FLYING SAFETY

UNITED STATES AIR FORCE

AUGUST
1957

Your Personal Equipment

File Thirteen

August is Personal Equipment month in our 1957 Flying Safety Program. Personal equipment is something we all take for granted, yet complain bitterly if it doesn't work when we need it. But can you honestly say that you preflight it to the same degree that you preflight your airplane? . . . Some (die-hard) crewmembers are reported still to be wearing nylon scarfs. In the event of fire, the nylon will fuse to the skin and cause painful, if not fatal burns. That's why the K-2B nylon flying suits were withdrawn from issue a few years ago. . . . Word from Hq USAF is that AFR 60-4 will soon be changed to require six instrument (or hooded) radar approaches and six instrument approaches other than radar, within the 12-months period prior to the instrument flight check. Three of each type approach must be made within each six-months period. It might be a good idea to start logging all instrument approaches in the Form 781 for record purposes. . . . Back to the theme for the month, a pilot who recently survived a 54 day stint in the high Sierras (after ejecting from a T-Bird) reports that he owes a lot to an item of equipment not furnished by the Personal Equipment shop—a knife. So say others who have had it happen to them. How sharp is yours? Or, more to the point, do you wear it?

'til September,

Vernon R Stutts

CONTENTS

What About Today? 2
May I Ride With You? 10
Well Done 13
Personal Equipment Checklist 14
Would You Accept This Equipment? 16
Those Shocking Altitudes 18
Survival by Accident 20
Your Airplane Isn't Everything 23
Are You Ready? 24
Crossfeed 26
Rex Says 28

VOLUME THIRTEEN NUMBER EIGHT

SUBSCRIPTIONS—FLYING SAFETY is available on subscription for $2.50 per year domestic; $3.50 foreign; 25c per copy, through the Superintendent of Documents, Government Printing Office, Washington 25, D.C. Changes in subscription mailings should be sent to the above address. No back copies of the magazines can be furnished.

Use of funds for printing this publication has been approved by the Secretary of the Air Force and the Director of the Bureau of the Budget, 18 July 1956. Facts, testimony and conclusions of aircraft accidents printed herein have been extracted from USAF Forms 14, and may not be construed as incriminating under Article 31 of the Uniform Code of Military Justice. All names used in accident stories are fictitious. No payment can be made for manuscripts submitted for publication in the *Flying Safety Magazine*. Contributions are welcome as are comments and criticism. Address all correspondence to Editor, *Flying Safety Magazine*, Deputy Inspector General, USAF, Norton Air Force Base, San Bernardino, California. The Editor reserves the right to make any editorial changes in manuscripts which he believes will improve the material without altering the intended meaning. Air Force organizations may reprint articles from FLYING SAFETY without further authorization. Prior to reprinting by non-Air Force organizations, it is requested that the Editor be queried, advising the intended use of material. Such action will insure complete accuracy of material, amended in light of most recent developments. The contents of this magazine are informational and should not be construed as regulations, technical orders or directives unless so stated.

USAF PERIODICAL 62-1

The Wrap Around You

Brig. Gen.
A. H. Schwichtenberg
Command Surgeon
ADC

Let me talk about the items of equipment that have been developed in the various aeromedical laboratories in the United States and elsewhere. As you know, these things are for the purpose of augmenting human capabilities to the point that we can continue to be master of these magnificent flying machines that have been created. For many years, the various design engineers have gone about their business designing engines and accessories and aircraft that can fly much faster, higher and farther than ever before. Of course, there is an urgent reason for this just now.

We are reminded of this often. The general attitude seems to be that somehow the aircrew can be made to adjust to the aircraft environment. We always have, more or less. A few of us remember the crude pipestem oxygen system and the heavy sheepskin garments and boots, together with the helmet and goggles that we all used to think was what the well-dressed flyer would wear. When we got all of this gear on, including our parachute, we could hardly move. In the open cockpit jobs of those days, one nearly froze, particularly in the rear cockpit where I always rode. There was a lot of complaining about the bulk and discomfort of the heavy equipment. Then we went faster and the noise and windblast got so bad that finally canopies just had to be developed. Most of the oldtimers, of course, grumbled about the soft, new generation and sighed for the good old days.

This did get rid of the bulky, heavy clothes and particularly with the development of good cockpit heating and better oxygen systems; the pilot was much more comfortable and able to move freely to do his job with a minimum of impairment because of the personal equipment he was wearing. It was not perfect, of course, but not too bad either for the job at hand and the capabilities of the aircraft then available during World War II.

These new, good old days didn't last long. The B-17s and '29s soon gave way to the B-36s, '47s, '52s, and soon the B-58s. Then the P-40s. P-47s and '61s gave way to the F-80, then the F-86, '89 and '94s. Now come the Century series—the F-100, '101, '102 and '104, and before long there'll be others.

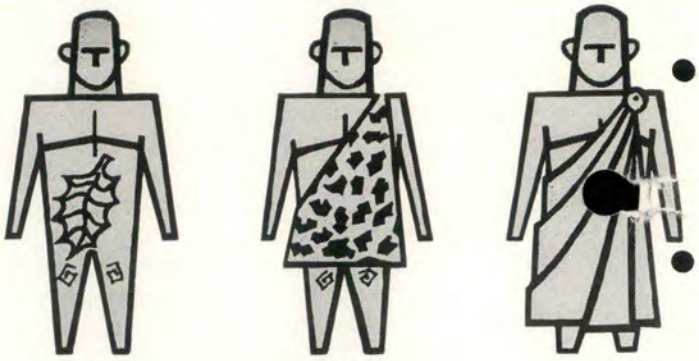
We are back around the full cycle and are hanging so much on our people that it is again most difficult to do the job they are in the airplane to accomplish.

Last spring at the ARDC meeting, the policy change was announced wherein the equipment and reliability would be engineered and built into the aircraft. Thus, the aircrews could again be unloaded to carry on their work more effectively. This is a welcome change and emphasizes that the people (who are the all-important element in this business) were not being given the consideration they deserved. Thus, the pendulum is swinging back toward a middle ground again. Engineers are in the midst of developing ways and means to build safety features into the cockpit of the aircraft. Again, personnel will be able to fly relatively safely without having to wear most of the protective equipment themselves. This will take time.

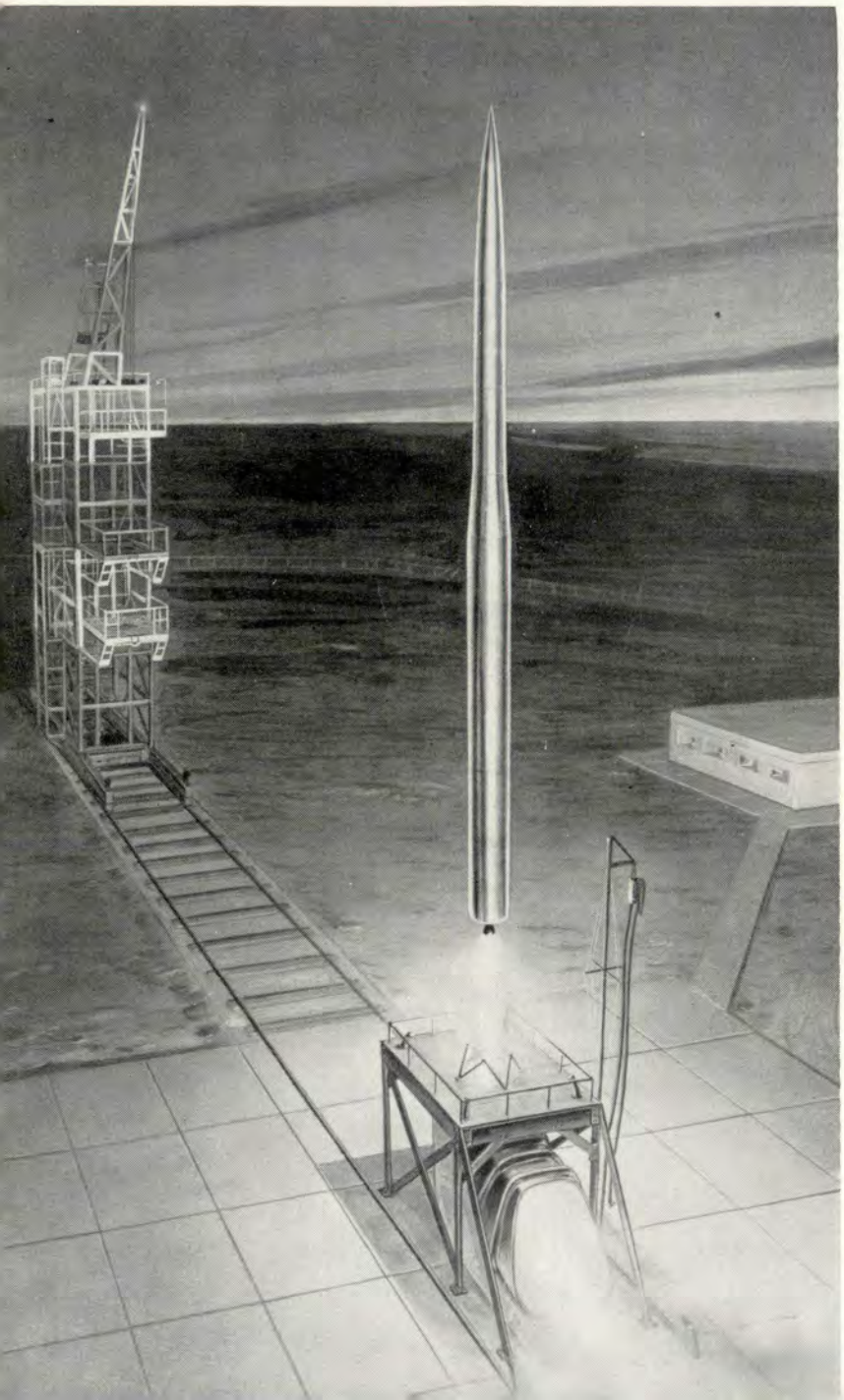
Meanwhile we have serious problems of everyday nature with which we must cope. The most troublesome are helmet-oxygen mask combination and —with the arrival of the Century series aircraft—the partial pressure suit and helmet. Until we reach the time when a pilot can fly in an aircraft which has all the safety features built in, all of us must devote a great deal more time and attention to the personal equipment we must use.

We should all dedicate ourselves toward devoting still more attention to the people we work with and their problems. We must look toward the prevention or amelioration of conditions which predisposes them to mistakes. Secondly, we must rededicate ourselves to the proposition that flying personnel are no safer than the state of their personal equipment.

During your flying career, you've had to work with various types of equipment. Some did the job and others made you wish for improvements. The improvements will come in the future, but . . .



. . . What About



Col. A. M. "Chic" Henderson

Coleman Engineering Company

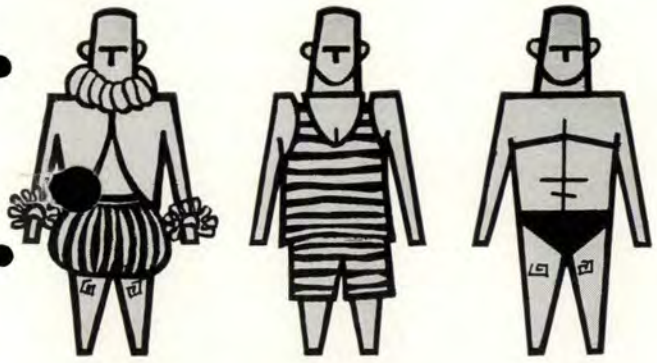
WHILE tremendous efforts are being expended, rightfully so, to provide better personal equipment, stabilized ejection seats and capsules for the future safety of our air crewmembers, what can they look for to protect them right now?

It can truthfully be stated that th[illegible] outlook isn't too bad, considering all of the facts. Engineers have made and continue to make astounding advances in the design and speed of aircraft; however, little has been done on the design of man since Adam peeked behind the forbidden fig leaf.

Today, you have ejection seats, automatic lap belts, automatic parachute opening devices, canopy releases, partial pressure suits and helmets, ventilating garments, anti-exposure suits, survival kits and other paraphernalia too numerous even to mention.

With various combinations of this personal equipment you can be protected from most of the hazards which may be encountered, should an emergency occur. Of course, it is bulky, heavy and uncomfortable but when it is needed, it'd better be there.

The blind learn to live without sight, the legless without legs. Both have added equipment to adjust themselves to the environment in which they must live—one, perhaps a cane and dog, the other crutches. It would be the ultimate in design if a bathing suit was available that would kee[illegible] one warm in the cold, ventilated i[illegible] the heat, dry in the wet, with built-in



Little has been done on the design of man since Adam peeked behind the forbidden fig leaf. Personal equipment supplements his shortcomings.

Today?

USAF (Ret.)

Los Angeles

parachute and pressure capabilities that weighed less than one pound. It is true that such a garment may be found, but to date the only feature available and guaranteed is the weight. Therefore, you must learn to live with the equipment of today. Thorough indoctrination and use make it more readily acceptable.

Physiologically equipped and psychologically prepared you can meet most of the problems of escape today with confidence. Perhaps the two weakest links in our chain are the frailty of the human body and the failure of the human mind to make a decision that it is time to go. Another extremely important factor is that of knowing thoroughly each piece of personal equipment and having confidence in its function.

Certainly there are many questions unanswered. For example, it is known that the human body can take a terrific beating and still function, but what is the dividing line between enough and too much? How strong are the neck, arms and legs, when the wearer of this equipment is ejected at supersonic speeds into a brick wall? Scientists and test subjects today are striving for the answers to these problems and will certainly come forth with a solution. In the meantime you will still fly, so perhaps a little know-how of what to expect may be of value. It is well known that a thorough knowledge of an enemy can assist greatly in his defeat.

First, it is important that you know thoroughly what you have in the way of personal equipment to protect you and, because of the complexities existing in this field today, some of the important items deserve discussion.

Let's talk about a few of these most important items of equipment and how they function.

Parachute Fitting

You are familiar with your parachute but the most important part of it is the one that many people ignore —the fit. A loosely-fitted parachute may cause painful injury, specially in the region of the groins. A properly fitted parachute harness should be uncomfortably tight when the wearer is in any position but seated. Always remember, a parachute, to be of any value, must stay with the individual after bailout. Characters with poorly fitted harnesses have been known to skin right out of the equipment on opening shock. This is extremely embarrassing, for a minute or so.

Canopy Quick Release

A canopy quick release mechanism is installed on your chute, on the main lift webbing, and should be located just below the collar bone in the hollow of the shoulder. On the B-4 and similar type chutes, there is one release on each side. On the B-5, however, only one quick release is installed—on the left hand side. Just as the name implies, when activated, this mechanism releases one side of the canopy in order to effect a rapid deflation of the chute after landing. Thus, it is designed to prevent personnel from being dragged through the water or across land.

The main point is for you to know *how* your parachute is equipped and *how* to work it for what you want to

do. Remember, we said that the older types of harness (such as on the B-4 chute) have two canopy releases. Each release operates one side of the canopy. Depending on what you land on (water, snow or rocky terrain) you will need to vary your technique. If you're in water, you may want to get away from the canopy entirely, to keep from becoming entangled. It may not be necessary, however.

If you land in snow or any other place where you'll be faced with a survival problem, you will need that chute. To pull one release will spill the chute and stop your travel. At the same time you keep the chute. If you pull both releases, you stop traveling but you also part company with it.

On the B-5 parachute, as we said before, you have only one release to worry about. This means that you can spill the chute all right but you can't get rid of it completely until you remove the harness. If you landed in the water and wanted to get rid of the chute, the best procedure is to wait until you are in your raft—then remove harness and all.

Above all, know how the canopy quick release works. Try working it on the ground until you become familiar with it. You will gain confidence in your ability to use it and you won't damage the mechanism or the harness. It can be put right back together again.

Automatic Opening Device

To avoid confusion, here's a bit about parachute automatic opening devices. Since they must work at all altitudes, the devices have two settings: one barometric and one by mechanical release. Perhaps an example would be best:

Suppose you're flying at 30,000 feet. The barometric release is set for 14,000 and the mechanical release for two seconds. You have to bail out at 30,000. Seat separation occurs in two seconds but the parachute does not function automatically until you free-fall to 14,000 feet. Slightly above the 14,000-foot level, the barometric release functions, activating the mechanical release. Two seconds later, the chute opens.

During ejection at less than 14,000 feet, the two-second mechanical release activates as seat separation takes place.

Barometric and mechanical release settings may be varied, so check and know the setting on the chute that you will use on this mission. You'll find these settings listed on the packing card in the pocket of the chute. These devices work in the same manner for non-ejection bailouts except that you must pull the automatic (red and white ball) ripcord. The manual ripcord or D-ring, if pulled, will override the automatic system and the chute will open immediately.

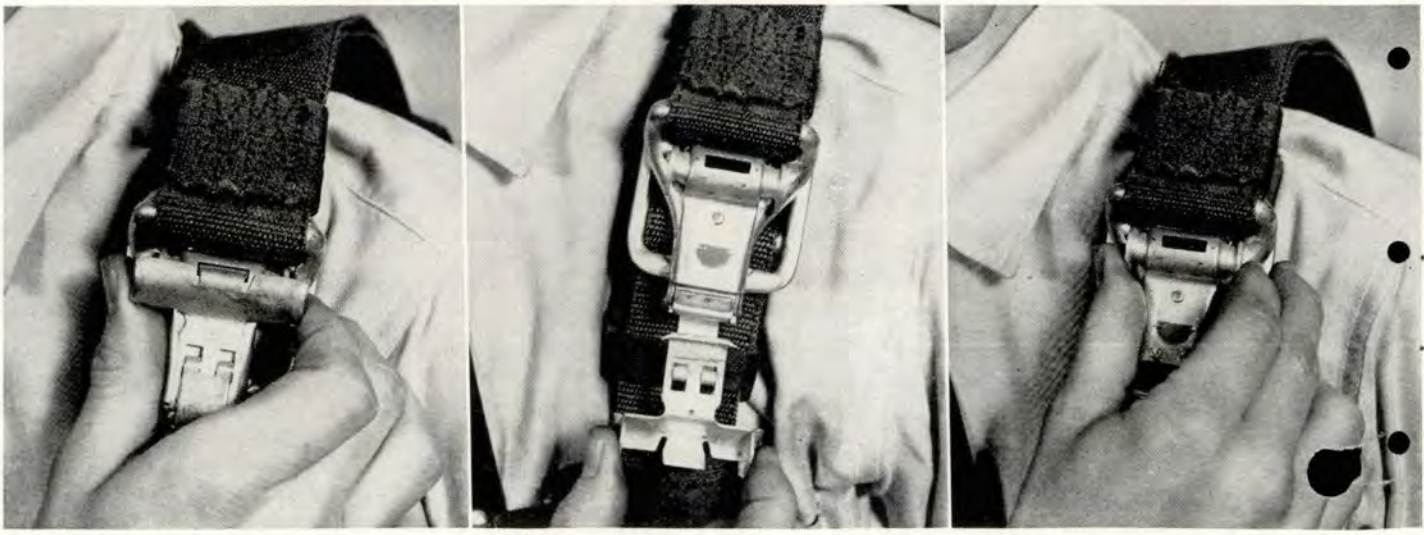
Automatic Lap Belts

Ejection seats may be equipped with automatic lap belts. While the belts may vary, the basic principle remains the same, that is to open the belts automatically. The activating device is gas operated. To make the automatic system complete, the belt and chute are normally used together; however, either may be used without the other.

A completely automatic system would function as follows:

The parachute automatic arming device (red and white knob) located on the left side of the back-type parachute main lift webbing, has a short lanyard securely fastened to it. On the unattached end, a key or keys are appended (two keys and a metal loop). The individual sits in the seat and places the shoulder harness loop on the belt link. The belt links are then placed in position, a key inserted (or the metal loop placed on the link) and the belt closed. Now the belt, while firmly fastened, can be opened manually or automatically.

You should be familiar with the parachute canopy quick release mechanism. By releasing one side only, you can collapse the canopy and still retain it for ground survival purposes.



Located on the seat is a pressure-operated device to open the belt. This release may be set for ¾ to two seconds. As the seat is ejected, the release is activated. Depending on the setting, it fires and automatically opens the belt. By force of drag differential, the individual begins to separate from the seat. As separation continues the shoulder harness loops slide off the belt link and the lanyard attached to the belt key and the parachute automatic arming knob pays out. The key remains firmly locked in the seat belt which remains with the seat on separation and cannot be released unless the belt is opened manually. When the lanyard travels its full length it pulls the knob which activates the chute for both barometric and mechanical release. CAUTION: The lanyard *must not* be entwined around the parachute harness or anything else. If it is, it means you are tied to the seat and separation cannot take place.

What are some of the hazards that you may encounter, should you have to make an emergency ejection or bailout? There are several that can be enumerated, such as hypoxia (lack of oxygen), spinning and tumbling, panic, opening shock, cold, landing and, last but but not least, survival. To escape and not survive is not to escape.

Let's take a hypothetical case where you have made an emergency ejection and follow through the sequence of events that might take place.

The Seat

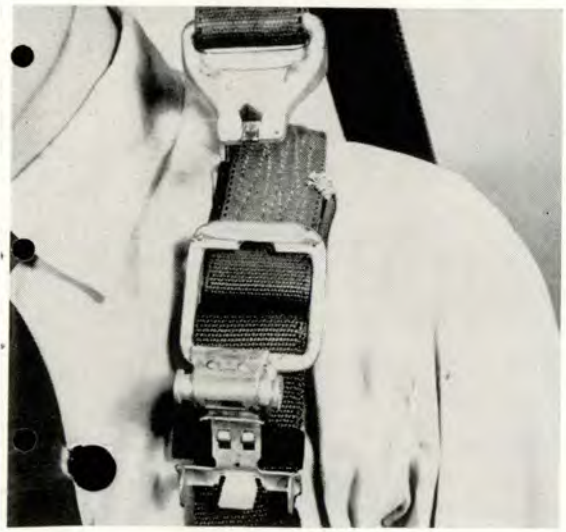
The operation of ejection seats vary. At present there are two methods of firing seats:

- Armrest trigger (upward).
- D-ring (downward).

Because of the variance in types of ejection seats, different pre-ejection movements may be necessary. It is extremely important that each person in the aircraft receive a briefing on seat operation, during which certain Standard Operation Procedures (SOP) are enumerated. First, it is hoped that you are sitting on a "hot" seat and that the pins have been pulled prior to takeoff, and then—

- Helmet and mask should be secured before canopy is released.
- Lower head and body as far as possible before releasing canopy to prevent injury from canopy (except in downward ejection).
- Sit erect, buttocks well back in seat, head back against the headrest, chin in, shoulder harness locked, feet in footrests (if provided), and activate bailout bottle (if required).
- Grasp firing device.
- Fire seat.
- Following ejection, release lap belt and kick away from the seat as soon as possible. There may be an automatic device to release the belt.
- Delay parachute opening, depending on altitude, to reduce opening shock and allow seat to fall clear. If chute is equipped

A loosely-fitted parachute may cause painful injury. A propertly-fitted parachute will be uncomfortably tight when you are not seated.



with automatic opening device and the seat with an automatic lap belt, you need do nothing but fire the seat.

Ejection

"S-W-I-S-H!" is the easiest way of describing this sensation. If the lap belt and shoulder harnesses are adjusted properly there is no jolt. Nor is there the sickening feeling you sometimes experience in rapidly ascending or descending elevators.

You are sitting relaxed (it is hoped), and then — instantly — you are gone. A kaleidoscopic scene of color unfolds before your eyes. There is no black-out or red-out, but there are a few moments of confusion. By the time you can move your head to look at the lap belt, the seat should be gone and you should be free falling. If for any reason you are held in the seat, check the belt. If it is open, use your hands and feet and push away. If the belt is not open, operate it manually. But remember now, if you do open the belt manually, your automatic parachute must be operated manually by actually pulling the red and white knob.

Windblast

When the ejection seat leaves the aircraft, you and the seat are subjected to windblast and wind drag deceleration which are functions of the air density and the speed, whose combined action is measured as ram pressure.

Windblast is fairly mild up to speeds of 400 knots; that is, you can readily feel the force but it is not frightening or injurious. At higher speeds the force becomes greater and it becomes difficult to restrain the limbs and head. It is therefore quite evident that the speed should be reduced, if possible, prior to ejection.

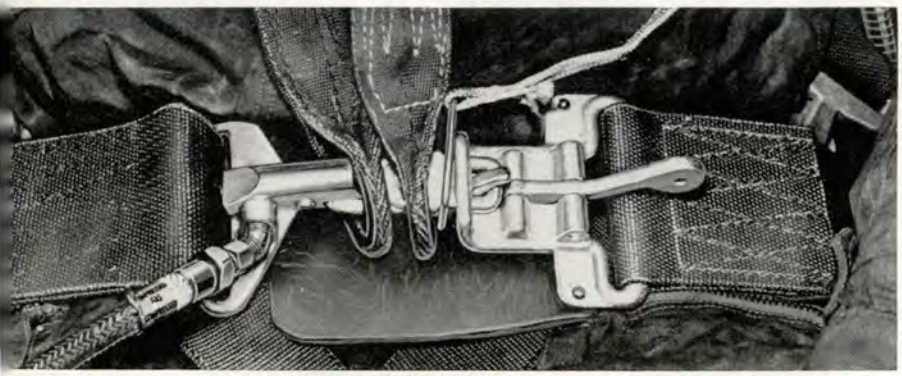
Free Falling

This is best described as a body falling through the atmosphere without the use of mechanical restraint. Actually, there is not any feeling of falling, and there are several advantages to a free fall after high altitude escape, regardless of the means of exit. There is less danger of getting the chute caught on the aircraft. There is less shock when the chute opens. Oxygen is required for a shorter length of time on the way down.

Spinning and Tumbling

A free falling body may encounter tumbling and spinning of varying degrees. Tumbling is defined as the head-over-heels rotation in a vertical plane while spinning is rotation around the vertical axis of the body,

Place the shoulder harness loops and the metal lanyard loop on the belt links, then close the belt. Some belts have a key instead of a loop.



When the seat belt fires, the parachute lanyard anchor is retained by the swivel link. Give the belt time to open before attempting manual release.

Manually releasing belt nullifies the automatic opening. Arming cable must be pulled or parachute can be opened by pulling ripcord.

Type F-1B automatic parachute ripcord release will be set at one second and 14,000 feet.

Tests have been made to study the trajectory of seats. When chute is equipped with an automatic opening device and an automatic lap belt, you do nothing but fire the seat.

commonly known as "flat spins." The eccentricity of spinning and tumbling is such that no known method of control has been developed. By merely exposing a small portion of a hand or arm to the windstream, a person can change the direction of spin. In some instances, waving the arms and kicking the feet (similar to swimming motions) have also been of assistance.

The spinning and tumbling may be fairly violent, weird (if a P-3-4 helmet is worn you'll experience a swishing noise in your ears as your body rotates), nauseating and frightening. But it can't last long.

Body position immediately following separation from an aircraft or seat is important. The best position is chin on chest, body slightly bent at hips, eyes focused on belt area, feet together, the left hand grasping the chute webbing just below the ripcord handle, and the right hand grasping the webbing just above the ripcord handle. In low altitude escape, the right hand should grasp the ripcord handle.

Time to ground from 50,000 feet for a free falling man is approximately three and one-half minutes. To 15,000 or the neighborhood of parachute opening, is just over two minutes. Wait it out; do not panic and pull the ripcord. Remember, the cold, the limited oxygen supply and the terrific opening shock are all against you.

Another possible source of annoyance may be the partial pressure suit, when worn. Be sure that the helmet tie-down cord is pulled down or the helmet pressure will raise the helmet on the head. Moisture caused from condensation may splash around inside of the face piece and it may become partially frosted over during the free fall.

It is also highly recommended that a cloth athletic supporter be worn. This need may not be obvious when the suit is unpressurized; however, in the pressurized state, the testes are subject to position change which could cause extreme discomfort and damage, during parachute opening shock, descent and survival.

Parachute Opening

Parachute opening shock is much greater at higher altitudes than at lower altitudes. At 7000 feet, the opening acceleration is 8 to 9G, whereas at 40,000 it averages 33G.

In practice, serious injuries have resulted from the impact of parachute opening at altitudes above 25,000 feet. One method of calculating time while free falling is to count "one thousand one — one thousand two — one thousand three, and so on." Each count represents one second. Caution must be exercised, however, because individuals under these conditions have a tendency to count too rapidly. A little practice helps to get the proper cadence.

Body position for the parachute opening is a most important factor. The same position as for free falling should be assumed prior to parachute opening. With the body in the proper position, it is unlikely that damage will occur, in case the suspension lines foul up during the opening.

When ready to open the back type non-automatic parachute, grasp the ripcord handle with the right hand and pull it down and to the right, across the body.

To open the seat type, non-automatic parachute, pull the ripcord up and to the right, across the body. In either instance, as soon as pulled, tuck your arm in against your body immediately.

When wearing automatic parachutes, no other movement is required after the red and white activating knob has been pulled. Once the ripcord has been pulled, keep your head down, your arms in and feet together.

To escape and not survive is not to escape.

The chute will deploy away from you.

After initial opening shock has been absorbed and you are dangling under the open parachute, be sure to check it visually. Here are some of the most common incidents that occur following parachute opening:

The risers may have several twists immediately over the head. If left alone, they will untwist without assistance.

The "Mae West" (no relation to the life preserver) is formed when one or more suspension lines are whipped across the top of the canopy. This causes two large bulges (hence, the name) to appear with a line or lines drawing in the canopy at the center. By grasping the risers and shaking them, you can usually cause the lines to slip off and the canopy will then resume its natural shape. However, if they do not slide off, forget 'em. At best, it merely increases the rate of descent some, and, well, you're going down anyway!

Open Parachute Descent

Now that the chute is open and you are nonchalantly dangling in mid-air, just relax and enjoy it.

The face piece of the pressure helmet should be removed. If an oxygen mask is worn, it should be unsnapped. If the helmet doesn't have a chinstrap, however, the mask should not be unsnapped. It is the only means of helmet retention. It is extremely important that the helmet be retained for head protection during landing.

The rate of descent varies, depending on the individual's weight and the size of the canopy. A 200-pound man wearing a 28-foot canopy will descend approximately 17 feet per second. The rate quoted is for sea level.

A word of caution: As you approach the ground it may appear that the rate of descent has increased greatly. This is not so; it's merely an optical illusion of what now seems to be the ground coming up to meet you.

Oscillation may be described as the pendulum-like movement of the body, swaying under an open parachute. In some instances it may feel rather severe, but, to date, no one has gone completely around. It may be somewhat descreased by pulling or pushing the risers in the opposite direction of the movement. Extreme oscillation only presents problems during actual landings on the ground.

Body position, while descending, is a matter of personal preference, except for a water landing, and depending upon the type of equipment being worn. (Water landings will be discussed later.) Two choices are open to you when you have time to spare. You can hang in the harness or you can pull yourself back in the seat sling and sit as in a swing. Remember though, ground landings require the hanging position and it should be assumed several hundred feet in the air.

Ground Landings

Body position for a ground landing is extremely important. It is:

- Arms overhead.
- Hands grasping the risers.
- Knees slightly bent.
- Feet together.
- Eyes looking out at a 45-degree angle to the ground.

In this position, the exact time of ground impact will not be anticipated. This will eliminate the hazard of pulling up your legs just prior to impact. As ground impact is made, allow the body to collapse in place; then twist either to the right or left in order to absorb the landing on the flat body surfaces. The parachute may be collapsed by any of three methods:

- Canopy release.
- Pulling in on the bottom risers.
- Getting on your feet, running around, if you're able; grasping the apex of the chute and turning it away from the wind.

Landing Impact

Landing impact is something that is difficult to describe. It may be extremely easy, like stepping off a chair. Or, it may be extremely difficult. It depends entirely upon the weather, wind and the amount of oscillation. Never attempt to make a standup landing, no matter how easy it appears. Remember, if the proper body position is maintained, the body can take a terriffc jolt without serious injury. Body rolls should not be attempted. If the landing is hard enough, the body will automatically roll or bounce. Remember what was said about the importance of body position and keep your arms overhead, hands grasping the risers, knees slightly bent, feet together and eyes looking out at a 45-degree angle to the ground.

This same position should be maintained even though it appears that you are going to land right into a

The anti-exposure suit and survival gear are available for issue today. Crews of Century series fighters and jet bombers will be equipped with emergency high altitude pressure suits.

house, fence or on the rocks. Attempting to steer the parachute, slipping and body turns are discouraged. Merely hit the way of the drift, whether it be backward, sideways or forward. The most common causes of injury on parachute landings are:

- Taking your hand or hands away from the risers to try to ward off ground impact.
- Looking down at the ground which tempts you to draw up your legs just prior to impact.
- Failing to keep your feet together. This causes one foot to take the brunt of the entire landing.

Tree Landings

It is entirely possible that you will land in a tree. In most instances, such a landing is quite gentle and not too disagreeable. The main problem, of course, is getting safely to the ground. The body position remains the same, with the exception of the arms and hands. The hands should be grasping the risers across your face. In other words, cross your arms over your face and grasp the risers on the other side. *Don't cross your legs.* Just keep your feet together as you would for any other type of landing.

Water Landings

These are much easier than ground landings. They have been executed into water with fully inflated preservers in 25-knot winds without injury to the man or damage to the preserver.

While the procedures outlined here are relatively new, they are an improvement over the old system and they relieve you of performing actions after water immersion. Here is all there is to it:

- Check the canopy immediately after the parachute opens.
- Remove your face-piece if you're wearing a pressure helmet.
- Unsnap your oxygen mask.
- Push the sling under your buttocks with your thumbs.
- Sit well back in your harness.

(This is the best procedure, but don't worry about it if you have trouble getting back far enough or run out of time. Since you have a canopy release, you can even hang in the harness.)

- If you're wearing the B-5 flotation vest (the Mae West, to you), unfasten or loosen the chest strap. You'll be more comfortable when it inflates.
- If you're wearing the MA-2 (Underarm) preserver, you don't have to bother with the chest strap at all.
- Inflate both sides of the preserver. (There is a separate pull cord for each side.)
- Pull down on the canopy release guard. This can be done safely at any altitude.
- When your feet contact the water, squeeze the canopy release buttons and rotate the clip out and down.
- Move away from the canopy to prevent tangling with it.
- Inflate your life raft.
- Climb into your life raft and paddle for home.
- Use the sea marker, shark repellent and signal mirror, as required.

Survival Kit

If you are equipped with an automatic kit, it should be activated during the parachute descent. The raft will drop out inflated, under you, on a thirty-foot lanyard. On the end of this lanyard, the balance of your survival equipment is encased in a waterproof container. Once you're in the water, all you have to do is grasp the lanyard and pull the inflated raft to you.

There are two methods of boarding a life raft. Here's the first one:

- Grasp raft and make sure it is right side up with narrow end toward your body.
- Face raft, place both hands on narrow end and push it down under your body. Move your hands to the boarding straps and pull your body onto the raft.

Keep your arms overhead, hands on the risers, knees slightly bent and feet together.

And now for the second method:

- Grasp raft and make sure it is right side up with narrow end toward your body.
- With back toward raft, place both hands on narrow end and push it down under the buttocks and slide in backwards.

The advantages of these procedures, in performing many functions in the air while descending, are:

- If malfunction of preserver cartridge occurs, oral inflation may be accomplished.
- You can see what you are doing, as opposed to fumbling about after becoming immersed.
- Water immersion is greatly decreased, causing less confusion.
- Decreases "panic" possibility.
- "Peace of mind" for you—everything is done.

In summary, the following points should be considered:

- Preflight inspection of your parachute and flotation gear is a MUST.
- Wear the chute properly at all times. Remember *time* is important in an emergency.
- Know what you are going to do, in case of an emergency, before you take off.
- If you do have to jump, relax and enjoy it. Thousands before you have done it, successfully. ▲

★ ★ ★

About the Author

Col. A. M. "Chic" Henderson, now retired after 32 years of service, was formerly assigned to WADC as Asst. Chief of the Aero-Med Lab. He is rated as a Master Parachutist, with a record of 127 jumps. He has personally test-jumped such experimental USAF personal equipment as ejection seats, automatic lap belts, anti-exposure suits and survival kits. He made the first test downward ejection from a B-47 jet bomber. Col. Henderson also participated in the program to determine the physiological limitations of the human body during periods of "free fall" through "unfriendly" high altitudes. His work in the field of developing personal equipment and escape is indeed outstanding. He's presently assigned to Project SMART. Perhaps you know him as "The Jumping Grandfather."

May I Ride With You?

FLYING SAFETY presents the passenger's point of view. Although originally published three years ago, the story is still apropos.

I'M A GROUND type, ground pounder, paddle foot—non-rated. Why? Because some flying instructor back in 1940 told me after 10:28 hours of PT-17 time that I couldn't hit the ground with my hat, let alone land an airplane. I met the board. All that was said was "It's been nice and thanks, but no thanks for any more." And that was the last word.

"Yes, Sir."

Come fall this year, I will have seventeen years in the Air Force, a comforting rank and a lot of passenger flying time, both in the ZI and overseas. A little has been in jets but mostly in gooneys, B-25s, C-45s, C-54s, T-6s, B-17s, C-121s, C-74s and L-20s. Some years I average 12 to 15 hours per month in the blue on various TDY assignments.

I've ridden with all types of pilots and aircrews. Today, I have a clear-cut picture of the guys I like to ride with; an equally vivid memory of those who made me wish that I'd been shopping with the wife—something I detest.

Suppose you are flying to Timbuctoo tomorrow. I call you the day before the flight to find out if you have room for me.

You say, "Be at Operations at 0615."

I show up at 0600 and find you've already started your clearance. This I like (and I know that you like my being there early). I've come to respect the pilot who has set a takeoff time and expects to meet it. The entire ride will reflect the same precision. You ask me if I care to get the weather with you. I chalk up another bonus point because you're the type who appreciates the interest every passenger has in the entire flight plan.

I realize, by the way, that passengers are not ordinarily allowed in either the Ops or Weather Office. Hence, I don't expect the plush treatment and accept it only on invitation and when I won't be adding to the confusion of things.

The paper work is completed and we walk out to the airplane. You introduce me to the rest of your crew and that is important to me—that personal interest in the people with whom I'm sharing this adventure. The opposite, all too familiar, scene goes something like this:

"Who's going on 3256? Joe, have you got any maps? Who has the clearance? Sergeant, how many chutes are there? Let's leap."

Brother, think I, this is another of those real gone rides. They want to get off the ground before someone cancels their cross-country. That gal simply will not be kept waiting. Bet they want to get us peasants off at the first stop.

This isn't meant to be the latest word on the niceties to be observed when traveling by military air. Rather, it is another impression to help define an attitude or frame of mind that ultimately adds up to the professional airmanship we all respect.

Let's get back to where we were walking out to the airplane. I follow you around as you make a visual inspection. You pay particular attention to the controls, step up on a tire for a close look in the wheel well. I don't know what you're looking for but am confident that you do.

Before starting the engines, you get the attention of all the passengers and explain the flight plan. The crew chief passes out the parachutes. You ask everyone to try his on.

The Sergeant says, "Colonel, your leg strap is a bit loose. May I tighten it for you?" He helps me and I think, "They're leaving nothing to chance. These guys are good."

"How many of you've ever used a parachute?" No reply.

"I've never had to jump either, but here are some points to remember: Keep your head down when and if you jump. Look at the D-ring, but don't put your hand on it until you're out. Turn around and watch the plane —a gimmick to make sure that you are well cleared. You know how to turn over in the water while swimming? It's just the same in the air. Twist your body and you'll turn. Keep your feet together. It keeps the shroud lines from between your legs."

After this, he continues through the routine and then explains alarm signals, emergency exits and procedures.

I've never been comfortable with an aircraft commander who takes all these explanations for granted, any more comfortable than I would be on a ship that failed to pull the customary lifeboat drill. I've been through the procedures many times and I want to hear them many times again. Not so much for my sake after all these years, but for the benefit of the young clerk-typist who is going home on his first leave; the cute little WAF with the engagement ring (somebody should have told her about parachutes and skirts); and the sailor going to Kentucky after two years of sea duty.

Sure, all of us like to act like seasoned space hoppers. Ever heard a passenger ask for a briefing on emergency procedures? Down in the heart we know something is missing when the commander does not solve the mysteries that each passenger is thinking about.

A little knowledge is a hazard to a ground pounder's peace of mind. He learns a smattering about engines, about flying techniques; he picks up a little weather lingo; realizes that there is an air traffic control agency;

Should have told that cute little WAF that chutes and skirts don't mix.

The pilot explains the flight plan, alarm signals, emergency exits and procedures to be used.

Embarrassed am I with the passenger who thinks that parachutes are for a beauty rest.

that some planes fly farther on a given amount of fuel than others, and that there are needle-ball and airspeed indicators, plus a gaggle of other gadgets and gages to make like a bird. Most of all, he knows that there is a lot he doesn't know and hopes and trusts that the crew does.

Flying along, do you sometimes put down the magazine you're reading and begin wondering about it all? Especially when everything shudders in a steep climb or turn, when the props get out of synchronization, when power and pitch settings suddenly change, and when the furniture for the new NCO club stampedes down on you in severe turbulence (this has happened).

When these random thoughts pass by, you realize that you are automatically doomed to the uneasiness which a little knowledge breeds.

Little things count, like seeing the pilot walk back occasionally. On a recent flight on a foreign airline, my seatmate, obviously a well-traveled European, said, "What I don't like about this airline is that I never see the Captain. I like the airline whose skipper introduces himself to the passengers, tells us about the flight and then tells us each time he makes a change."

His remarks reminded me that another airline attached to my timetable and ticket a booklet that explained why the atmosphere is sometimes rough and compared its effect on an airplane to a ship in heavy seas.

Well-briefed passengers will be less a problem than a group that was mystified before takeoff.

All of this adds up to confidence in the equipment and the people. You say, "You're getting a free ride—you want a free book, too?"

No, but I figure the effort the commander makes to let his brood know that he is aboard and really in command, shatters uneasiness and reflects well on himself and my branch of the service. Should an emergency arise (this has happened, too), the confident group of passengers will be less a problem than a group that was mystified and perhaps slightly apprehensive at takeoff.

I have also come to appreciate that aircrews make equally valid observations of their passengers.

I wince with the aircraft commander when passengers expect his crew to hop bells for baggage; suffer with the pilot who keeps one hand on the elevator trim because passengers are holding a track meet in the rear. But most embarrassed am I with the rider who thinks safety belts are for sports cars, parachutes for a beauty-rest and Mae Wests a cushion for precious personal baggage. Another pet peeve is the sick passenger who is ashamed to reach for a paper bag—or even his hat — and the matador who gets that gored expression when told to quit monkeying around with the door handle.

This has been written for the benefit of us who frequent the passenger lounges, asking the question, "May I ride with you?" bargaining that the travel time we save is worth taking on any and all comers as a crew and not always appreciating the usually competent airmanship that gets us from here to there. ▲

WELL DONE

Major J. R. Stevens

33rd Air Rescue Sq., Okinawa

MAJOR STEVENS was flying an SA-16 on a local flight just south of Okinawa when he was notified that a Tow Reel Operator had fallen from a B-26 from 10,000 feet, some 98 miles out to sea. After flying to the scene and setting up a search pattern, the downed airman was sighted struggling to remain alive in 16-foot waves. Seas of this height are far beyond normal capabilities of the SA-16; however, Major Stevens realized that the airman could not survive until surface craft arrived. He also knew that unless the landing was executed perfectly, the aircraft and crew, as well as the downed airman, would be sacrificed. Relying on the skill and experience gained from six years of rescue work, he brought the SA-16 into the turbulent seas in a classic, full-stall landing. Inspection revealed that the aircraft was undamaged and the water-logged survivor was quickly picked up.

With his wet passenger safely on board, Major Stevens made two attempts to lift the 28,000-pound amphibian from the water and twice was beaten back. The aircraft was taking a tremendous pounding during each takeoff run and the pilot felt that in all probability, further attempts would break the fuselage wide open. His decision then was to taxi the aircraft 98 miles back to Okinawa. Now, airman-turned-sailor, though barely able to control the plunging amphibian, he fought the seas for 9½ hours back to base. A "record" for sea taxiing distance was thus established!

The quick decisions, expert skill and complete knowledge of his aircraft's capabilities resulted in another life being saved. Major Stevens' actions upheld the high traditions of the Air Rescue Service and the United States Air Force. Well Done!

Personal

In our business the word "preflight" is an all-important one. We think of it, however, as referring to the aircraft only. But it also applies, with equal importance, to personal equipment.

The term PERSONAL is very apropros, for if it doesn't work when we need it, it gets too personal for comfort.

So, let's get with it. Expand on that careful preflight inspection to include your personal equipment.

The following checklists do not include all items of personal equipment but they do cover those pieces of equipment most commonly used.

• P-3, P-4 Helmets •

Fit	Properly adjusted and fitted by the Physiological Training Section.
Shell	Free of cracks and ruptures.
Lacing and Cords	Proper tension.
Knots	Securely tied.
Oxygen mask tabs	Serviceable condition.
Earphones	Not loose or torn.
Visor assembly	Lens not scratched to extent that vision is impaired. Assembly functions properly, opening between mask and helmet does not exceed ½ inch.
Chin strap	Properly attached and adjusted.
Communication cord	Serviceable condition.
Oxygen mask	Properly attached and fitted.

(T. O. 14P3-4-1)

• Parachutes •

Log	Check for accomplishment of 10- and 60-day inspections.
Pack and Harness	Check external condition for visible defects.
Ripcord	In place, handle not sewed or snapped to cover. Pins in place and not bent or corroded.
Automatic Opening Ripcord	Proper time and altitude setting; proper attachment of power cable and power cable housing to dual mounting plate. Plate undamaged.
Aneroid	Check for leaks.
Ripcord seal	Intact.
Arming cable knot guide	Secured to pack assembly.
Pack opening bands	Serviceable condition.
Canopy quick release	In closed position.
For correct fit	Check instructions sewed and stenciled on the cushion of chute.

(T. O. 14D1-2-61)

• Oxygen Mask •

Attachment	Mask secured to helmet suspension studs with screws.
Mask	Cleanliness, sealing of inlet and exhalation valves; free of nicks, grooves, scratches and other damage affecting sealing action.
Hose and Rubber Parts	Cracks, cuts, other signs of deterioration.
Straps	Signs of fraying and wear.
Inlet check valves	Plastic covers installed with arrows pointing downward.
Lip Strap	Serviceable condition.
Hose clamps	Secured at both quick disconnect and mask ends.
Gasket and C-ring	In place on quick disconnect end.
Inspection	Mask should be cleaned and inspected at least every 30 days or more often, depending on use.

(T. O. 15X5-4-2-44)

• Life Raft (Seat type) C-2A •

General Condition	Examine for holes, tears, oil, hydraulic fluid and mildew. Check date of last inspection.
Slide fasteners	Operational.
Cylinder to inlet coupling nut	Tightness.
Accessory kit lanyard	Attached to cylinder nut.
Inner pull tab	Attached to inner inflation valve. A 90-day inspection is required on all rafts under three years old. A 60-day inspection is required on those over three years old.

(T. O. 14S3-2-1)

• B-5 Life Vest •

CO_2 Cylinders	Charged. Cylinders must be weight-checked every 30 days and date of inspection shown.
Compartments	Check for leaks by orally inflating both sides. After check, deflate vest and lock oral inflation tubes.

Equipment Checklist

Accessories	Sea marker (yellow packet); whistle; shark deterrent (blue-green packet); recognition light (do not stow in vest pocket but in holder attached to right side webbing strap. Signal mirror; signal flares. Battery BA-30 should be of latest date.
Fabric	Free of oil and grease that will deteriorate bladders. Date of inspection should be properly stenciled and serviceable tag attached showing date next inspection is due. A six-months inspection is required on B-5 vests not exceeding three years old, and 60-day inspection for B-5 vests over three years old.

(T. O. 14S2-2-1)

• MA-2 Life Preserver (Underarm) •

General Condition	Free of holes, tears, oil or grease; stitching not frayed or torn.
Cotterpins	Not damaged or corroded. Insure sealing thread is intact and properly installed.
Accessories	Sea marker; whistle; recognition light; shark deterrent; signal mirror, signal flares.

(T. O. 14S2-3-1)

• Anti-G Suits •

Bladder	Check for leaks and condition.
Hose assembly	Serviceable condition.
Zippers	Serviceable condition.
Laces	Check for damaged or missing laces.
Buttons	Check for damaged or missing buttons.
Fabric	Check for tears, open seams or frayed areas.

(T. O. 14P3-6-1, G-3; G-3A suit
14P3-6-11, G-4A suit
14P3-6-31, MB-2 suit)

• H-2 Bailout Bottle •

Pressure	1800 psi.
Pull cable	No frayed or broken strands.
Bayonet fitting	Insure that it mates with mask fitting; connect before takeoff.
Ball	Attached to pull cable.
Tubing	Serviceable condition.
Caution Tag	Pull before flight (aircraft equipped with ejection seats); other aircraft, retain tag until use is desired.

(T. O. 15X-1-1)

• Seat Type Subsistence Kit •

Container, cushion and harness	General condition. Check for holes, abrasions, frayed harness.
Seams	Check for gaps or torn areas.
Seal	Intact and properly attached.
Seat pan assembly	Sheared studs or eyelet damage.
Seat cushion	Two-inches thick, and properly attached to container.
PK-2 Life Raft	Inspect and insure raft container is attached to chute.

(T. O. 14S3-2-13)

• Exposure Suit R-1, R-1A •

General Condition	Visually check condition of suit container; it should be free of holes, tears and the seal should be in place.
Emergency Entrance Tab	Not unglued or torn.
Serviceable Tag	Attached, showing date of last inspection. A 60-day inspection is required on all R-1 and R-1A exposure suits.

(T. O. 14P3-5-21)

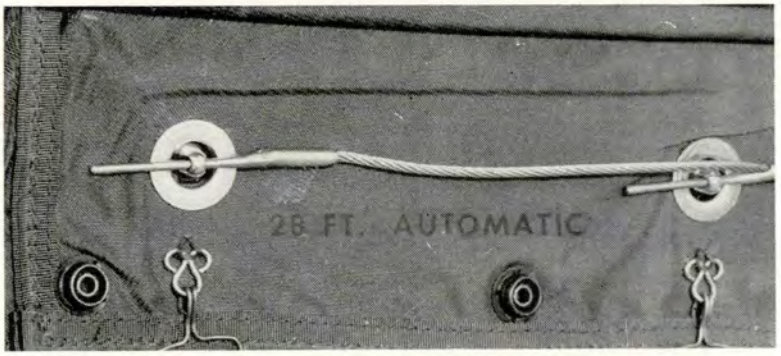
WOULD YOU ACCEPT THIS

Can you spot what's wrong with the personal equipment shown on these two pages? Would you be willing to fly a mission with what you see here? Pencil in your guess and then turn to page 19 to see how sharp you are.

1._____

2._____

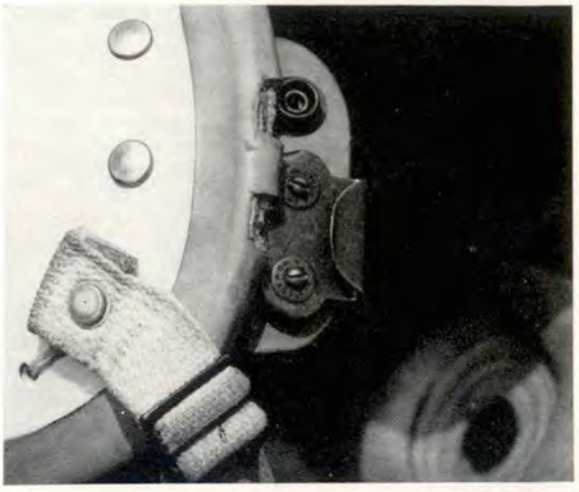
3._____



4._____

5._____

EQUIPMENT ?



6. _____

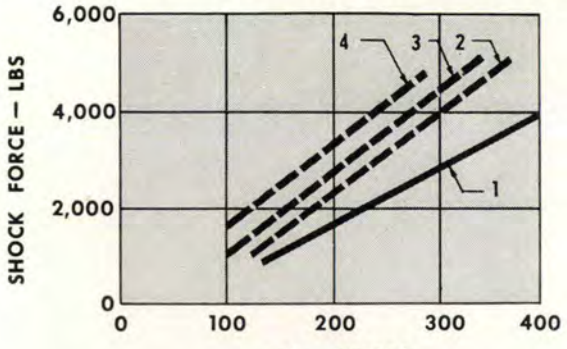
7. _____

8. _____

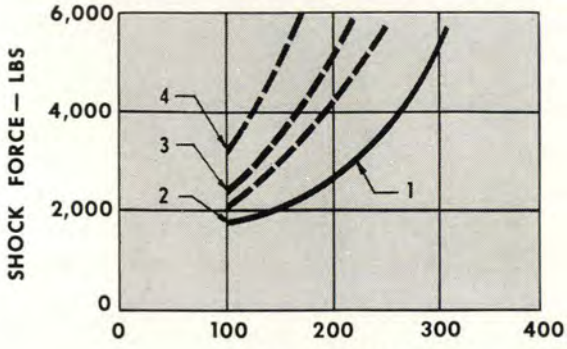
9. _____

10. _____

PERSONNEL PARACHUTE PERFORMANCE
CANOPY SHOCK FORCE VS INDICATED AIR SPEED



Type C-11 canopy, assem. P/N 50C7024-12 &-13



Type C-9 canopy, assem. P/N 50C7024-9 &-10

LEGEND
1 Drop test data for sea level
2 Drop test data for 7,000 ft press alt
3 Drop test data for 14,000 ft press alt
4 Drop test data for 20,000 ft press alt

FIG ONE

Those Shocking Altitudes

This article was prepared by the Parachute Branch, Equipment Lab., WADC.

THE Wright Air Development Center has established 14,000 feet as the fixed altitude for automatic parachute aneroid controlled operation. The aneroid setting was selected to obtain lower altitude escape capability with a minimum compromise to high altitude-high speed escape.

Flying in the Denver, Colorado, Mt. Whitney and Mt. Shasta, California, or Seattle, Washington, areas, you may note mapped altitudes of 14,000 feet and higher. It registers that something must be wrong; the two just do not seem compatible. But actually, your chances of flying and having to escape over these areas are pretty remote. The reasoning behind setting 14,000 as a fixed altitude is based upon a series of compromises involving terrain altitudes, survival (hypoxia and exposure from high altitude bailouts), and, most important, parachute opening shock.

In the United States, all of the terrain above 14,000 feet is in the form of peaks. The total area of all peaks at the 14,000-foot "plateau" is approximately 20 square miles. The largest single area is Mt. Shasta, with about three and a-half square miles.

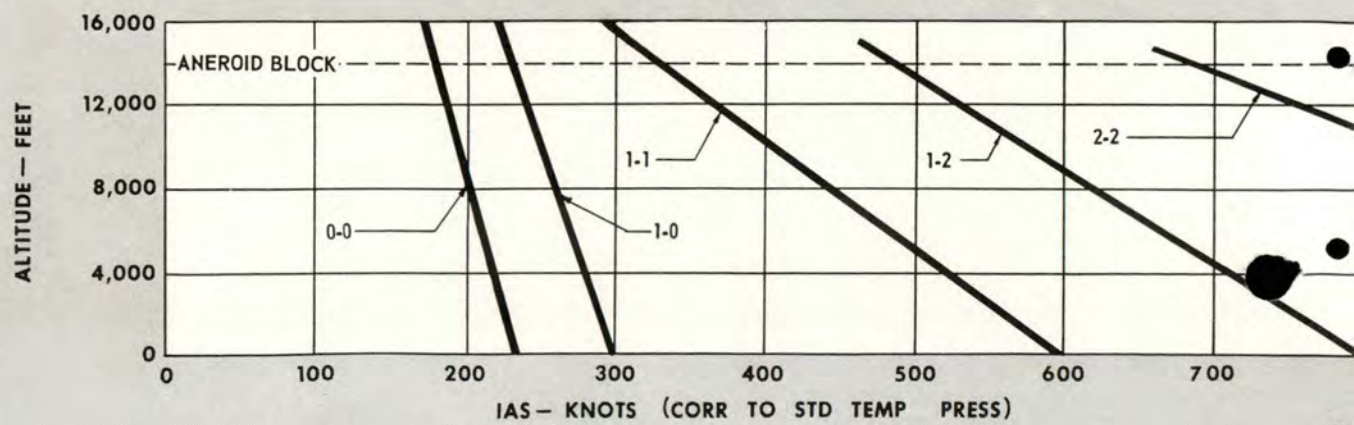
In the Alaskan Territory the total area above 14,000 feet altitude is approximately 140 square miles, with Mt. Logan accounting for some 50 square miles.

With the exception of isolated peaks in Africa, Arabia, Antarctica and New Guinea, there are only two other areas in the world which are predominantly over 14,000 feet. These are the Andes Mountains of South America and the Himalayas of Tibet.

An altitude of 14,000 feet will be sufficient for most training and operational conditions. The automatic parachute releases are so constructed that under special mission or area conditions, altitudes may be reset.

The actual aneroid block is 1500 feet above the dial

SAFE EJECTION SPEEDS ALTITUDE VS SEQUENCE (LEVEL FLIGHT)



LEGEND

Type C-9 28 ft flat canopy, type B-4 pack P/N 50C7024-9 &-10

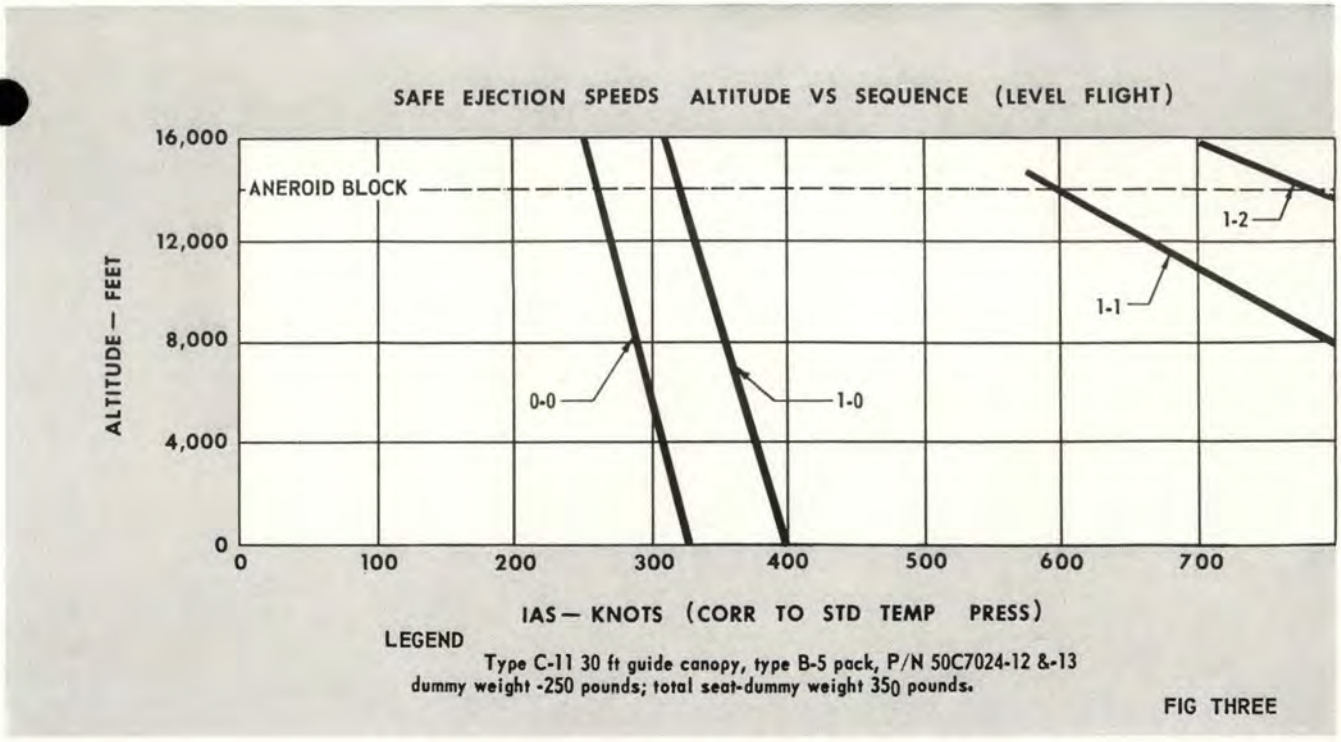


FIG THREE

setting of the automatic release device. This is done to provide a safety margin to overcome allowable variations in aneroid altitude sensitivity and preset time delays. In other words, a device set at 14,000 feet would always operate above 14,000 feet.

High altitude parachute openings, aside from producing severe opening shock, will produce long descents where hypoxia and exposure to the colder atmosphere become a problem.

Opening shock increases with altitude. Figure 1 shows a comparison of opening shock (average) versus indicated airspeed. When these parachute opening characteristics are applied to the ejection sequences, the safe ejection speeds noted in Figures 2 and 3 are obtained. Figures 2 and 3 are based upon the maximum safe parachute opening speed and/or the opening shock within human tolerance.

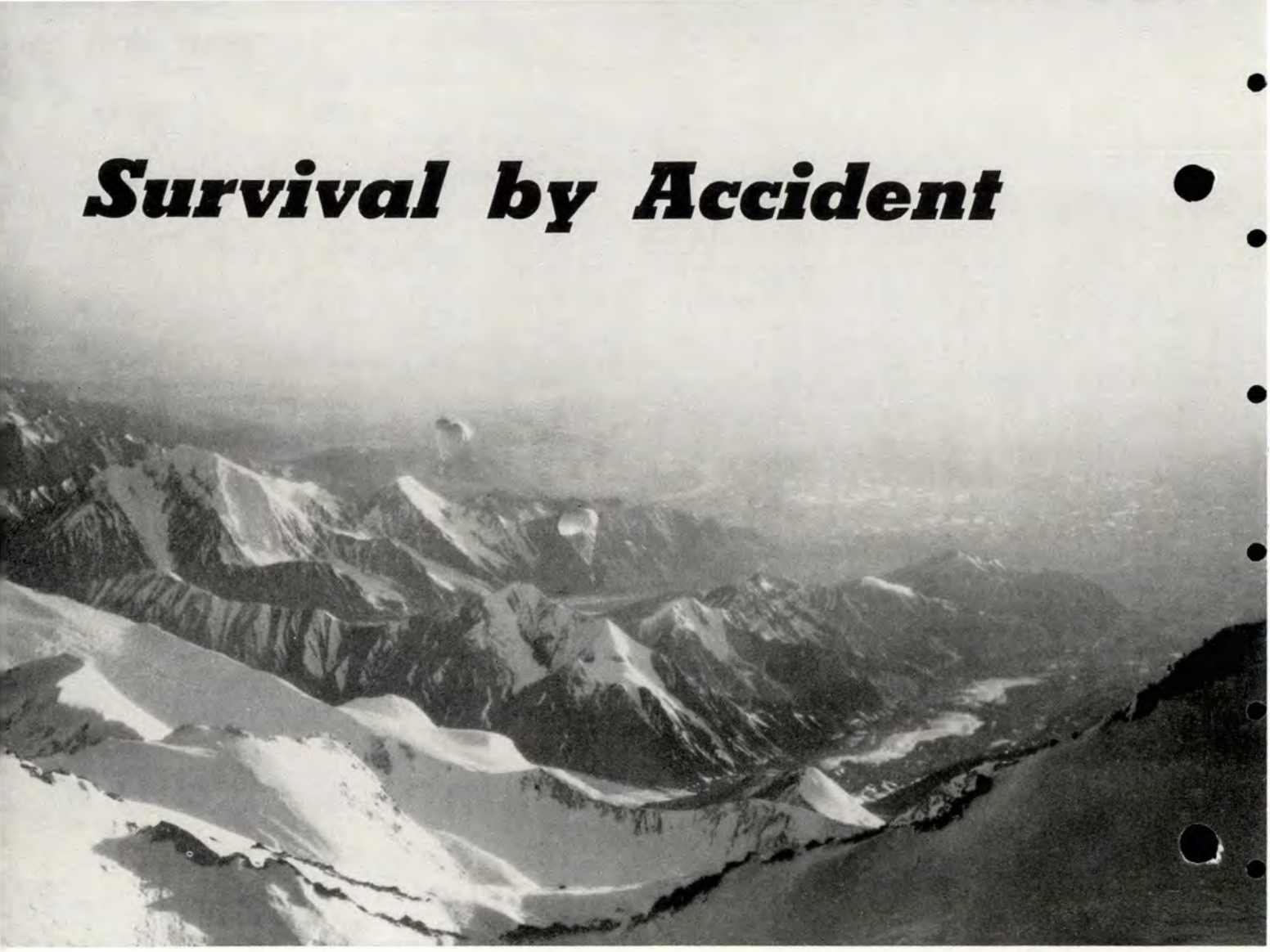
To sum it up, let's take a hypothetical case: The automatic ripcord release is set at 20,000 feet and two seconds time. The aircraft is an F-86D on an intercept mission. The parachute is a standard 28-footer. The escape sequence is a two-second initiator on the lapbelt and the two-second parachute release. On climbout at 20,000 feet, you have to eject. This ejection speed and altitude places the pilot in a position where the highest parachute opening shock can be obtained (20—25G). If the pilot ejects at this altitude, exposure to high altitude atmosphere (down to 15,000 feet) will last some three minutes and the over-all descent (neglecting winds and thermal currents) will be approximately 15 minutes to sea level. Assuming the pilot is in shock and just hanging in the harness, the lack of oxygen will cut down his chances for survival. Or if he lands in a tree and cannot get down, his chances of survival likewise decrease rapidly with time. Had the same pilot been equipped with an aneroid setting of 14,000 feet, the parachute opening would have been mild to moderate. Exposure between ejection and 15,000 feet would be in the order of 20 seconds and survival chances would be excellent. All of this makes for pretty sound reasoning establishing the 14,000-foot preset altitude.

The main point is for you to know your setting, and when you have to, use it accordingly. ▲

Answers to Quiz "Would You Accept This Equipment?"

1. Oral inflation valve open. 2. CO_2 pull tab not safetied. 3. Time and altitude improperly set. 4. OK. No seal required on automatic chutes. 5. Seal broken; canopy exposed. 6. Flares are missing. 7. Safety clip missing. 8. CO_2 cylinder missing. 9. D-ring hooked. 10. This chute is all right.

Survival by Accident



SLUGGER 21 and Slugger 22, two F-89Ds, took off from their Arctic air base to practice intercepts in the local area. The pilots were briefed to alternate turns at flying as target and interceptor aircraft. No sweat.

Separated on take-off, both aircraft were vectored by GCI on different headings five minutes apart to 1000 on top of the overcast. They broke out at 30,000 feet. No sweat.

On the first intercept, Slugger 21 acted as target. GCI vectored the intercepting Slugger 22 for a 90-degree beam attack. No sweat.

But the two aircraft were only seven miles apart when the Radar Operator in Slugger 22 finally got a lock on his target. Then, almost at once, the pilot in each aircraft found himself on a collision course with the other. And this is where the sweat begins.

"Go under, Jim, go under!" Slugger 21 called wildly to Slugger 22.

But Slugger 22 had a mind of his own. There wasn't time, he decided, to go under. He broke to the left, hoping to go behind and slightly above the onrushing Slugger 21.

"His right wing," Slugger 21 later reported, "clipped my right wing off about two-thirds of the way out, and we did a snap roll on contact and continued to snap.

"I tried to recover from the snaps," Slugger 21 continued, "but was unable to do so. I told the Radar Observer that we'd better get out and I blew the canopy. The right armrest would not come up. *I couldn't locate the safety pin.* My helmet would slide over my right eye as I craned my head to the right trying to find the safety pin; so I took my helmet off but it didn't do any good. I still could not get the pin.

"I elected to go over the side and on my first attempt I was blown back into the cockpit. Finally, with my feet in the seat and both hands on the right rail, I managed to get over the side to the inside of the spin. I hit some part of the aircraft but I don't know what. I got a light to moderate opening parachute shock. But I was greatly surprised when I found *I had forgotten to attach my survival kit to my parachute D rings.* I landed in a tree and because of the strong surface winds, had difficulty in getting out of my harness. I was rescued 15 hours later."

The Radar Observer in Slugger 22 never got out of the aircraft and was killed.

Slugger 22 had meanwhile gone into a spin, "preceded by two or three alternating climbing and diving snap rolls," the pilot reported. "Let's get out of here. Blow the canopy, Bill,

This is a story of a survival—by accident. Check off the slips you might have made, yourself. And remember, this is what happens when you forget the book and try to fly and survive on your luck.

The two aircraft were only seven miles apart when the RO got a lock on. Each pilot immediately realized that he was on a collision course. Here the sweat begins.

you blow the canopy!" he called to his observer.

"I tried," he continued in his report, "to squawk emergency but couldn't reach it because of severe G forces. But the canopy blew and I knew that Bill had heard me even though he made no transmission after the impact.

"I tried for three turns of the spin to fire the seat by pulling at the right armrest but I couldn't get it to the UP position."

Then the pilot of Slugger 22 also decided to go over the side. He too had trouble getting out. "I had considerable difficulty moving my hand to the lap belt buckle because of the G forces. When I did get the belt off I tried to go over the side but was blown back into the cockpit. During this attempt, I lost my helmet and gloves. Finally, I got my feet in the seat and jumped straight up. I think I hit the tail of the aircraft.

"My chute opened with a very mild shock, and for about ten minutes, I couldn't see. Before contact with the ground, I unbuckled my leg and chest strap and noted that my survival kit was attached to my chute. I landed in the trees and hung momentarily by my parachute, then dropped into the waist-deep snow. My hands were extremely cold and I had to use my teeth to unzip the survival kit.

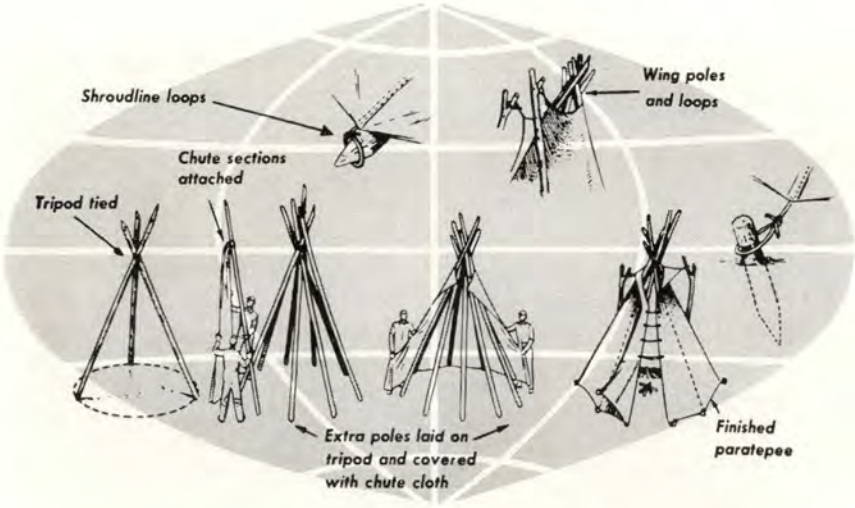
"I found two trees and a large bush, and using the tarpaulin from the kit and a piece of chute, built a shelter. The snow was heavy and the wind was strong. The matches in the survival kit were safety matches and I had nothing to strike them on. Fortunately, I had other matches in my pocket or I would not have been able to build a fire. I placed the chute on the ground in the shelter and put my sleeping bag on top of the chute. I changed socks, loaded the 22 caliber rifle, fired it once, put it in the sleeping bag with me and then went to sleep.

"At three o'clock the next morning, 13 hours after the accident, I heard a plane fly over. I leaped out of the sleeping bag, ran outside of the shelter and tried to fire a flare. I couldn't get it to fire before the plane was gone. The second time the plane came over I fired the flare and apparently the rescue team saw it, as a helicopter arrived in about 15 minutes and picked me up."

The Radar Observer from Slugger 21 had his own story to tell:

"At impact, my only statement was 'Whoops!' The pilot calmly said, 'What'd we lose?' I answered, 'Part of our right wing is gone . . . better squawk emergency.'

"When we decided to get out, the pilot blew the canopy and I raised the left armrest with my left hand and began searching for the armrest safety pin with my right hand. Just about the time I felt panic approaching, I located the pin and after some difficulty managed to pull it. The ejection was not abrupt and the force was not great enough to close the visor on my helmet. I believe my hand and the automatic lap belt release acted almost simultaneously. I pulled the ripcord almost immediately after releasing the lap belt and my parachute opened with a great deal less opening shock than I had expected. While descending, I noted that I did not



One man had never heard of a "parateepee" . . .

have my survival kit attached to my parachute. I had always left it unattached in case I had to make a rapid exit on the ground. . . . I'd never considered that I might not have time to attach it in flight if the need to eject arose.

"I landed on my left side and was dragged about 15 feet in the snow on my back. I was stopped by the stump of a bush which knocked the protective coating off my helmet and forced snow down my back. I collapsed the chute by releasing only one side of the canopy release as I did not want to lose the chute. After brushing the snow off, I made a shelter with part of the chute, converted the back pad of the chute into a warm cover for my feet, and settled down for the night, wrapped in the remainder of the chute. I was picked up by a helicopter about 15 hours later."

If you haven't been keeping the score, here's what happened. The primary cause of the accident, the investigating board determined, was pilot error on the part of the intercepting pilot in Slugger 22 in that he failed to take proper corrective action to avoid collision and did not follow the advice of his element leader to go under. Further, both pilots failed to follow squadron SOP in that they did not allow for vertical separation on the first intercept to insure that their radar computors were properly calibrated to provide lateral clearance. But that's not all.

In the use of ejection and personal equipment there were a number of glaring errors, the board stated. Such items as these were obvious:

- Failure to remove seat safety pins.
- Failure to attach survival kits to parachute D-rings.
- Inadequate inspection of survival kits, which resulted in the inclusion of safety matches but nothing to strike them on.
- Failure to fasten chin straps, resulting in the loss of helmets on bailout.
- The releasing of the lap belt by hand which rendered the automatic opening device for the parachute useless. (This may have contributed to the frost bite of one crewmember whose chute opened above 20,000 feet.) The automatic device would have afforded free fall to 14,000 feet.
- Ignorance of the crewmembers of the many emergency uses of the parachute for ground survival in the Arctic. One had never heard of a "parateepee."

Considering all of this, the survivors were lucky to make it. Two of them were lucky to have escaped from spinning aircraft without the use of their ejection seats — seats that couldn't eject because a safety pin hadn't been pulled. Two were lucky to last for 15 hours in the snow, without survival kits. Two had no helmets; one no gloves and one might have had no fire to warm himself except for the happy chance that he happened to have some other matches in his pocket. It's a sad story about an accident that needn't have happened in the first place. But it did.

There is only one good item in the whole long list of errors. Both Slugger 21 and Slugger 22 were equipped with chaff dispensers and the dispersion of chaff was painted on GCI scopes and led to the rescue of surviving crewmembers within a period of 15 hours. Here they were lucky too, for given another day and a night in the frozen snow, somebody's luck might have run out.

What's the moral? There's almost an even dozen here, beginning with don't forget to pull the safety pins on your ejection seat. But most of all, don't ever forget that it can happen to you. Remember this when you climb into your bird and the odds are pretty strong against forgetting anything else. ▲

Your Airplane Isn't Everything

Major Wallace W. Dawson
Fighter Branch, D/FSR

LET'S FACE IT. As aircraft fly higher, faster and farther, crewmembers' personal equipment becomes more and more important. To quote one of our rustic heroes: "As any fool can plainly see, your airplane isn't all you need to know, anymore."

Personal equipment is just about as old as the flying game itself, but like everything else, it has had to change with the times in order to keep abreast. For instance, a pilot would look pretty silly today, wouldn't he, mounting an F-100, dressed in puttees, riding pants, leather jacket and with his bill cap turned backwards?

No, today, the demands of our mission dictate the type of gear we will use and the way we will use it. Because of this, the picture changes constantly and sometimes we have to rush to keep up with the new stuff that's coming out. This is especially true for those jocks whose primary duty is flying an LSD (a large, steel desk).

There is a bright side to this picture, however. Not very far away are several people who are interested in your knowing your personal equipment and who are ready, willing and able to help you do just that. Along this line, periodic visits to the Personal Equipment Section can really pay big dividends. The next time you get the chance, stop in and spend a couple of hours with these people. I'll bet you'll learn something and, who knows, maybe some gloves *have* finally come in. And while you're there, ask the experts to check over your equipment and to give you the latest "poop" on any new gear that's out. They'll be more than happy to answer your questions and will help you all they can.

Of course, they can only go so far towards keeping you safe and comfortable while you're flying. The actual preparation for flight and the proper use of your gear is up to you. A lot of time and money have gone into the gear that you wear in flying today.

It has been said, and rightfully so, that familiarity breeds complacency. It is only natural for a fighter jock to trust his bird. He has probably flown it hundreds of times without any serious trouble and expects to continue flying it . . . that way. This is when *care* and *handling* of personal equipment can suffer. 'Loosen that chute harness a little so it will be more comfortable.' 'No need to wear gloves, baby, it's hot outside.' 'And that Mae West—leave it in the locker—this flight is over the desert.'

Yes, these things can and do happen even though they shouldn't. And then if the red light comes on sometime and you are faced with an emergency, you may not be ready.

Why not make like a Boy Scout? Besides helping old ladies to cross the street, he is "prepared." This can get real important because as our mission requires higher and faster flight, it also requires operation of our equipment at maximum efficiency. Airplane parts have failed in the past and might even do so again. If this happens, it just might be necessary to resort to a nylon descent and you may not have any time to spare.

Your personal equipment is tip top—the best in the world. Experts have been provided to show you how to use it and how to keep it in the best possible condition. All you actually have to do then is to learn to use it right and to use it that way.

After all—the life—well, it may be your own! ▲

Are YOU Ready?

Physical, mental and psychological factors can have a direct bearing on performance. What with checklists for everything else, here is a personal one for you.

Jeff Sutton, Research Engineer
CONVAIR, San Diego

ONE OF THE earliest devices for checking the presence or absence of an item, or the degree to which it possessed a given characteristic, was the checklist. This simple device, properly used, can still be a pilot's best life insurance. Pilots recognize its value in checking out their aircraft and flight plans. Its use is a must—or it should be—even if you are just flying to the corner grocery. Then, why not a checklist for the most variable component you have to cope with—your own flight readiness?

For use in such a checklist, your flight readiness, or well-being, is defined as your physical, mental and (especially) psychological (emotional) fitness to operate an aircraft during the full time you propose to be airborne. This means your ability to attend instruments and respond quickly and accurately to all operational demands. Your judgment, decision-making processes, accuracy of response and reaction times are the chief areas involved. These are the areas where you have to be sharp—at peak condition.

This is especally true if you are jockeying one of the Century series hotrods where closure rates are fantastically fast and decisions arise by the bunch. It is also true if you are in the heavier hardware where flight routines are long and monotonous, and even the fresh starter ends up fatigued. Yet it is in precisely these areas that performance decrements first set in—often long before you are aware of them.

Such impaired performance may take the form of something as seemingly simple as the misreading of a dial, a misjudgment of distance, failure to perceive a warning signal or undue length of reaction time. Yet, these are the raw materials from which accidents are made. Such goofs are not simple discrete occurrences. They are signs that deterioration of performance already is well along in its course. They say, "Beware!"

No practical checklist could serve to examine all the danger areas exhaustively. It would take a staff of physicians and psychologists to do that. But it can present pertinent questions which will give you a pretty good idea of what kind of performance you are capable of. If the shaky variety is indicated, that's your cue not to fly. It's easy to rationalize by saying, "It's just a short hop." Well, it might be shorter than you think.

The value of such a checklist is directly proportional to the care taken in its construction. It must be short enough to be readily usable, yet include the major factors which have a bearing on flight performance. These latter are physical, mental and psychological states which adversely affect your ability to fly even though you may not be aware of them.

The main trouble areas have their genesis in prior dissipation, lack of sleep, sustained concentration, prolonged flying time without adequate rest, excessive time on instruments and abnormal environmental conditions, all factors ensuing from flying itself. These are natural precursors to impaired performance. But so are such commonplace things as mother-in-law troubles, balancing-the-budget headaches, or the accumulation of all the common distractions that mark everyday life. Your son's penchant for throwing rocks at the neighbors' windows can have direct effects in your undershooting or overshooting on the letdown, or your failure to let down your landing gear.

In aviation the results of such irritants customarily have been gathered under the all-inclusive word *fatigue*. This catch-all category includes the common garden variety of muscular fatigue (caused by prolonged or difficult physical exertion), mental fatigue (caused by sustained concentration, difficult mental tasks, or the effort required in monitoring a number of mental tasks simultaneously or in quick succession) and psychological fatigue (which arises from fear, worry or any prolonged emotional binge).

In turn, the fatigue syndrome has direct and adverse effects on performance which have been measured many times. These include:

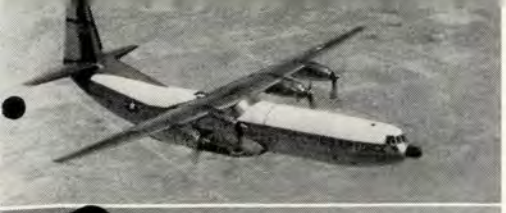
- Increasing energy requirements to perform a given task.
- Increasing variability and error in manipulating controls, reading gages and estimating distances.
- The acceptance of increasing tolerances in all aspects of operational flying.
- Increasing reaction time.

Do you ever find yourself concentrating unduly on one instrument at the expense of others or neglecting your peripheral instruments?

Or, do you find yourself making the right actions at the wrong times or over-controlling your aircraft? That, too, is fatigue. Oddly enough you may feel right in the pink at a time when your performance is sadly on the skids. That's the insidious thing about fatigue. It does not announce its arrival. The value of the checklist lies in pointing out the little cues that tell you when such operational effects are apt to occur. It tells you when to keep your feet on the ground.

However, if you are fatigue-wise, you will recognize the subtle and not so subtle signs which mark its onset and hark to their warning. It is these signs which form the basis for the suggested accompanying flying safety checklist.

They are not all-inclusive. They do not, for example, cover health con-



ditions which arise from physiological malfunctioning. But they do cover most of the symptoms of temporary or chronic fatigue which effect performance. And right here is the place to put in another pitch. If you have any health problems or suspicions of such or are chronically fatigued, pay a fast call on your flight surgeon. That's what he's there for.

You will note that the checklist for flying safety has a four-way breakdown: temporary fatigue symptoms that are physical, mental and psychological in origin, and chronic fatigue symptoms in all three areas. The method of classification is chiefly for convenience, inasmuch as these symptoms often cross party lines.

For example, "tenseness of major body muscles," shown as a symptom of physical fatigue, can just as easily mark psychological fatigue. Also, some of the symptoms classed as "temporary fatigue" are also prominent in chronic fatigue. The kind of fatigue is not as important as the fact that it is present.

Fatigue is generally classified as "temporary" if it can be eliminated by a good night's sleep. If you have any of the symptoms listed under the last category (chronic fatigue), then the flight surgeon most certainly is your man.

One last word about the checklist: The presence of one or more of the symptoms listed doesn't necessarily mean fatigue. Conversely, passing the checklist with flying colors does not guarantee that you're in super shape. But the checklist does indicate when you should see your flight surgeon. The safest course is to check periodically with him, and check without fail when any disturbing symptoms are present. In the case of aircrew, disturbing symptoms often are disregarded in the interests of preserving flight pay. The specter of being grounded is unpleasant — but to fly when you should be grounded is the height of false economy. In the heavier hardware, crew performance is measured by its weakest link.

You can construct your own checklist, following the advice of your flight surgeon, or you might like to keep the accompanying checklist for handy use. A handy-dandy checklist that is never consulted is about as valuable as an all-lead glider. But if your checklist is carefully constructed and used before each flight, the dividends it pays may be the saving of your life. That's quite a bonus. ▲

CHECKLIST FOR FLYING SAFETY

TEMPORARY FATIGUE SYMPTOMS

Physical Fatigue

Physical Exhaustion
Increased Effort to Carry Out Work
Increasing Rate of Error in Operations
Tenseness in Major Body Muscles; Stiff Neck; Tremor
Tendency to Doze; Need of Sleep
Feeling That You're "Not Sharp"

Mental Fatigue

Unusual Difficulty to Follow Instructions; Things Hazy
Need to Re-check Your Actions; Uncertain About Decisions
Diminishing Range of Attention; Deterioration in Judgment
Accepting Greater Tolerances in Instruments and Controls
Accepting Unnecessary Risks

Psychological Fatigue

Vague Headaches
Increased Startle Response
Tendency Toward More Frequent Sighing
Irritability, Fault-finding, Impatience, Temper Flareups
Unusual Preoccupation; Forgetfulness
Sense of Discomfort; Failure
Boredom, Loss of Motivation, Lack of Group Interest
Tendency to Carelessness
Inability to Concentrate

CHRONIC FATIGUE SYMPTOMS

Physical, Mental and Psychological Fatigue

Increased Reliance on Coffee, Tobacco and Alcohol
Loss of Appetite
Loss of Weight
Social Withdrawal, Resentment Toward Others
Nonconformity, Asocial Acts
Decreased Personal Cleanliness
Insomnia, Nightmares, Radical Change in Sleep Habits
Confusion, Chronic Anxiety, Fearfulness, Depression
Vague Chest Pains; Difficulty in Breathing
Vague Visual and/or Auditory Disturbances

CROSS FEED

LETTERS TO THE EDITOR

In Australia

This is an inquiry about getting on the mailing list for FLYING SAFETY.

I am a USAF officer on exchange duty with the No. 82d Bomber Wing, here in Amberley, Queensland, Australia, until May 1958. I am a senior pilot and I feel rather left out of current USAF procedures, since being at this far-removed assignment. If I could receive FLYING SAFETY I feel that I could at least keep abreast of present procedures and trends. The Australian officers assigned to this wing would literally wear out the publications since the RAAF does not publish a similar magazine for service consumption.

Would like to be advised if the magazine can and will be mailed to me without charge.

Major Larry W. Smith, USAF
Exchange Officer

You're on the list, Smitty. Sorry, we can't do the same for your Aussie Compadres. But we're still taking subscriptions.

★ ★ ★

Faulty Perception

Bouquets to you for passing the word on illusions of perception and how pilots can avoid or effectively combat these phenomena. (I refer to the article, "Deception Rides the Skyways" in the June issue of FLYING SAFETY.)

During the past four months, this command has experienced two major aircraft accidents that were caused by faulty pilot perception and, in one instance, the pilot became hopelessly disoriented, and crashed. Although your article was too late for these pilots, it will serve to educate the rest of us concerning this vital aspect.

Regarding Lt. Col. Harry N. Young's letter to the editor, also in the June issue, I'd like to point out that many ARTC's seem to have a penchant for assigning IFR cruising traffic altitudes that are not in accordance with an appropriate VFR altitude for the direction of flight. Admittedly, this practice does not violate any regulations and is a valid practice in expediting traffic; however, it does set the stage for mid-air collisions between aircraft not operating under the same rules.

I suggest that the CAA should carefully re-evaluate this practice to determine what justification exists in creating a high risk potential for the sake of expediency. For my part, I won't accept "inappropriate" IFR altitudes. Sure, I'm delayed at times . . . but it's a comfortable delay.

Capt. John Y. Harris
Hq 4AF, Hamilton AFB.

Delay is often cheaper and a darn sight more comfortable. If you can't wait, keep a sharp eye going for you.

★ ★ ★

That Green Apple

While reading the May 1957 issue of FLYING SAFETY, I was particularly interested in the article "Just a Triggerman." I noticed that whenever you mentioned the automatic release arming knob, you referred to it as the "green apple." Any automatic release that I have ever encountered had an orange colored knob with a white luminous strip around. Could it be that you were confused with the pull cable knob on the bailout bottle which is green in color and round like an apple? If someone were to bail out and pull the "green apple," a 10-minute supply of oxygen would be had. But, O-O-O-OH, that ground is hard.

Please advise me if I'm wrong.

S/Sgt. James L. Mercier
Personal Equipment,
1002d IG GP, Norton AFB.

It Should Be Red

The article "Just a Triggerman" in the May issue of FLYING SAFETY has been reviewed with considerable interest and is considered a step forward in a field where crewmembers have received a minimum of briefing. There are two points, however, which must be clarified:

1. The altitude setting for all automatic parachutes has been established at 14,000 feet.

2. The "green apple," mentioned, when pulled, will operate the Type H-2 oxygen bottle and not the parachute. This reference is misleading and can lead to serious consequences. The automatic ripcord release is actuated by pulling a red plastic knob called the "arming knob." A luminous strip embedded in the knob permits visual location in the dark.

This Branch will continue to follow FLYING SAFETY avidly and hopes that more space can be devoted to personal equipment and escape problems in future issues.

W. P. Shepardson
Chief, Parachute Branch
Equipment Lab, WADC

The "green apple" referred to has certainly given us the bellyache. Seriously, this was a goof on our part and should have been caught by proofreaders. We hope our readers are aware that the arming knob is actually reddish orange in color with a white luminous stripe.

See "Those Shocking Altitudes," page 18 for the latest word on automatic opening chutes.

Oxygen Mask Test

Here's a bit of information that might be of interest and value to other flying organizations and perhaps worthy of space in FLYING SAFETY.

In the past (to the best of my knowledge), no single, readily accessible apparatus, other than the aircraft itself, has enabled flying personnel to test oxygen masks and headsets. Malfunctions in these two items have thus rarely been discovered prior to a crewmember's entering the aircraft to perform his preflight inspection. Granted, these are both dependable pieces of equipment, nevertheless, like people, they are subject to occasional failure.

To provide flying personnel of the 9th Bomb Wing with a facility for testing oxygen masks and headsets, a singly enclosed device was designed, constructed and installed in each of our squadron's personal equipment section. Our so-called "Mobile Oxygen Mask and Headset Test Stand" is a wooden cabinet containing a pressure-demand oxygen regulator, a low-pressure oxygen cylinder, a small easily-built radio set and jacks for both high and low impedance; material for mask cleaning and instructions for its use.

The crewmember takes the gear which he draws from Personal Equipment, to the Test Stand and checks his oxygen mask, mike and headset before proceeding to his aircraft. By having it checked here, first, he won't have to return to Personal Equipment from the ramp, should any part malfunction.

He may also prevent the possibility of having to abort a mission.

In the event this information warrants magazine space, it might be mentioned that a diagram of the radio set and a plan of the test stand can be made available to any interested outfit by writing to our unit. The photos show three of the installations made, to date.

Capt. Robert B. Yandell
Commander, 1st Alt. Ch.
Indoc. Flt. 9th B-Wg(M)
Mountain Home AFB, Idaho

Good show! Another case where some guys don't wait for the silver platter treatment. The rig is great, but don't forget to preflight the airplane end of the equipment, as well.

UHF Switch

I have just read one of your items entitled "Rex Specials" in the May issue. The last paragraph states that by positioning your UHF Switch in the Tx/Rx plus guard receive position will allow the radar controller to override any transmissions by the pilot in the event control instructions are a must.

In the case of the very common RT-178/ARC-27, if the pilot is transmitting with switches positioned as above, he cannot receive on the guard receiver or the main receiver because the common antenna is switched to Tx section only of RT-178 by relay K-1401.

Reference to this can be found in 12R2-2ARC-27-2 (Handbook Service Instructions) page 60, Sec IV, Par 4-66.

T/Sgt. John Johnson
68th A&EM Sq, 68th Bomb Wg (M)
Lake Charles AFB, La.

Slips. The man is right.

★ ★ ★

The C-45H

On page 26 of the May issue, the article entitled "Flying the C-45H," states: "Let the nose tanks run dry." "And they have been known to never catch." Please relate specific instances.

If you can't get an airstart in a C-45 after running any given tank dry, some old, bold C-45 pilots are in for a rude awakening. It has been a practice to run C-45 tanks dry in order to determine exact fuel consumption and hence information concerning remaining hours to fly. Fuel gages have proven to be somewhat unreliable when they approach the empty side of the dial. Determining exact fuel consumption and exact remaining fuel can make a great difference in the safety of long range planning.

Now then: If you contemplate a future article on C-45 aircraft, some reference to mixture control settings could be of value to FLYING SAFETY's readers. The C-45, with mixtures in rich position, will fly slightly longer than a T-Bird before flaming out. By leaning the mixtures judiciously, you can get over seven hours out of it and help the Air Force save money.

Maj. Gordon J. Andrews
1727th Support Sq. (Trans)
APO Seattle, Washington

REX SAYS

IN REVIEWING the replies to questionnaires completed by 132 pilots who had ejected successfully from the F-86, '101 and '102 aircraft during 1956, it was amazing to note how many factors were common to all. These ejections occurred at altitudes varying from 800 feet above the terrain up to 39,000 feet, and at speeds varying from a stall to 525 knots, yet the factors remained fairly constant. They read like this:

- When the helmet chin strap was not fastened, the helmet and mask were usually lost. Therefore the chance of retaining the helmet and mask is greatly enhanced if the chin strap is fastened and the visor is down.
- All pilots ejecting successfully had removed the armrest safety pin prior to the emergency.
- The majority of pilots receiving cuts on the head and face, had not fastened their oxygen hose connection to their parachute chest strap in prescribed manner.
- Those pilots having difficulty collapsing the parachute canopy on landing were not familiar with operation of the parachute canopy quick release.

Most of the injuries sustained on landing occurred when the pilot hit the ground while drifting with his back to the direction of drift. Many also stated they were unable to turn themselves in the chute and could not judge their height above the ground (resulting in hitting the ground when they thought they still had another 100 — 200 feet to go).

You will probably say, "So what? This has been known for years." True, it has been. But there's nothing like actual experience to prove recommended procedures. And these ejections were "for keeps" and not service testing or the like.

When the time comes to eject, there seldom is time for pin-pulling, chin-strap fastening or studying the operation of the parachute canopy quick release. These are things you must have done and/or be familiar with. And the procedures in the Dash One aren't just educated guesses of the manufacturer. They more than likely came the hard way — that of cr[illegible] members having to eject and then g[illegible]ing us the benefit of their experiences. We can hardly afford to ignore them.

REX SPECIAL

EVER HEARD of P. D. McCripe? Sure you have. Everybody knows that P. D. McCripe is an oxygen checklist, but if you are the average Air Force crewmember, you don't use this list because you consider it too long, or as one pilot said, "I can't even remember what the letters stand for."

Operational safety surveys conducted during 1956 failed to reveal a single crewmember who consistently conducted the check. Why? Because they erroneously felt that it really wasn't necessary to check all the items included in the checklist. So much emphasis has been placed on a proper fitting helmet and mask and the importance of cleaning the mask every 30 days that crewmembers are inclined to forget about the rest of the oxygen system.

What good does it do to have a proper fitting mask if the regulator is shot? Or if the hose connection to the regulator is leaking? The answer is obvious.

Oxygen discipline is a must in any aircraft; it is of vital importance in fighter aircraft where the pilot is alone or at least inaccessible to other crewmembers in-flight. It is seldom that one hears of accidents caused by hypoxia in multi-place aircraft, for the copilot or navigator can always get to the pilot if he passes out or begins to act "peculiar." The single-place aircraft pilot, however, either regains consciousness or else. Often it is "Else."

Actually, pilots do check most of the items included in the P. D. McCripe checklist; however, they do not perform the check in any systematic manner and this leads to forgetting or overlooking critical items. Take a look at ol' P.D.:

P — Pressure and quantity gage.
D — Diaphragm of regulator (blow back test).
M — Mask (condition, leaks, valves).
c — Connection to mask (quick disconnect).
C — Connection at regulator.
R — Regulator.
I — Indicator (blinker).
P — Portable unit (multi-engine aircraft).
E — Emergency bailout cylinder.

Is it to long or too difficult to remember? Not if you use it a few times and conscientiously check each item. If you check most of these items anyway, why not do it by a mnenomic checklist rather than by a haphaz[illegible] guess. Odds are that you'll be less likely to overlook [illegible] item. ▲

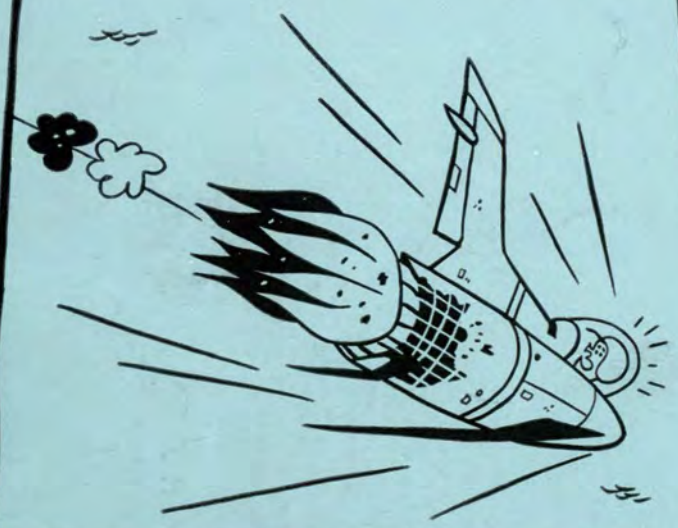
LOOK WHO'S LEAPING

Just goes to show that you never can tell who's going to be next. Take a tip from Kay Reid and get acquainted with those finer points right now. You'll find the word of an expert in the story beginning on page 2. Could be your turn.

MAL FUNCTION

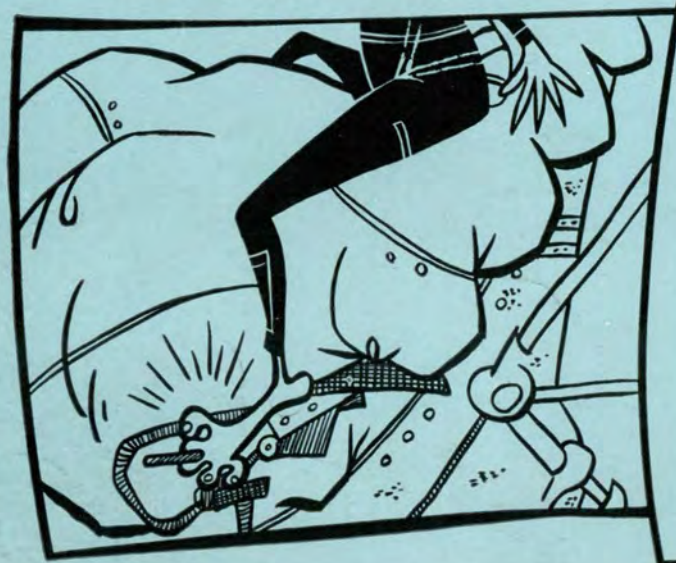
"Equipment's fine," we heard Mal say,
As off he roared on merry way.

But things go awry in the sky,
And Mal's got problems you can't buy.



The dinghy goes when it ought not,
And on the canopy he is caught.

But he's in luck with all his woes,
He's got the handle with his toes.



His trouble's his own—we hate to nag,
He should've looked at Inspection Tag.