply of oxygen in the bottle before you reach an altitude where you are safe from anoxia. Use the oxygen bailout equipment, but fall free also.

In a high altitude bailout you reach your maximum speed a few seconds after leaving the plane. From then on you slow down, as the chart shows. Therefore, a free fall to a lower altitude means a reduced shock at the opening of the chute.

Your next—and logical—question is, “**How do you know exactly when to pull the ripcord?**”

With that one, you have not only asked the sixty-four dollar question, but you have stumped the experts too!

There is no good, practical, one-two-three answer to that question. However, here is some honest and realistic advice which you may find of some help.

A workable method for judging when to open the chute in a high altitude jump is to look at the earth and judge your approximate altitude by the appearance of the ground. For example,

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at around 5,000 feet recognizable details of the earth appear, the horizon spreads, and the ground seems to be rushing up at you.

After that point do not delay long in pulling the ripcord. You haven't much time left.

One limitation of this method is difficulty in seeing the ground because of weather conditions. Clouds at high altitude are usually in broken masses. If you can see the ground through the broken clouds, use the appearance of the earth as a guide to your altitude. If you cannot see the ground but notice that broken clouds become a solid layer below you, wait until just before you enter the solid cloud formation and then pull the ripcord.

These unbroken overcasts do not extend up to great altitudes, and when you enter one you are usually low enough to open your chute safely.

Note: This procedure applies to bailout at high altitude into clouds. Use judgment in following it. For example, if you bail out in clear atmosphere, and far below you can see a low overcast, pull the ripcord before you get into the overcast. It might just cover the top of a mountain.

There are times when none of this information is applicable. For example, on a dark night visual references are useless. Or, you may be unable to fix your vision on ground reference points because your body is spinning. In such

circumstances, if you have no other guide for estimating the proper time to pull the ripcord, depend upon your sense of the passage of time. Judgment of time is difficult, and counting seconds is unreliable for most people, but an attempt to judge when sufficient time has elapsed is better than nothing.

In any case, before you leave the airplane, find out the altitude at which you are flying; look outside to see what weather conditions exist; and then decide quickly what procedure you are going to follow, and follow it.

Study the free fall chart until you know approximately how long it takes to fall free to safe levels from various altitudes.

It is unlikely that you will ever have to make a high altitude jump. But if you do, use your head, try to keep cool, and the odds for a safe descent will be in your favor.

CLEARING THE AIRPLANE

The most important step in the average parachute jump is to clear the plane before you pull the ripcord.

Keep your eyes open. Look around, and be sure that you are well away from the airplane before you open the chute. If you have enough altitude, wait at least five or ten seconds before pulling the ripcord.



PULLING THE RIPCORD



The ripcord stage of the parachute jump is fairly simple if you follow these directions:

1. Straighten your legs and put your feet together. This maneuver keeps you from spinning or somersaulting. It reduces the danger of tangling up in the harness when the chute opens, and eases the opening shock.

2. Use both hands to grasp the ripcord pocket. Look down at it; hold the harness strap out with one hand so that you can grab it with the other.

3. Grasp the ripcord handle with the right hand and yank! Keep your eyes open and look at the ripcord as you pull it.

THE DESCENT

About two seconds after you pull the ripcord you will feel a short, strong tug as the canopy opens.

Look up to see that the chute is fully open. If a suspension line is crossed over the canopy, or if the lines are twisted, manipulate them until they straighten out.

As you come down you will probably swing back and forth in the parachute. This oscillation of the chute is not dangerous. Don't attempt to check the swing or slip the parachute. Only experts know when and how to do that safely.

Your rate of descent will be approximately 1000 feet per minute.

Observe your drift by craning your neck forward and sighting the ground between your

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feet, keeping your feet parallel and using them as a driftmeter.

Face in the direction of your drift.

While you cannot steer your chute, you can turn your body in any desired direction. The

body turn is the most useful maneuver you can learn. With the body turn you can make certain that you land facing in the direction of your drift, thus reducing materially the chance of injury on landing.

HOW TO MAKE BODY TURNS

TO TURN YOUR BODY TO THE RIGHT:

1. Reach up behind your head with your right hand and grasp the left risers.

2. Reach across in front of your head with your left hand and grasp the right risers. Your hands are now crossed, the right hand behind, and in each you have two risers.

3. Pull with both hands at the same time; this will cross the risers above your head and turn your body to the right. You can readily turn 45°, 90°, or 180° by varying the pull.

TO TURN TO THE LEFT, REVERSE THIS PROCEDURE

Study the pictures. Practice the body turn in a suspended harness if you get the chance.

The instructions for making the body turn may sound backward to you. Just remember this:

“To turn right, right hand behind my head.”

“To turn left, left hand behind my head.”



In the descent, start your body turn high enough to allow you to master it. Once you have made the turn, you will find that you can control your direction of drift perfectly. Hold the turn, or slowly ease up if necessary, to bring you in facing **downwind**. Continue to hold the risers, whether you have had to twist them to make a body turn or not, and ride on into the ground this way.

THE LANDING

1. NORMAL LANDINGS



2. HIGH WIND LANDINGS

When there is a high wind blowing across the ground carry out the procedures described for normal landings, including the body turn to face you in the direction of your drift.

Then, once you are down, roll over on your belly and haul in on the suspension lines nearest the ground. Keep on hauling until you grab silk. Then, drag in the skirt of the canopy to spill the air and collapse the chute.

If you can't manage this maneuver on your face, roll over on your back and do it.

Keep your hands above your head, grasping the risers.

Look at the ground at a 45-degree angle, not straight down. This procedure will aid you in judging your height above the ground more accurately.

Set yourself for the landing by placing your feet together and slightly bending your knees so that you will land on the balls of your feet.

Don't be limp; don't be rigid. Just partially relax, and ride on into the ground, drifting face forward.

As you hit the ground, fall forward or sideways in a tumbling roll to take up the shock.



3. TREE LANDINGS



Tree landings are usually the easiest of all.

If you see that you are going to come in on a tree, let go the risers, cross your arms in front of your head, and bury your face in the crook of an elbow.

Keep your feet and knees together.

If you get hung up in a high tree and you know that rescue is coming immediately, it's better to stay there and wait for help down. Otherwise, get out of the harness and cut lines and risers to make a rope for climbing down.

4. WATER LANDINGS



If you see that you are going to land in water, start getting ready early:

1. Throw away what you won't need.
2. Pull yourself back into the sling as far as possible.
3. Undo your chest strap by hooking a thumb beneath one of the vertical lift webs, and pushing firmly across your chest to loosen the cross webbing so that you can undo the snap.
4. Free the leg straps by doubling up first one leg then the other, unsnapping the fasteners each time. Hang onto the risers and ride on into the water.
5. As you go into the water, but not before, throw your arms straight up and shrug your shoulders out of the harness, so that the canopy will blow clear.
6. Inflate the Mae West, **but never until your chest strap is unfastened.** If you find yourself in the water before freeing your leg straps, the Mae West will support you while you unfasten the straps or slide them off over your feet. Use a knife to cut yourself free of harness and suspension lines, if necessary.

Caution

When you land in the water your parachute sometimes blows downwind away from you. Then when you collapse the chute by pulling on the bottom lines it stays put in the water. But as soon as you inflate your Mae West, you float, and tend to drift toward the collapsed chute. **Therefore, immediately work back and away from the collapsed chute so that you won't drift**

into it while inflating your raft or floating around waiting for rescue.

To use your one-man life raft in the water, pull the cover off the pack and remove the raft, then pull out the locking pin from the carbon dioxide cylinder and open the valve. Enter the raft by grasping the hand straps and pulling it under you as it inflates. Once in the raft, tie down all the accessories to keep from losing them.



5. HIGH TENSION WIRES

High tension wires are usually high above the ground and strung about six feet apart. If you come down into wires raise your hands above your head, with your palms flat against the risers to avoid contact. Keep feet and knees together. Streamline your body.

6. NIGHT JUMPS

During night jumps, prepare for a normal landing as soon as your chute opens. Since you cannot see the ground on a dark night, be ready to make contact at any moment.

Get your feet and knees together, your legs slightly bent.

Hang onto the risers above your head and wait for contact.

PARACHUTE KIT

Your individual parachute emergency kit contains articles which will help you get along on your own after bailout into wild country.

The components of the kit include the following items: water container assembly, signal flares, machete, signal panel, ration unit, match case with matches, cooking pan assembly, compass, pocket knife, fishing kit, can of solid fuel, first-aid kit, mosquito headnet, goggles, gloves, and an emergency manual.

DITCHING

Ditching is the forced descent of land planes on water. It is extremely hazardous but the experiences of many bomber crews have proved that it can be done successfully.

The crew has two main problems in ditching. One is adequately bracing against the terrific impact of the water landing. The other is getting out of the airplane with the equipment you must take along before the plane sinks. The length of time a bomber will float is measured in seconds, not in minutes.

Ditching Drill

The ditching will come off successfully only if the crew is so thoroughly drilled in the proper procedures that reaction is automatic. If proper ditching procedure is followed, a minimum of confusion results and nothing is omitted which might contribute to the safety of the whole crew.

Successful ditching depends on constantly repeated drill.

The whole crew must practice together the coordinated steps in ditching procedure, as often as time permits. Wet ditching drill involving the actual launching and boarding of life rafts in a body of water is preferable, but if such facilities are not available, drill in your own plane under simulated conditions. Learn your own job in ditching. Learn also what every other man does so that nothing will be overlooked in case some crew members are missing or hurt.

Preparation

When an emergency develops over water which makes it doubtful that you will reach land, **start**

your preparation for ditching immediately. Particularly start preliminary radio procedure. Don't wait on the possibility that the situation may improve. All ditching experience to date indicates that radio signals sent prior to ditching the aircraft are the most valuable aid to searchers.

Note: If you are able to make land, cancel the SOS later, so that you won't waste the time and jeopardize the safety of other crews in needless search.

The value of power in ditching is great. Ditch the plane before the fuel is exhausted. Keep a margin of speed available so you can pick your spot to set the airplane down.

Wind Direction

On your first few flights over water study the appearance of the sea in relation to wind speed and direction. Try to become thoroughly familiar with surface conditions as an index to the wind.

During every over-water flight keep wind direction and wind speed constantly in mind so that you will be prepared if ditching becomes necessary.

1. **Waves** move downwind, except close inshore. Waves break downwind, but remember that the foam from the wave crest appears to slide down the back, or windward, side of the breaking wave. This often makes the direction of the break difficult to judge from altitude.

2. **Spray** from wave crests is blown downwind.

3. **Swell** is a rising and falling of the sea surface. It does not indicate wind direction.

4. **Smoke** from surface vessels drifts with the wind. The trail of the smoke, however, is caused by wind plus the ship's forward motion. In this case wind direction is somewhere be-

Wind Speed

1. A few white crests.....10-20 mph wind
2. Many white crests.....20-30 mph wind
3. Streaks of foam along water.....30-40 mph wind
4. Spray from crests.....40-50 mph wind
5. Wind is always stronger than the appearance of the sea suggests if it is freshening, blowing off a nearby shore, or blowing in same direction as tide or swell.

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tween the forward path of the ship and the smoke trail.

5. **Wind lanes** are alternating strips of light and shade which appear on the surface of the sea. They lie parallel to the direction of the wind, but in a steady wind it is difficult to tell from which direction the wind is blowing down the lane.

Altitude

1. Altitude is difficult to judge when the surface of the sea is smooth.

2. Radio operator should lower trailing antenna until it strikes water, and notify pilot when current drops.



Handling of Plane

Ditch along the top of a steep swell.

Ditch upwind in a long shallow swell.

If there is a cross wind over 30 mph, ditch into the wind. If ditching into the wind involves ditching across a swell, put the airplane down on an upslope towards the top.

After flattening out, try to keep the airplane from striking the water until all excess speed is lost.

If the airplane alights as it should, in a tail-down attitude, there will be a jolt as the tail strikes, followed by a severe impact with violent deceleration.

If you come in too fast on a calm sea, there will be a tendency to bounce. Hold the control column back hard in that case.

In a sea with average size waves, the tail touches the crest of a wave. Keep the nose up. This will cause the forward part of the airplane to touch the next wave crest approximately

under its center of gravity. The nose buries under the water, but the plane will not collapse.

At night in bright moonlight, ditch toward the moon, unless wind direction or condition of the sea prevents it.

CREW PROCEDURE

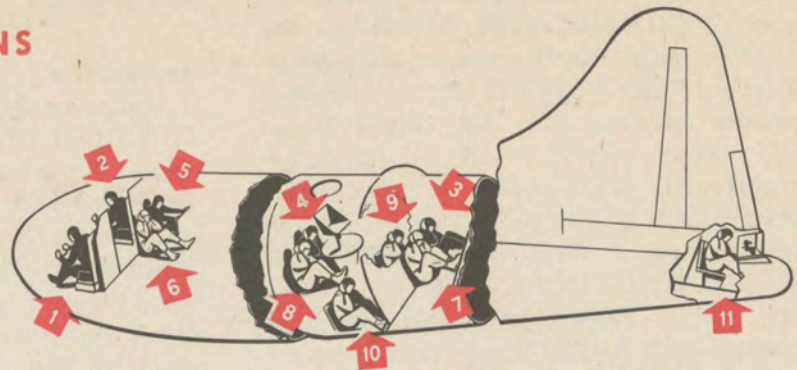
This is the recommended crew procedure worked out by experienced personnel for ditching the B-29. It is also the general procedure to be followed in practice ditching drills. However, in certain models of the airplane, differences in equipment or in stowage may make certain steps of this procedure impractical. Practice ditching drill frequently with your own airplane; and if necessary, with the help of the Personal Equipment Officer, and using these steps as a basis, work out a procedure which you know will work for your airplane.

NOTE: If time is not available to break out the top gunner's blister and remove the sight before ditching, the four crew members in the CFC compartment will use the rear escape hatch as an alternate exit. The rear escape hatch also will be used in ditching drills.

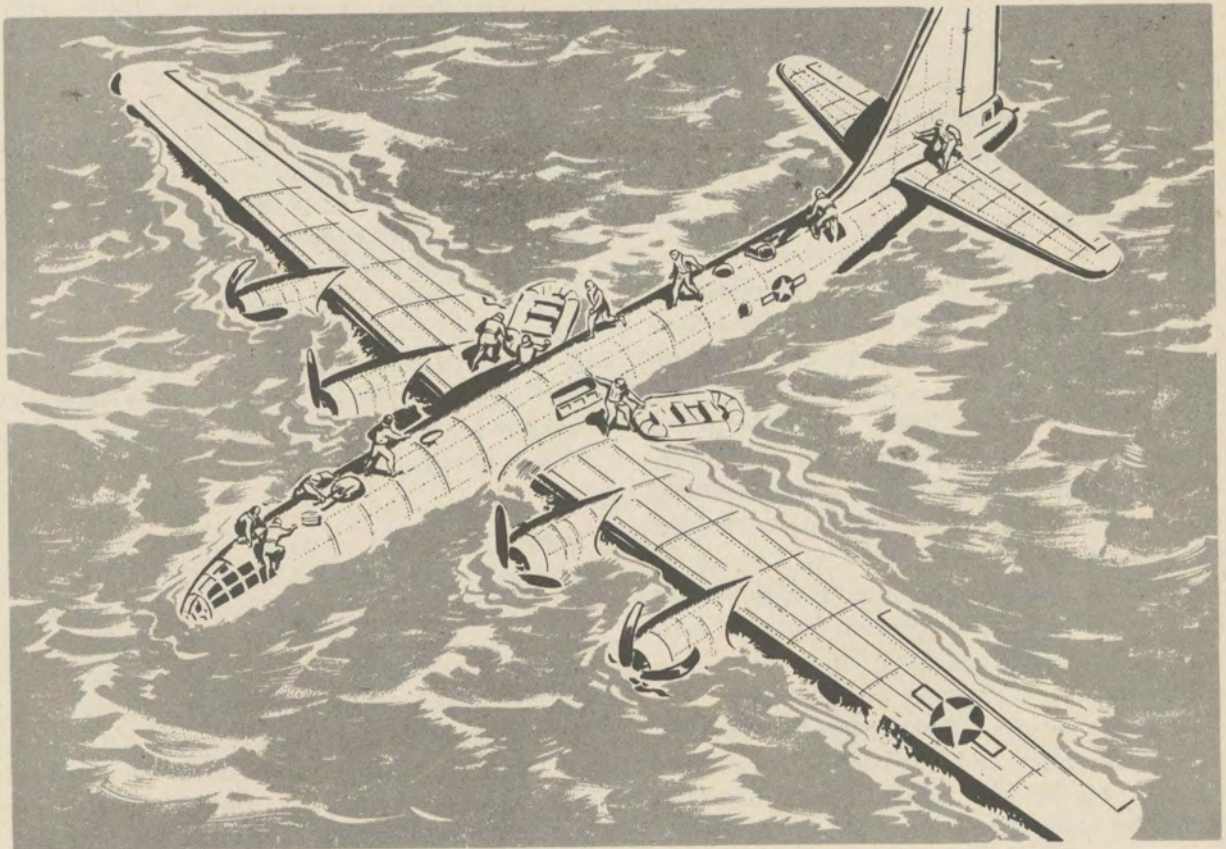
Pilot

1. Give copilot warning: "PREPARE FOR DITCHING IN ——— MINUTES!" Give several short rings on alarm bell. Flip IFF Emergency Switch ON. 2. Remove parachute harness, flak suit, flying boots; fasten safety belt. 3. Advise any accompanying aircraft of distress by radio, then turn to interphone. 4. Give copilot order: "THROW OUT EQUIPMENT!" If possible give this order above 5000 feet. 5. Give copilot order: "STATIONS FOR DITCHING. IMPACT IN ——— SECONDS." If possible give this order above 2000 feet. Order flight engineer to kill inboard engines, then feather them. Open window, brace feet on rudder pedals, knees flexed. About 5 seconds before impact, order: "BRACE FOR IMPACT!" 6. Check to see that crew is clear of forward compartment, then exit through left window. Inflate Mae West on window ledge. Climb atop cabin, thence to left wing. Secure left raft; pull outside release handles if necessary.

DITCHING POSITIONS



- | | |
|--------------------|----------------------------|
| 1. PILOT | 7. RADAR (OPTIONAL GUNNER) |
| 2. COPILOT | 8. TOP GUNNER |
| 3. NAVIGATOR | 9. RIGHT GUNNER |
| 4. BOMBARDIER | 10. LEFT GUNNER |
| 5. FLIGHT ENGINEER | 11. TAIL GUNNER |
| 6. RADIO OPERATOR | |



Copilot

1. Relay pilot's command over interphone call position: "PREPARE FOR DITCHING IN ——— MINUTES!" Receive acknowledgements. Tell pilot: "CREW NOTIFIED!" 2. Remove parachute harness, flak suit, flying boots. Fasten safety belt. 3. Stand by on interphone to relay pilot's orders. 4. Relay order: "THROW OUT EQUIPMENT!" and check on crew's progress. 5. Relay order: "STATIONS FOR DITCHING. IMPACT IN ——— SECONDS!" Open window, brace feet on rudder bar with knees flexed. Thirty seconds before impact, order radio operator to abandon his key and take station. When pilot gives order: "BRACE FOR IMPACT!" send one long ring on alarm bell. 6. Exit through right window. Inflate Mae West on window ledge. Climb atop cabin, using guns, thence to right wing. Secure right life raft or pull outside raft release handle if necessary.

Navigator

1. Acknowledge in turn: "NAVIGATOR DITCHING." 2. Remove parachute harness, winter flying boots, and flak suit. 3. Calculate position, course, altitude, and ground speed for radio operator to transmit. Give pilot surface wind strength and direction. Prepare classified documents for destruction. 4. Gather essential maps and navigation equipment into waterproof bag or tuck inside clothing. Assist in jettisoning all loose equipment from front compartment, then close pressure door to bomb bay. Proceed through pressure tube to rear pressurized compartment with navigation equipment. 5. Take sitting position against armored bulkhead at radar operator's (optional gunner's) left with hands and cushion behind head, knees flexed, feet braced. 6. Tie raft accessory kit line to your arm and throw kit out; then follow radar operator (optional gunner) out rear ditching exit. Inflate Mae West and proceed to right wing with navigation kit. **Note:** If there is not sufficient time to transit the tunnel, navigator and bombardier take prone positions on the deck alongside forward turret and as far away from it as possible, feet against

wheel well step, knees flexed, head cushioned by hands and arms.

Bombardier

1. Acknowledge in turn: "BOMBARDIER DITCHING." 2. Remove parachute harness, winter flying boots, and flak suit. 3. Dismount bombsight and prepare bombing data for destruction. 4. Open bomb doors; jettison bombs. Assist in jettisoning all loose equipment in forward compartment, including bombsight. Shoot out ammunition from front turrets. Close and check bomb bay doors. Proceed aft through pressure tube. Assume sitting position on right side of gunners' compartment, back against forward pressure bulkhead, hands and cushion behind head, knees flexed. 6. Follow right gunner through upper blister. Inflate Mae West and proceed to right wing. Secure right raft or pull outside raft release handle if necessary.

Flight Engineer

1. Acknowledge in turn: "FLIGHT ENGINEER DITCHING." 2. Remove parachute harness, winter flying boots, and flak suit. 3. Open front emergency hatch and jettison it together with any other loose equipment through front bomb bay. Gather up emergency signal kit, tying it to yourself. 4. Kill inboard engines on pilot's command. Take regular position facing aft, head and shoulders cushioned against copilot's armor plate, safety belt fastened, hands braced against control stand. 5. Exit immediately through front emergency exit carrying signal kit. Inflate Mae West on window ledge. Use top guns to climb atop cabin, thence to right wing.

Radio Operator

1. Acknowledge in turn: "RADIO OPERATOR DITCHING." 2. Remove parachute harness, flak suit, and winter flying boots. 3. Set IFF Emergency Switch **ON**. Put out trailing antennae. Transmit position, course, altitude and ground speed data as received from navigator on MF/DF. Relay fix or bearings obtained to navigator. Give MF/DF contact all data as soon as possible without waiting too long for

answer. 4. Destroy classified material; check IFF setting. Continue to send emergency signals. 5. On command from copilot clamp down key and take ditching station next to flight engineer, facing aft with feet in the aisle, head and back cushioned against copilot's armor plate. 6. Pull both life raft release handles on pressure bulkhead. Pick up emergency radio and exit through front emergency hatch behind flight engineer. Inflate Mae West on window ledge. Use top turret gun to climb atop cabin, thence to left wing.

Radar Operator (Optional Gunner)

1. Acknowledge in turn: "RADAR OPERATOR (OPTIONAL GUNNER) DITCHING." 2. Remove parachute harness, flak suit, and winter flying boots. 3. Open rear ditching hatch. Cut loose stowed life raft container and place it near hatch. Leave rear bulkhead pressure door **open**. Jettison any loose equipment from rear pressurized compartment. Destroy radar equipment if near enemy territory. 4. Take sitting position in rear pressurized compartment with back against armored bulkhead. Plug in headset and relay copilot's instructions if possible. Put cushions and hands behind head, knees flexed, feet braced. 5. Tie the raft accessory kit line to your arm. Also secure line from extra raft if carried. Throw out raft accessory kit, and raft; then exit through rear ditching hatch. If navigator stays forward, you must throw out both accessory kits. Inflate Mae West and proceed atop fuselage to right wing. Retrieve kit and third raft whenever practicable.

Top Gunner

1. Acknowledge in turn: "TOP GUNNER DITCHING." 2. Remove parachute harness, flak suit, and winter flying boots. 3. Shoot out ammunition from rear upper turret. Help jettison all loose equipment from gunners' compartment. 4. Close forward pressure door of gunners' compartment and take sitting position with back cushioned against it, hands and cushion behind head, knees flexed. 5. Follow

bombardier through upper blister. Inflate Mae West and proceed to right wing.

Right Gunner

1. Acknowledge in turn: "RIGHT GUNNER DITCHING." 2. Remove parachute harness, flak suit, and winter flying boots. 3. Help jettison all loose equipment into bomb bay. Shoot out all ammunition in rear lower turret. Latch **open** the door in the armored bulkhead. Take over fire axe and break out top blister. If necessary weaken the blister with a few pistol shots. 4. Take ditching position in gunner's seat with back pushed firmly against back of seat, feet braced, knees flexed, hands clasped in back of head, safety belt fastened and body bent so that elbows touch knees. 5. Exit first through top blister. Inflate Mae West and proceed to left wing. Secure left raft or pull out outside raft handle if necessary.

Left Gunner

1. Acknowledge in turn: "LEFT GUNNER DITCHING." 2. Remove parachute harness, flak suit, and winter flying boots. 3. Report progress within gunners' compartment over interphone to copilot. 4. Relay pilot's interphone instructions to crew and keep pilot informed of action underway. 5. Take ditching position in gunner's seat with back pushed firmly against back of seat, feet braced, knees flexed, hands clasped in back of head, safety belt fastened, and body bent so elbows touch knees. Relay impact warning to crew men. 6. Follow top gunner through upper blister. Inflate Mae West and proceed to left wing.

Tail Gunner

1. Acknowledge in turn: "TAIL GUNNER DITCHING." 2. Remove parachute harness, flak suit, and winter flying boots. 3. Shoot out ammunition in tail guns. Jettison tail gunner's escape hatch. 4. Remain in seat, facing aft, back and head cushioned against back of seat and compartment bulkhead, knees flexed. 5. Exit through tail gunner's escape hatch to left horizontal stabilizer; inflate Mae West and proceed to left wing.

Warning

Don't relax ditching position until plane comes to rest. Remember there are two impacts, the jar when the tail hits and then the terrific jolt when the forward fuselage slams in and stops quick.

Exit from the plane in the order practiced during ditching drill but give wounded men first consideration and assistance.

Speed in getting out is of most importance, but don't neglect to take along raft equipment, emergency radio, etc.

If ditching occurs at night, turn landing lights on, providing the reflection does not interfere with the pilot's vision. Turn off bright lights within the plane, so that you can see better when you get out into the darkness. Turn them on again after landing to guide nearby rescue parties.

DITCHING EQUIPMENT

Twelve drift signals are stowed under the navigator's table and the drift signal chute is in the door just behind the navigator. Take the signals with you.

One hand axe is secured on the navigator's control stand next to the fire extinguisher and

another on the aft compartment auxiliary panel. These axes may be useful in breaking out of the plane after ditching or crash landing.

There are two 6-man life rafts carried in the airplane, in the left and right raft compartments atop the fuselage. After landing, the radio operator pulls both raft releases, located on either side of the tunnel opening in the forward pressurized compartment.

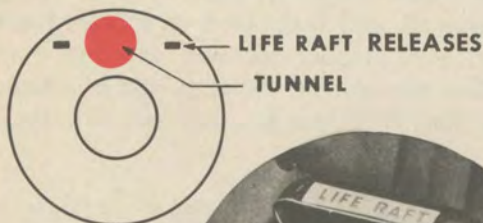
Pulling the handles automatically releases the rafts from the compartments and inflates them. If the internal mechanism jams, you can open the compartments by external release levers on top of the fuselage next to the compartment doors.

If a third raft is carried inside the fuselage, it is thrown out of the rear hatch by crew members and inflated by pulling a ripcord on the CO₂ cylinders.

Don't jump from plane into rafts; you'll go



right through. If a raft inflates inverted don't jump on it to right it. You'll only push out the air underneath and make it harder to turn the raft over. It may be possible for two or more men to right the raft from the wing. This may also be done by getting into the water, climb-



There are two raft release handles. Pull both handles to release and inflate both rafts.

ing up on one side of the raft and pulling on the handline attached to the opposite side of the raft. Remember, however, that it is better

to keep dry, if possible, when the weather is cold.

Fend the rafts off the wings of the plane while launching and boarding them. Wing flaps are usually torn loose in ditching and jagged edges of flaps or wings can easily puncture rafts.

When all men are aboard, tie rafts together to keep them from drifting apart.



SIX-MAN LIFE RAFT



RIGGING THE RAFT SAIL

RESTRICTED

Raft Accessory Kits

An accessory kit is furnished with each raft. Kits are normally secured inside the raft case. Stowage difficulties sometimes make it necessary to keep the kits inside the fuselage, separate from the rafts. In that case, certain crew members must be designated to take the raft kits along when leaving the plane. This step must be included in ditching drill.

You may find sunburn ointment, religious booklets, and a desalination kit for making sea water drinkable in later raft accessory kits.

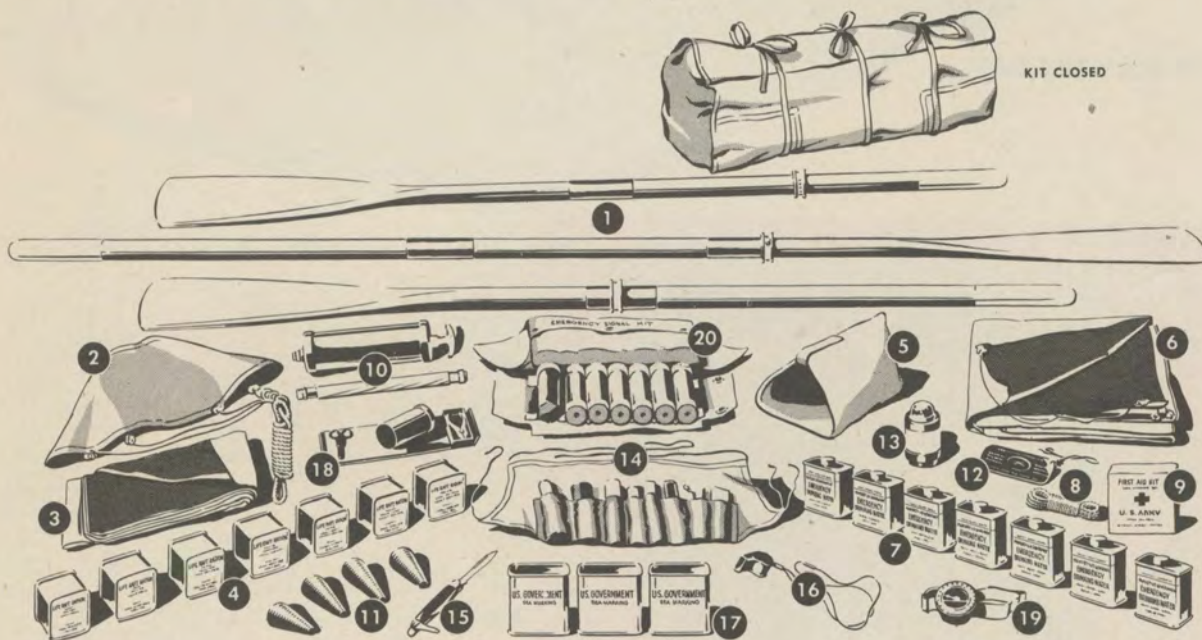
Keep the separate items of equipment securely in the kit or tie them to the handline of the raft so they won't be lost if the raft cap-

sizes. It is important to keep signaling equipment accessible, because the opportunity to use this equipment is sudden and short.

Emergency Radio

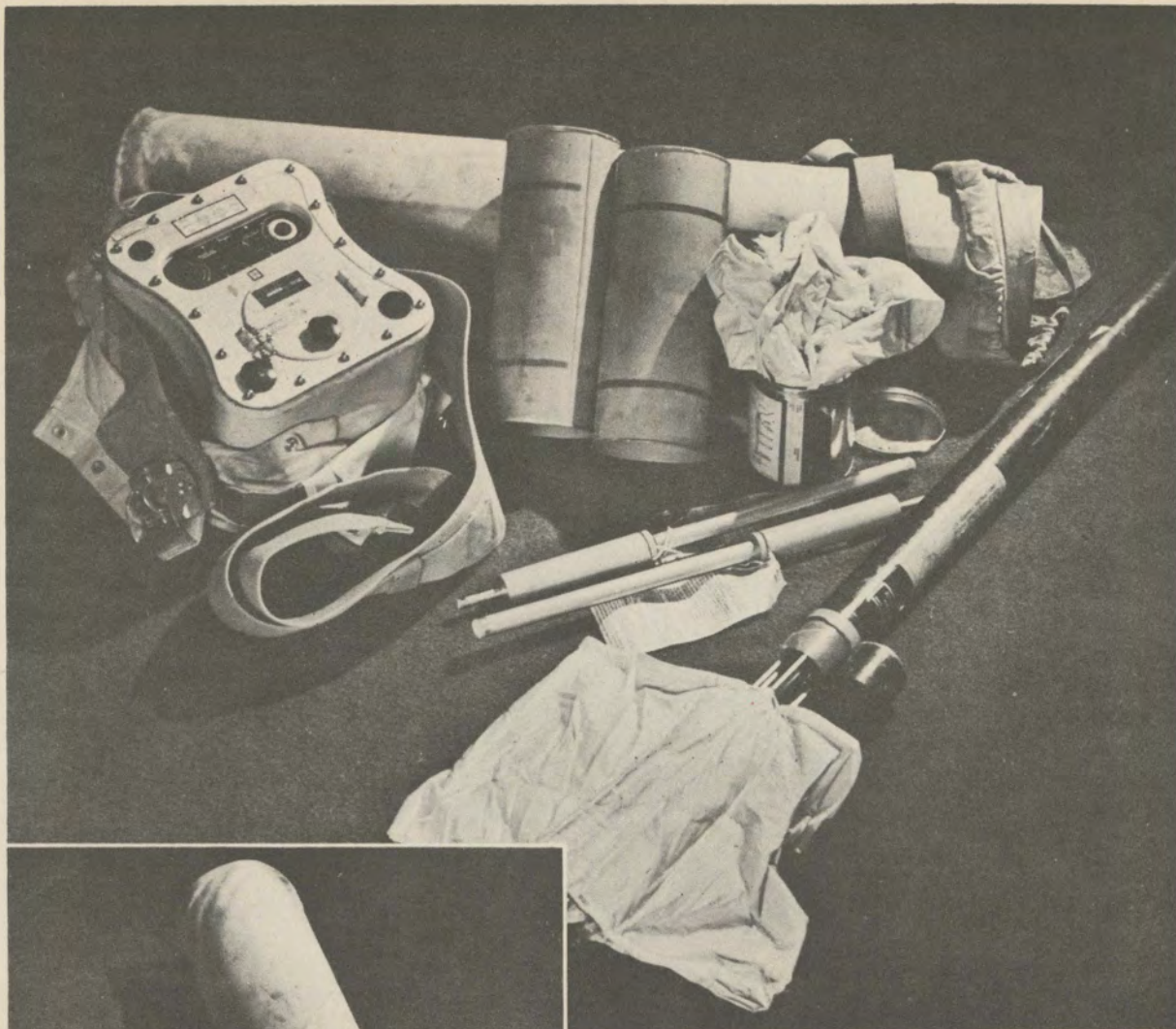
Get the emergency radio set into operation as soon as weather permits. The kit is contained in two cases, strapped together, which are brought out of the plane after the ditching by the radio operator.

Complete instructions for operating the radio are included in the kit. When you use the radio, try to keep the antenna out of the water, or your signals won't be heard. If possible, be sure to send during the 3-minute international silent periods, at 15 and 45 minutes past the hour.



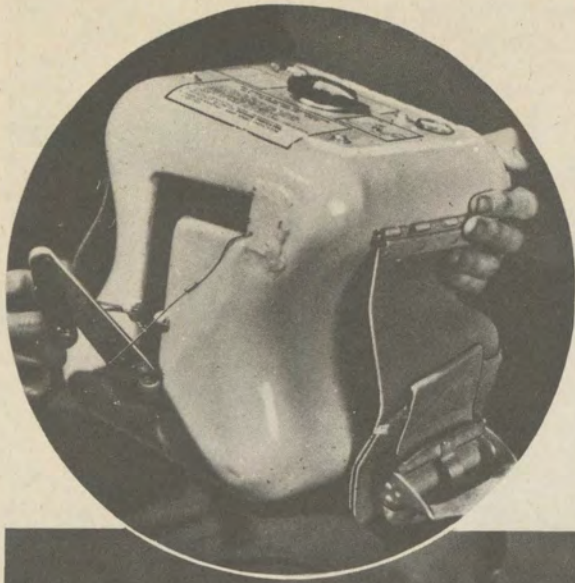
ACCESSORY KIT CONTAINS:

- | | | |
|-------------------------------|--------------------|----------------------|
| 1. Oars | 8. Line | 15. Jackknife |
| 2. Sea anchor | 9. First-aid kit | 16. Whistle |
| 3. Sail | 10. Inflating pump | 17. Sea marker |
| 4. Rations | 11. Puncture plugs | 18. Repair patch kit |
| 5. Bailing bucket | 12. Signal mirror | 19. Wrist compass |
| 6. Shade and camouflage cloth | 13. Flashlight | 20. Signal kit |
| 7. Drinking water | 14. Fishing tackle | |



Emergency radio. One case contains the radio, and the other contains accessories for operating it, including the following items: balloon and kit for raising antenna, hydrogen generators for inflating balloon, signal lamp, extra roll of antenna wire, and an instruction book. A parachute for dropping the radio to survivors is attached to the accessory case.

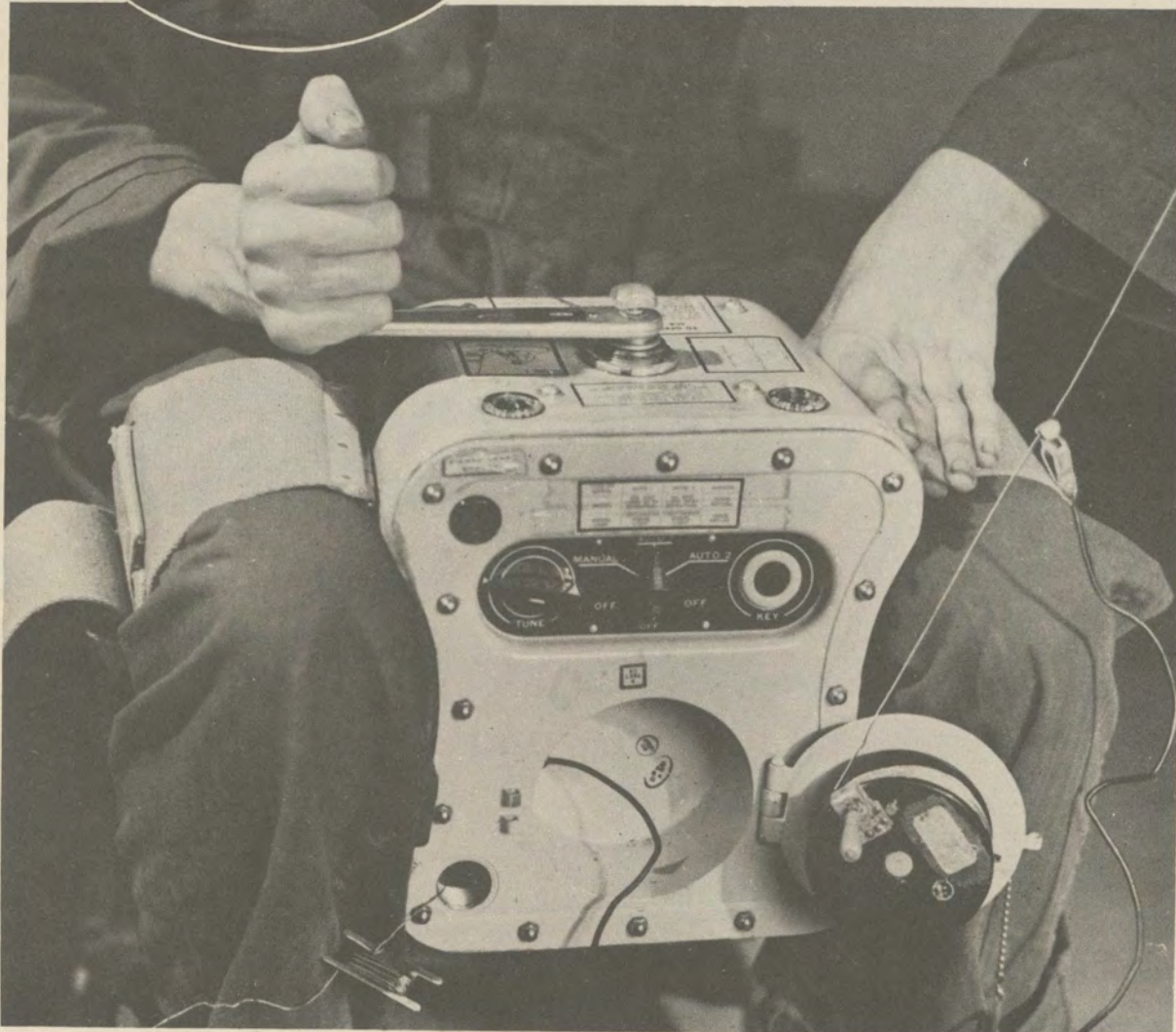
RESTRICTED



Don't lose crank. There is only one and you cannot operate the radio without it.

**STUDY YOUR JUNGLE, ARCTIC,
DESERT, OCEAN SURVIVAL
MANUAL NOW FOR DETAILED
INFORMATION ON HOW
TO LIVE ON A RAFT**

Antenna supported by kite or balloon. Handle inserted for operation. Radio lead-in snapped to antenna. Ground wire thrown into water. On land bury ground wire in wet earth.



CRASH LANDINGS

Crash Land or Bail Out?

The pilot decides whether crash landing or bail-out is preferable. Sometimes the circumstances of the emergency dictate the procedure to be followed. When there is a choice, however, consider the following advantages of crash landings:

1. The crew can remain together for mutual support.
2. Searchers can spot the outline of the airplane more easily than they can see individual signals.
3. The airplane provides fuel, shelter, equipment and tools.

If possible make the decision to crash land early enough to give the crew time for adequate preparation. The pilot should notify crew to start preparation by appropriate alarm signal and by ordering "PREPARE FOR CRASH LANDING" over interphone.

Drill

Successful crash landings, like successful ditchings, depend on the crew's familiarity with the

proper procedures. Frequent dry-run drills are essential.

General procedure is like that for ditching. Crew positions are the same for crash landings as for ditching.

Don't relax your braced position until the airplane has come to a complete rest.

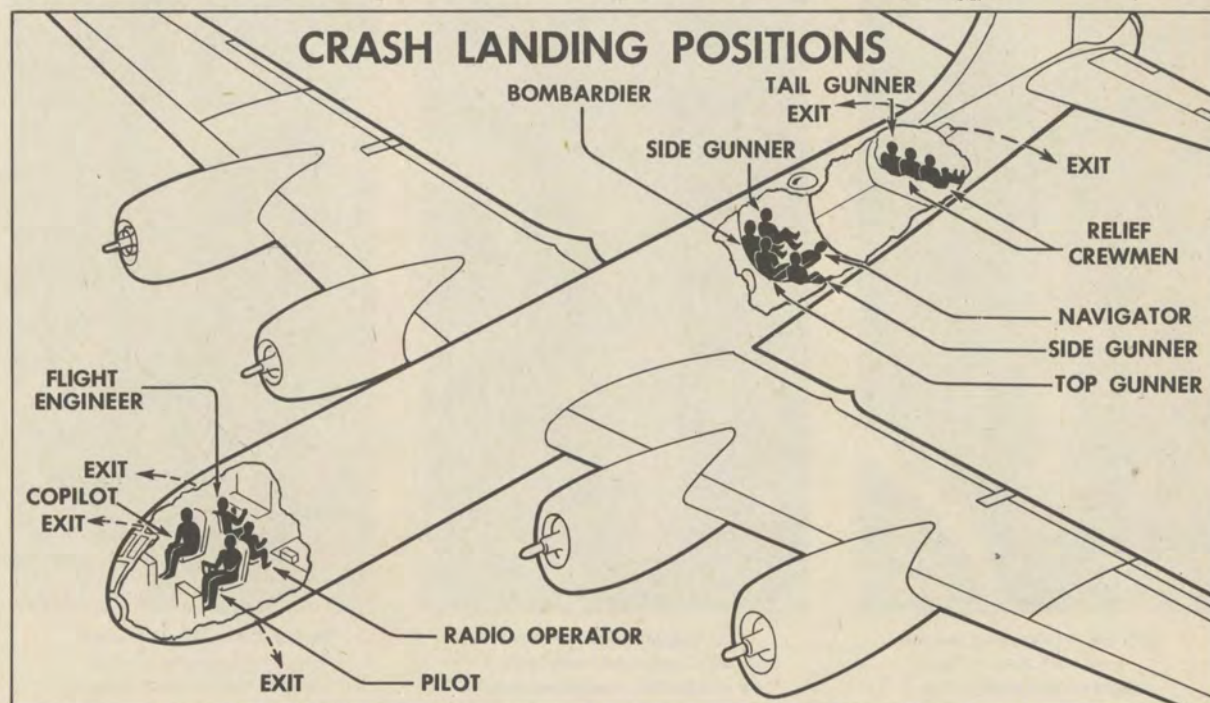
Get out of the plane in quick but orderly manner, using hatches and exit sequence learned in drill. Use hand axes if necessary.

Procedure After Landing

Usually the question of staying with the plane or destroying and leaving it will be answered for you in pre-mission briefings.

If you leave the airplane be sure to take with you all the equipment you might need on your way back to a base. All first-aid, signalling and sustenance kits, any extra rations and everything else which might contribute to safety and comfort should be packed along with you.

Study your *Jungle, Arctic, Desert, Ocean Survival Manual* for detailed information on survival after forced landings.



FIRE FIGHTING

Nacelle fires during flight are handled by the pilot and flight engineer by use of the automatic fixed carbon dioxide extinguishers.

Cabin fires must be controlled by use of the portable fire extinguishers.

Notify the pilot as soon as a fire is discovered. He pulls the pressure relief valve.

If it's an electrical fire the flight engineer cuts the proper electrical power switches at the direction of the pilot.

In the forward compartment the navigator operates the CO₂ extinguisher.

In the case of fires in the aft compartment the nearest men should grab the nearest extinguisher and use it. If possible, use the carbon tetrachloride extinguisher first, and then the CO₂ if necessary.

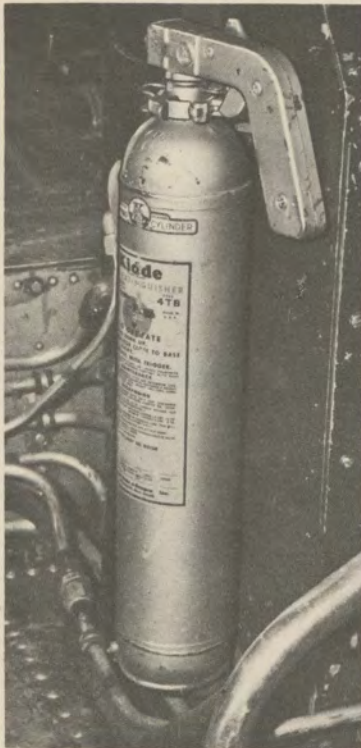
Keep all exit doors and windows closed unless you are ordered to bail out.

When the flight formation is under attack the inboard gunner (nearest to your formation) will switch control of his turrets to the outboard gunner and operate the extinguisher in the rear compartment. If the formation is not under attack either gunner can operate the extinguisher.

If the fire cannot be controlled the airplane commander will decide if and when you are to leave the airplane. Don't bail out until you are ordered to do so.

Warning

Carbon tetrachloride extinguishers produce a poisonous gas. When using that equipment stay as far away from the fire as you can. Open the bombbays for ventilation as soon as possible after use of either type of extinguisher.



CO₂ type extinguisher located on inboard side of flight engineer's control board.

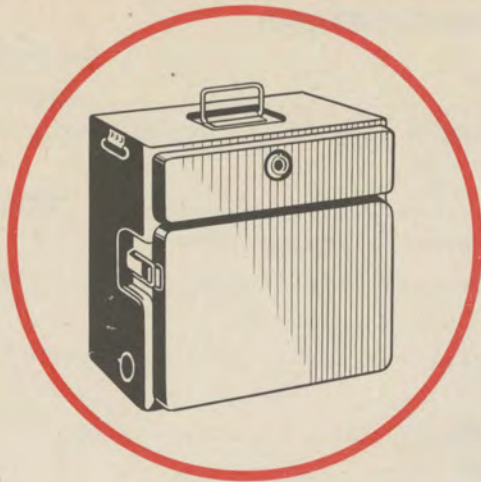


CO₂ type extinguisher located in aft pressurized compartment, aft of auxiliary equipment panel.

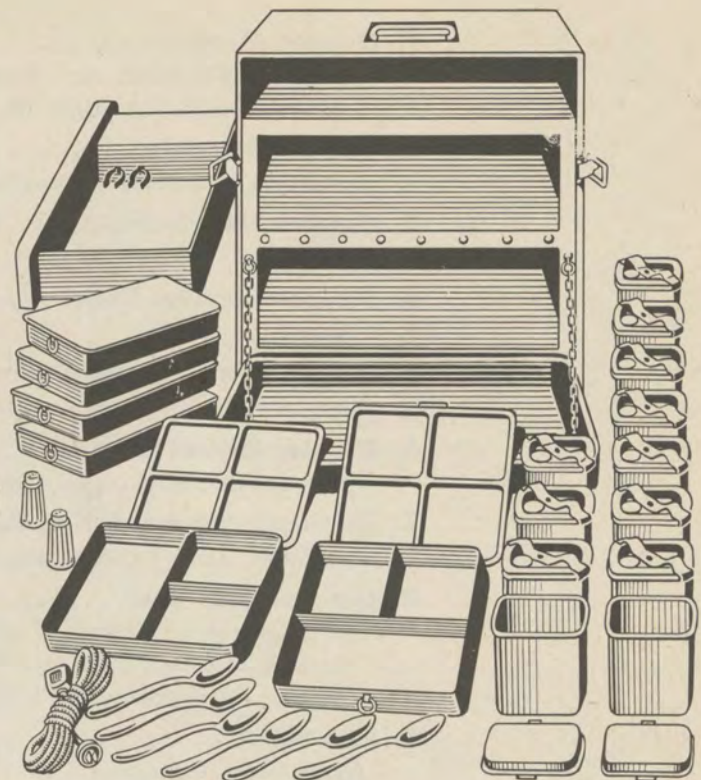


Carbon Tetrachloride (Pyrene) type extinguisher located beside rear entrance door.

FLIGHT MESSING



Food Container.



Contents of
food container.

Your airplane carries two food containers for the serving of hot meals during flight. One is in the forward compartment and one in the aft compartment.

The insulated drawer in the top has space for utensils, salt and pepper shakers, and for bread, cake, cookies, sandwiches, and fruit.

The lower part of the cabinet has two sections. The upper one contains 12 covered metal beverage cups for soup and hot drinks. The lower section contains six food trays. Each tray carries one meal for one man.

The trays are individually marked so that a man can return part of his meal to the container and be sure of getting his own tray back later.

The containers are wired for either ground or airplane currents.

Attach the cord for the container to the right hand plug of any 24 volt electrical outlet on the plane. To heat up a meal, the container must be plugged into the current two to three hours before the meal is desired.

Follow this procedure before the flight:

Call the kitchen as early as possible before takeoff (at least 45 minutes) and tell them at what time you need the food container.

The mess crew handles the necessary cooking and packing of food, and will have the container ready for you when you call for it.

The crew then arranges for some member to pick up the apparatus at the appointed time, and to return it to the kitchen after the mission.

Check to be sure that food containers are on the plane before take-off.

CHECKLIST**BEFORE EACH FLIGHT CHECK THIS EQUIPMENT:**

See page:

- | | |
|--|---------------|
| 1. Oxygen Mask | 10-11 |
| Condition, Fit, Leak test, Position of hose clip, Seating of hose gasket, Quick-disconnect fit | |
| 2. Oxygen Regulator | 12-13 |
| Condition, Tightness of knurled collar, Emergency valve flow | |
| 3. Oxygen Flow Indicator | 14 |
| Operation | |
| 4. Oxygen Pressure Gage | 14 |
| Charge of system | |
| 5. Oxygen Walk-Around Cylinders | 15 |
| Accessibility, Pressure, Operation | |
| 6. Oxygen Bailout Cylinder | 16 |
| Pressure, Security on harness, Connection to mask adapter | |
| 7. Electrically Heated Flying Suit | 19-20 |
| Condition, Circuit connection, Operation | |
| 8. Life Preserver Vest | 21 |
| Fit, Proper wear, Charge of CO ₂ cartridge, Position and safetying of inflator lever, Tightness of container cap, Closure of mouth valves, Date of inspection, Attachment of First-Aid packet | |
| 9. Flak Suit | 22 |
| Availability, Condition | |
| 10. First-Aid Kits | 29-34 |
| Availability, Proper stowage | |
| 11. Parachute | 35-37 |
| Harness fit, General condition, Record on Form 46, Condition of pins, Security of seal, Condition of ripcord housing and elastics, Stowage of pack corners, Attachment of emergency kit and First-Aid packet | |
| 12. Individual Life Rafts | 38, 44 |
| Availability, General condition of pack, Proper stowage | |
| 13. Ditching Equipment | 50-54 |
| Availability and proper stowage of extra life rafts, Raft accessory kits, Drift signals, Axes, Emergency radio | |
| 14. Sustenance Kit | 55 |
| Availability, Proper stowage | |
| 15. Fire Extinguishers | 56 |
| Availability, Proper stowage | |
| 16. Food Containers | 57 |
| Availability, Proper stowage | |

