FLYING SAFETY

INSPECTOR GENERAL · U. S. AIR FORCE · RESTRICTED

IN JETS YOU EJECT!

PAGE 2

SEPTEMBER, 1951
RESTRICTED

COVER:

That's not really a look of pain on the face of the man being "shot" by the ejection seat trainer at Williams AFB. The trainer imparts an initial force of 14.5 G's to the occupant, and this force is sufficient to cause sagging of the facial tissues so that, in this photo at least, a look of utter agony results. Actually, the subject felt no pain at the time, although for several days after his ejection he hobbled about on sore ankles. The reason: his toes stuck out over the stirrups so far that the sudden upward acceleration pulled them downward with sufficient force to sprain his ankles. Perhaps his feet were too big; on the other hand, perhaps he didn't have his heels snugly against the rear of the stirrups. The intrepid airman in the photo is Captain Ben Newby, Flying Safety staffer. For more on the ejection seat and the trainer, see "In Jets You Eject" which begins on page 2.

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COMING UP:

Plans for the October, 1951, issue of Flying Safety are to make it a one hundred per cent winter issue. Tips on aircraft operation and maintenance under low temperature conditions, and a briefing on such things as winter clothing, survival equipment and procedures, and a resume of the findings of the All-Weather Flying Division are planned. The purpose of this issue of the magazine will be to get you and all your Air Force brothers started off on the right foot for this coming winter's flying operations.

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WHAT DO YOU WANT?

We don't kid ourselves that every article which appears in Flying Safety is avidly read by every man in the Air Force. We would like for that to be the case, but we know it isn't. Sometimes a story which we don't think is too hot turns out to be a "best seller"; but sometimes one which we think is exceptional falls flat. Or maybe you just don't comment on things you like? Anyway, please let us know what you think about the things we print—good or bad. Drop an informal line, a post card will do, to the Editor, Flying Safety Magazine, Directorate of Flight Safety Research, Norton Air Force Base, San Bernardino, California.

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WHAT WE WANT:

If you have an idea for an article, if something is going on at your base which you believe warrants publicity in Flying Safety Magazine, let us know about it. And if you would care to try your hand at writing something for us—swell. You'll get a credit line and we'll do any editing or polishing required.

FLYING SAFETY

RESTRICTED

DEPARTMENT OF THE AIR FORCE
THE INSPECTOR GENERAL, USAF

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——contents——

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The printing of this publication has been approved by the Director of the Bureau of the Budget, 9 August 1950.

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I'M *Impressed!*

by Bob Hope

THE AIR FORCE'S FAVORITE ENTERTAINER HAS SAFELY TRAVELED THOUSANDS OF MILES IN OUR AIRPLANES

I'M A LUCKY GUY. Not because I made a picture with Jane Russell (all I got out of that was high blood pressure), but because I've had a better opportunity than most U. S. citizens to see our Air Force at work —under all conditions. I saw the boys in Europe in '44 and '45 flying those round-the-clock bombing missions. In '48 I watched them make aviation history operating the Berlin Airlift, and more recently in Korea I had a gander at the jets that have the North Koreans writing to Moscow for AWOL instructions. I flew in one of those jets, and take it from a guy who's still waiting for his stomach to arrive—they really go!

Seeing these things gives you a feeling of security, and also the feeling that the government isn't spending Crosby's tax money foolishly.

I wish it were possible for every American to have a box seat and watch the great Air Force team in action. I have, and all I can say is—thanks for the memory.

in jets you

WHAT DO YOU KNOW about ejection? Here are the facts, straight from the horse's mouth . . . the pilots who have "ejected." Bona fide information on what really happens when the proper or improper sequence of handles and triggers are actuated, has been accumulated by personal interviews and special questionnaires. These reports include the "little things" which can make the difference between ignorance and knowledge, safety or a statistic. The rumor factory, which has had too long a lease on the ejection seat can now step back in favor of facts which prove this the first and only best bet for escape from high speed aircraft.

The ejection seat is the best way for a pilot to completely clear the aircraft. Once the canopy is jettisoned, it takes less than one second to actuate the seat release and to clear the aircraft. This, despite G's or the attitude of the aircraft at the time of ejection. If, for any reason, the seat does fail to fire, only a fraction of a second has been lost and the time has come to use the last resort . . . the manual bail out. Crawling over the side is no more than that in a high speed aircraft . . . the last resort. In many jet emergencies the aircraft goes out of control and does violent maneuvers so that very high G loads are encountered by the pilots. Under these conditions many pilots have found it difficult to lift their hands enough even to actuate their seats.

At 500 mph, in straight and level flight, a load equivalent to 5,000 pounds, or the same as about 25 heavy men, is imposed on the pilot by air blast alone. This impact force, even at much lower airspeeds, pins pilots helplessly half in, half out of the cockpit.

In addition to this it has been found that a college athlete, (200 pounds) in top physical condition, clad only in gym shoes and shorts, when subjected to three

The purpose of the ejection seat training tower at Williams AFB is to familiarize cadets and pilots with the body position and feeling of being ejected. The tower is a great confidence builder.

EJECT

Here is the ungarbled word on the jet pilots' life saver — the ejection seat.

radial G's, was incapable of moving from his seat. This is about the G force which could be expected from a jet in a spin.

The method of conversion from "bailout" to "eject" type pilot is approximately as follows, which is an excerpt from a report by a fighter pilot.

"The reason I did not attempt use of the ejection seat is that I was gliding at airspeed of 190 so I thought I could simply pull the nose up, drop the airspeed to about 150 and crawl over the side with ease, and in so doing I would not have to use precious seconds getting rid of the seat before pulling the ripcord.

"I fired the canopy, pulled the nose up, and very quickly felt the plane shudder (I had not meant to stall the aircraft), unbuckled my safety belt and started to crawl over the side. When only half way out I could get no farther. The plane of course nosed over and started to spiral. Suddenly the aircraft and I parted, through no fault of my own. I pulled the ripcord, felt the opening shock, looked down for the ground and made contact at the same time. The only injury I got was a sprained knee."

Too many pilots, through ignorance and fear have failed to accept the seat as their method of exit when emergencies arose. Or, even if they have used it, their lack of knowledge of the proper sequence of operation has in some cases led to failure or injury. The most common lapse is failure to disengage the seat belt before pulling the ripcord. One pilot "forgot" to such an extent that he pulled his ripcord, the 'chute opened (he was wearing a back pack, and it streamed out through the shoulder harness), and he landed, seat and all, without injury. Others who have neglected to leave their chair behind have not been so fortunate.

The ejection seat training tower at Williams AFB is being used to advantage to acquaint future jet pilots with the functioning of the ejection mechanism. Mainly, it satisfies that universal need, when it comes to machinery of any kind, of seeing how it "works." Upon firing, with the same type of cartridge used in the aircraft seat, a momentary 14.5 G force is applied to the sitter. This ejects him up the steel tower to a height of about 50 feet. This training aid is going a long way toward eliminating the bogie man fears of broken tail bones and the anticipated sensation of terrific G force.

A specially designed strong seat is used on the tower which will withstand the beating of many ejections. The tower seat is being modified to simulate an aircraft cockpit and in the near future will include all of the necessary handles and triggers to go through the complete sequence of ejection, including the jettisoning of the canopy. Pilots who have ejected have asked for more of this type of training.

Mobile ejection seat trainers consisting of cockpits and towers have been ordered and will be available within a short time. These trainers will be taken all over the world, wherever there are USAF jet pilots. The pilot will only be ejected 20 feet on these trainers, but every step in the procedure will be simulated. If one step in the procedure is "forgotten," the seat will not eject.

The process of ejecting seems to be becoming more routine, according to letters sent in by the pilots. Familiarity with the process, but mostly knowledge of "what to expect" is contributing to this attitude which is expressed by the following excerpt:

"Shut engine down, all switches off, etc. Tightened and locked seat straps. Disconnected radio cord and oxygen hose. Took off sun glasses and placed notebook in left lower pocket. Secured helmet and undid safety strap on ejection handles (flying an F-84E-10RE), leaned forward over stick and fired canopy. Straightened up, head back, feet in stirrups, checked cockpit for clearance, etc., and fired seat. Tumbled four or five times and then released seat. Watched seat until well away, then opened chute while still above the overcast. No sweat!"

This ejection was made in a level attitude at a

Until they have had a ride in the trainer, cadets are a bit reluctant; afterwards, they feel much more at ease about ejection.

A thorough briefing goes with each practice ejection in the hundred-foot tower at Williams AFB. Person of average weight will shoot up about half the tower's height.

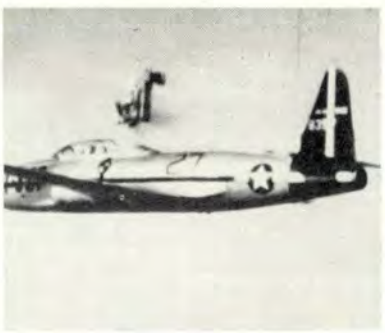
speed of 310 knots and altitude of 10,000 feet with the aircraft obviously under control, but his knowledge of procedure and confidence in the system would have helped this pilot under any conditions.

Although familiarity with procedure and being able to knock it out like "one, two, buckle your shoe" is the pilot's best friend at a time like this, it is good to know how forgiving the ejection seat can be to those who "forget."

The procedures vary because of the lack of standardization of cockpits, but the feet should be in the stirrups before ejection. However, in many cases the feet have been everywhere else but, and in only one case has there been major injury which consisted of a broken ankle. Generally, pilots report that under these conditions, the calves of the legs are bruised. In one case the pilot had his feet all the way in on the rudders, and, contrary to the rumor factory's gospel, his

How not to do it. This man did not hold his head back against the headrest. Several hours later he had a painfully stiff neck.

Capt. Vincent Mazza, who worked on development of ejection seat, was also one of its first guinea pigs. He made four of first five live ejections, which ranged in speed from 405 to 555 mph. In the photo series below, one of Mazza's first jumps, rotation of



feet were not cut off . . . he was not even bruised. There have been no cases of feet being cut off.

The need for correct posture is accepted, but "no injury" ejections have been accomplished with the head down; shoulder harness unlocked; arms off arm rests and body off center. In spite of this, according to pilots' reports, they have experienced only bruises or stiffness. The major injuries are occurring as a result of poor parachute landing technique and from waiting too late to get out.

Knowing the facts, including the dark ones, is usually the best weapon for chasing that old bug-a-boo Fear. In this category comes a collection of odds and sods about ejection which can be summed up as "What to Expect." So here it is:

There is no "blackout" from the force of ejection. Some pilots feel "a great deal of force"; others report none. Anyway, it's only a momentary sensation lasting about half a second and a ride on one of the new trainers will check that off the list of the "unknown."

In every case the ejection seat has successfully cleared the pilot of every part of the aircraft . . . no more fear of hitting the tail.

Most of the pilots are losing helmets and masks. The new anti-blast visor should take care of this.

In an F-84D the canopy "failed to leave." The pilot slipped the plane and disengaged the canopy. Canopies which depend on aerodynamic lift to disengage "duck down into the cockpit" . . . so lower the head.

Tumbling of the seat is universally reported as severe, but never seems to interfere with release of the seat or unbuckling of the seat belt. All pilots report that the "seat just leaves." No need to kick.

The seat, being light, will not fall as fast as the pilot, hence there is no danger of its being caught in your chute if you wait a second to pull that rip-cord.

At high speeds airblast is very strong. It sometimes blurs the vision to such an extent that the pilot can not see at all. This is no time to start looking for triggers. Ejection should be planned to take place immediately after the canopy is jettisoned. Because of the air friction, temperatures become intense in air blast and the whole experience is described as "demoralizing," which emphasizes the need to plan a quick getout.

One pilot reported that the laces of his anti-G suit became entangled with the seat and another that the leg straps of his B-10 'chute were caught under the seat. This pilot asked that "everyone concerned be informed of the importance of having all loose equipment secure when using the seat."

A certain amount of justifiable concern has come up about non-adjustable head rests combined with wearing backpacks. Under these circumstances it is impossible to get the head all the way back in the recommended position for ejection. Fourteen pilots have ejected without using the head rest and suffered no injury.

A pilot in Korea was asked why he didn't use his seat as a means of escape and he told the story about the pilot in the States who had had his feet cut off. This seems to have been favorite rumor number one and is purely the figment of someone's imagination. However, very recently, a pilot of an F-94B broke his ankle while ejecting. This is the first incident and can be understood to a certain extent when it is considered that it was necessary for him to hold the aircraft at a speed in excess of 330 knots and to maintain extreme force on the controls up until the second of ejection.

Since all other injuries, with the exception of those who waited too long and landed in the seat, have been due to poor 'chute landing technique, it would seem that the ejection seat has proven itself as the pilot's best friend. There are mechanical deficiencies which are rapidly being remedied, but the best mechanism in the world will not guarantee safety unless the pilot knows what he wants to do and does it.

Refusal of pilots to make use of the seat where it is most needed, at low altitudes, is one of the attitudes that it is hoped knowledge and proper training will combat. An extreme example of the seat saving a pilot's life under these circumstances is the following: "I was at 800 feet, inverted, wearing a back type B-8 'chute; shoulder harness unlocked. I believe feet were in stirrups, body was in crouched position. Chute was pulled on leaving aircraft and body bent forward to open 'chute. Landing was made while sitting in ejection seat."

It looks as though the time has come for any conventional bailout devotees to make up their minds if they want to fly Cubs or jets. In jets you "eject."

seat is evident, however, this is no problem if the jumper will focus attention on his lap and ripcord rather than sky and earth.

Pilots who decide early in emergency to use ejection seat, remain calm, and know and use the proper procedure will have no trouble.

Flying

The F-86 is a flying airplane,

By Capt. ROBERT M. BELL

So you're going to be checked out in the F-86.

No doubt there is a list of questions the proverbial "mile long" to be answered. Veteran fighter pilots or new sports, it makes little difference. Enthusiasm runs high in either case over the MIG-killer. Volumes of rich descriptive phrases have been written about this speed burner so we can skip the flowery prose and start with your check-out.

A thorough preflight check of your Sabre will go far towards assuring a safe and successful flight. Remember that the F-86 is still a brand new airplane to an awful lot of people, and be especially careful about your preflight when you're away from your home station. If your team-mate, the crew chief, isn't around to care for your plane, then all his jobs become your responsibilities. You can't trust a B-25 specialist to give your F-86 the care it requires.

The preflight check given in the "dash one" tech order should be followed to the letter, with minor additions. For example, the speed brake locks and the hydraulic actuating equipment should be checked for leaks and the flap rollers for freedom. The aspirator drain in the aft section of the tailpipe should be checked, and the main accumulator air pressure in the right wheel well should be given a look. The correct pressure is 1200 psi.

Now climb into the cockpit; be careful not to step on the canopy seal or track. Get comfortably seated. Hook up your oxygen, radio, etc., and take a leisurely look around the cockpit for familiarization. You will notice that the airspeed indicator is calibrated in knots—keep that in mind. Note the locations of emergency equipment. The pilot's checklist is located under the right side of the instrument panel.

Before you start the engine, make sure the danger areas about the nose and tail are clear. Several Air Force personnel have been killed or injured by being drawn into the air intakes of jet aircraft. Also, where practicable, start the engine headed into the wind as a fire would be aggravated by a tailwind. During the actual starting, it has been found that it is better operational practice to tab the tailpipe temperature as the key starting guide rather than fuel pressure, because "hot" starts are of primary concern and can cause damage. Don't ignore the fuel pressure but use it as a cross-check during starting.

After the unit has started, check your radio equipment. Close the speed brakes on the crew chief's signal. Flaps are down to takeoff position while taxiing out. This is between half and full, depending on the load carried and the runway length. Flap settings will be established by your training SOP. After performing the pre-takeoff check, which includes your emergency fuel regulator test, roll in two or three-degrees nose-up trim and you're ready to go. Roll out onto the runway and line up by allowing the Sabre to roll a few feet using nosegear steering. Run up to 100 per cent, release brakes and you're on your way.

the Sabre

but it must be flown right.

If you have aligned yourself properly for takeoff, you will have no trouble maintaining directional control. However, if you've started off on the wrong foot, a slight tap of the brakes will realign you rapidly. At approximately 90 knots, ease slight back pressure which will bring the nosewheel off. At about 120 knots (sea level) you will break ground. As soon as safety permits, "up" the gear. Remember that if you accelerate to an airspeed over 185 knots, damage to the nosegear may result during its travel to "up" position. Raise flaps before reaching 185 knots. Bring them up in one movement. The changes in the angle of attack as flaps come up give the appearance of settling but actually a slight increase in back pressure counteracts any sinking of the '86.

The Sabre is a high-speed climber and once you start to accelerate and begin to climb it will amaze you with the rate by which the earth falls away. At approximately 5,000 feet, turn off the emergency system. Trim for level flight, hands off, with aileron boost by-pass ON. Watch your trim when you turn off the boost as an out-of-trim condition might give you a few hectic moments.

The Sabre is smooth on acrobatics. As you might already suspect, this jet has a high rate of roll either way and is smooth as silk on the controls. There is possibly only one spot which might cause trouble and that is just before reaching the horizon at the top of a loop. You will have to increase back pressure slightly at this point instead of letting it fly through. On airplanes modified with elevator bob weight installation, stick back pressures are increased in all accelerated maneuvers. If you are flying an unmodified aircraft, watch out for stick force lightening and reversal when pulling a lot of G's.

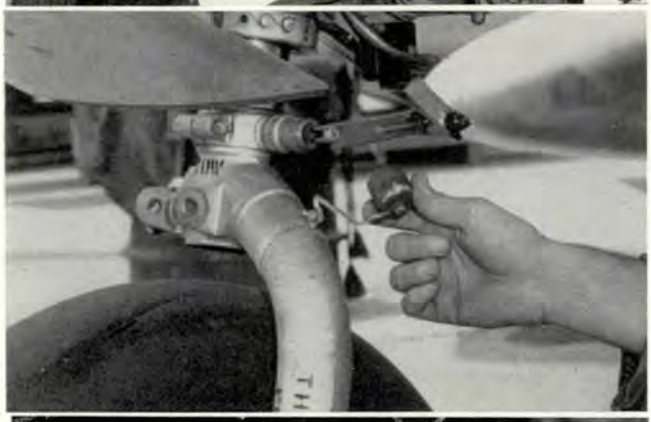
Stall characteristics are good, straight and with ample warning. This is with both gear and flaps down, or clean, power on or off. Normal stall recovery is adequate but you will lose 1,200 to 1,500 feet. Also watch those negative "G's."

Spin recovery is easy. First, drop external stores, put speed brakes *in,* if they are out, then apply opposite rudder and release back stick pressure. If you do not recover within a turn or so, put your controls back into the spin and try again. It might be remembered that the '86 will recover alone if not hindered.

You can handle most emergencies if you are alert and have done some pre-emergency planning. On flameouts not due to any malfunction of power unit, such as fuel starvation caused by inverted flight for over 10 seconds, airstarts are not difficult. Be patient and use the recommended method. Remember it will take a little time. Of course if the unit is frozen, usually indicated by a zero tachometer reading, then forget the airstart and decide whether to bail out or to make a forced landing. Remember a frozen unit means no hydraulic pressure.

Make sure you know your ejection seat SOP thoroughly. The sequence of getting out and rid of the seat,

MEET THE AUTHOR—Captain Robert M. Bell, Operations Officer of the 188th Sqdn., First Fighter Wing, has a total of 1160 hours jet time, of which 365 are in F-86's. Captain Bell participated in the F-86E final phase acceptance test at Edwards AFB, during which the "flying tail" was evaluated.



In the photographs on this page, Capt. Bell illustrates a few of the elements of a good preflight check. Emphasis on preflight is due to fact that many pilots make visual innspection errors which later get them into trouble. Bell's nearly twelve hundred hours in jet fighters made him ideal pilot to write this article

opening the chute, etc., is a one-two-three job which you should be able to do mechanically. It may save your life.

Do not let go-arounds worry you in this fighter. Just remember—ease the throttle forward slowly—"in" speed brakes. Raise gear and ease flaps up at a safe altitude and airspeed. Make a slight turn inside of the pattern so you can see the runway conditions. But, if you are too low before starting the go-around, then it is full power and speed brakes in. As the '86 settles, you can let it roll along the runway for a touch and go landing. Make sure you know the runway condition before letting it settle.

Landings have to be made right, but with proper technique it's not difficult to do. On the initial, open speed brakes. Have between 265 and 285 knots when you break. Hold your altitude until final approach, gradually knocking down the airspeed throughout the turn. As you turn from "base" onto final, drop the nose. A low altitude turn under 150 knots with gear down and speed brakes out is not conducive to longevity. Flaps go down at about 185 knots and drop the landing gear at about 180 but not over 185 knots. The tendency of beginners is to overshoot the turn onto final as the nose is heavy with low airspeed. More back pressure is needed to hold the nose up. The final is reasonably shallow so as to avoid any sharp roundout.

Land on main gear with nosewheel approximately one foot off the runway. This is the ideal condition. Full stall landings are not recommended. Even after the aircraft is on the runway, it can still be stalled out. If the nosewheel drops hard it can be damaged. Hold the nose off as long as possible but avoid using any excessive back pressure that might cause this stall condition. The tailpipe will not hit on any normal landing. But it can be clobbered on a dropped-in, nose-high landing or by hitting nosewheel first and bringing in back stick pressure on the resulting sharp bounce. The tailpipe can more easily be dragged during no-flap landings, so keep it in mind.

You will find that the '86 has very good brakes, so don't worry about using them if need be. Do not engage nose steerage except when taxiing, as control will be next to impossible, especially at high landing speed.

After you have stopped rolling, engage the nose steering and head back to the ramp. Taxi in with flaps up. The '86, you will find, is as easy to park as your car.

Depending on the particular squadron SOP, some outfits taxi in with speed brakes "in," having brought them "in" at the same time as the flaps are brought up. If speed brakes are in, they should be opened after parking. Before they are opened, however, pressure should be bled to about 1,200 pounds through flap cycling.

When you've parked your plane, idle your engine for 30 seconds before shutting it off.

After you've completed your first flight in the Sabre, you'll know you've flown an airplane.

MEDICAL SAFETY

HYPOXIA

You can't fly high without oxygen.

"Sorry Colonel, with such an excessive mask leak it just isn't safe to take you to 38,000 feet."

"Lieutenant, I've been using this mask for quite a while; no trouble at all. I'd like to get this altitude chamber flight out of the way, now I'm here."

"In the pressurized cabin of an F-80, Colonel, your pressure altitude doesn't get much beyond 10,000 feet on the missions you're flying, so you haven't experienced any ill effects from mask leak, fortunately, but you would in the low pressure chamber. I can't take you. My advice is to go down to supply now and get a properly fitted oxygen mask. Let me know when you replace the mask and we'll schedule you for a chamber flight."

The colonel started out the door of the physiological training unit.

"And Colonel," called the Lieutenant, "I wouldn't fly, if I were you, until I had a good mask fit."

The colonel didn't bother to get a new mask.

About two weeks later while flying a routine high altitude mission his wingman noticed that the colonel was flying erratically and saw him suddenly go into a vertical dive from which he never recovered.

In the accident investigation it was brought out from reports of radio conversation, observed manner of flight, and from the flight surgeon's report, that hypoxia was the accident cause. Three factors made this accident fatal: Loss of cabin pressure, excessive mask leak, no H-2 bailout bottle.

We have all repeatedly heard the warning—"Hypoxia sneaks up on you. You don't realize when you're in trouble."

Hypoxia, of course, is the medical term which means deficiency of oxygen in the inspired air. Your oxygen equipment protects you against hypoxia by supplying extra oxygen as your body requires it. But without oxygen equipment or with a leaking mask, at pressure altitudes above 10,000 feet, a man's mental and muscular coordination decreases and, although he may feel fine, he performs irrationally, and may suddenly collapse. There are no warning symptoms a pilot can count on.

We are well aware that oxygen is as necessary to high altitude flight as is fuel. We use it all the time and we have faith in the equipment. It will do its job, if you give it a chance. Be sure to make the P. McCripe test (See T. O. 03-50-1) before each flight. Just in case it has slipped your mind, here it is:

P—pressure gage: the pressure gage should read between 400 and 450 psi.

M—mask: be sure your mask and helmet fit and function.

c—connections at mask: check that quick-disconnect to be sure that a positive connection is made and that there is no strain on it when you move your head.

C—connections at regulator: see that the tubing is securely clamped to the regulator outlet elbow.

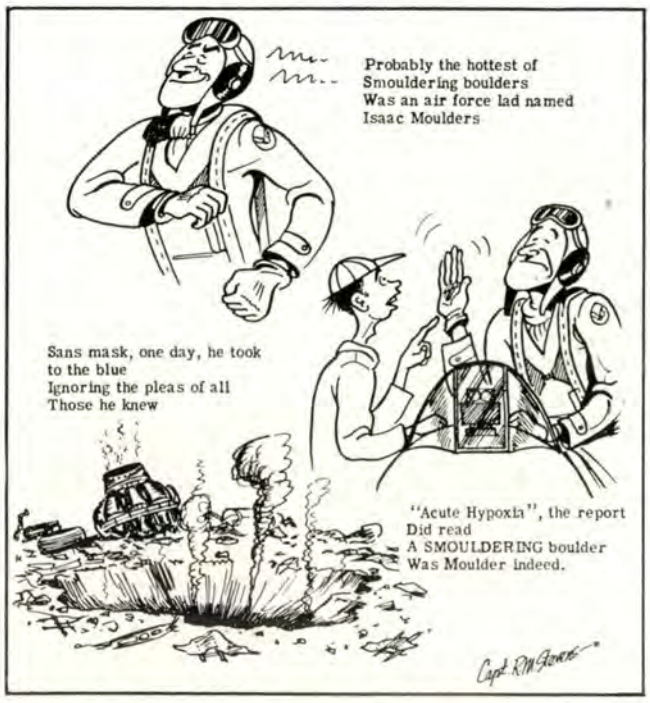
R—regulator: with your mask disconnected, and with the dust cap open, set the regulator dial at "SAFETY." A slight but steady flow of oxygen should result. Higher settings should increase the flow. Turn the dial back to "NORMAL." The flow of oxygen should cease. Blow back against the open end of the mask-to-regulator hose for about five seconds. Any escape of air from the regulator indicates that the regulator leaks and must be replaced before flight.

I—indicator: set the regulator at 100% OXYGEN and inhale through the hose. The blinker should blink.

P—portable unit: use the blow-back test on the regulator of the portable unit and check the pressure for 400 to 450 psi.

E—emergency cylinder: the pressure on the emergency cylinder must be 1800 psi. Connect the tubing to the mask connection and see that the cylinder is securely fastened to your body or to the parachute harness. Remove the "caution" tag prior to flight.

Have your personal equipment officer make a chemical leak test on your mask, and remember, it shouldn't leak at all!



personally YOURS

Check your personal equipment as though

MANY AIR AGES AGO pilots wore helmets so no one could possibly mistake them for ordinary men. White scarfs also served this purpose. Scarfs are still worn, although, naturally now they are only to keep the pilot's neck warm. But the role of the helmet has changed radically. Now it is designed and worn for the pilot's protection. So far has it departed from its prototype, the leather and fur job, that most pilots would not dare to wear it on a streetcar for fear of being mistaken for a sand-hog. If worn in close proximity to an airplane, especially in pictures, it is still invaluable in the old role of lending glamour to the pilot. But there is no getting away from the awful truth . . . it is meant to keep the pilot safe from head injuries . . . the rest is secondary.

Researchers have put in a lot of thought on the subject of head protection and it spoils their day when they hear about some hard-headed pilot who won't wear a helmet, or who doesn't take care of it properly.

Then, there is always the pilot who thinks only sissies wear anti-G suits. Some quotes are available but they are not printed due to their descriptive qualities.

Another sore point with pilots is the **amount** of personal equipment. No doubt about it, there's a lot, but the average pilot of today might well be going a lot of places on one mission and should be dressed for each occasion . . . jungle, desert, water, land and stratosphere, to mention only a few.

Since you are an Air Force pilot and must wear this equipment for your own protection and to do a proficient job for the Air Force, let's take a look at each item. There's just a chance that, through proper use and care, your personal equipment may be persuaded to give you a little more for your money in the line of personal safety . . . and who isn't interested in his own neck?

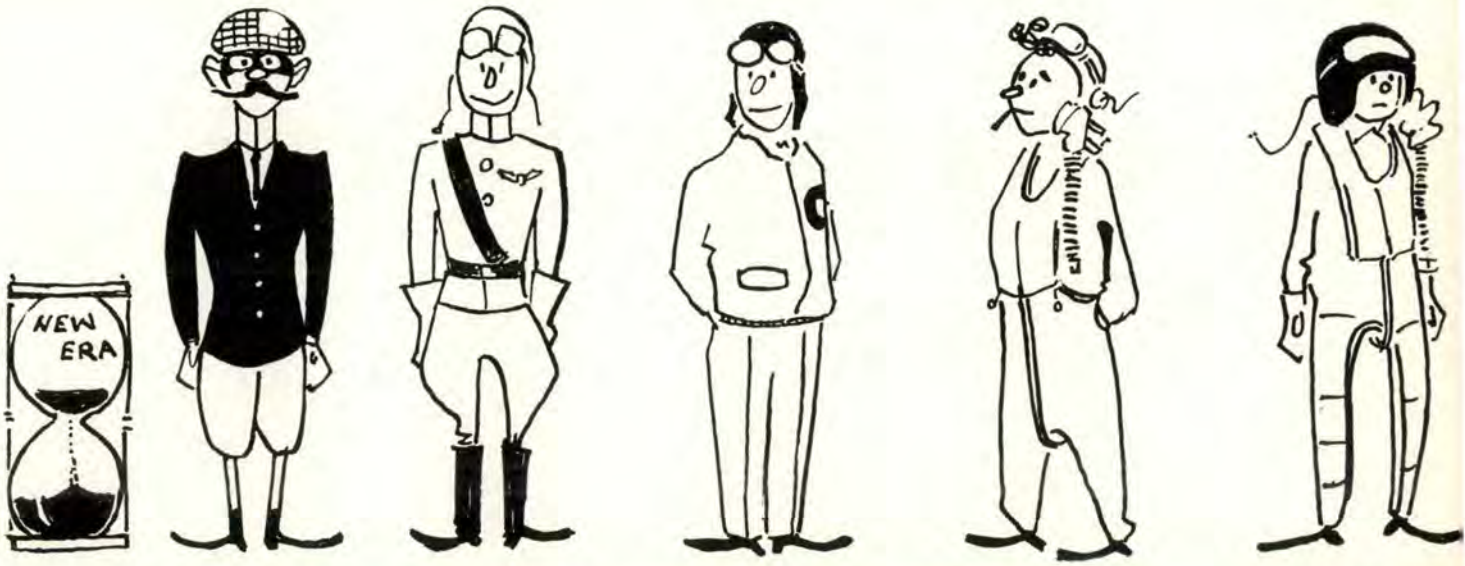
HELMETS AND VISORS—

The introduction of high speed aircraft with reduced cockpit sizes, particularly in regard to head clearance, has made protective headgear mandatory. The Air Force P-1A and P-3 helmets are the results of much experimentation and research to provide protection with an optimum degree of comfort. The most vital area of the body with regard to its low tolerance to impact is the brain. The proximity of the canopy, rear view mirror, gunsights and cameras require that the protective helmet be worn at all times.

Many complaints have been received about lack of comfort, pressure points on the ears, back of the neck, forehead, crown of the head, and of the helmet shifting under G forces. Most of these complaints indicate lack of knowledge of proper adjustment and fitting of the suspension harness. For those pilots who do not as yet have their own personal helmets . . . supply is now meeting the demand.

A windblast visor attached to the existing P-1 helmet will prevent the loss of the helmet and oxygen mask when subjected to windblast. With this modification the helmet will be known as the P-3.

The windblast visor modification for the P-1 helmet consists of a plastic, adjustable windscreen with a snap lock. The colored plastic will also reduce glare. When helmets are equipped with the windblast visor, the visor must be worn in the down and locked position to keep the helmet on in the event of canopy blowout or ejection. Decompression associated with canopy blowout occurs so rapidly that the pilot does not have time to pull down the visor from the stowed position and lock it in place.



your life depends on it . . . because it does.

Let's take a look at the visor doing the job for which it was designed. During a recent F-89 flight the enclosure was lost. As a result, a series of flight tests were run to determine the effect of airblast on the pilot, radar operator and cockpit equipment when the canopy is jettisoned.

The airblast effect on a human radar operator equipped with a type P-1A helmet and adjustable windblast visor was studied in this test. A dive, started at a high altitude, terminated in a pull-out at medium altitude. No visual obstruction was noted, nor did the visor-equipped helmet develop any tendency to lift from the head. Flutter of the P-1A helmet visor was noticed at very high speed. This was attributed to the aperture between the lower edge of the visor and the oxygen mask. It looks as if the safe formula is: P-1A helmet plus oxygen mask plus windblast visor, equals P-3 helmet which equals . . . no sore heads.

OXYGEN EQUIPMENT—

Since many modern aircraft operate at altitudes above which 100 per cent oxygen on the demand system will not suffice for body function, it has been necessary to develop a method of delivering pressurized oxygen to the pilot. The new automatic D-1 regulator is coming into use on some aircraft but for the majority of pilots the delivery of pressurized oxygen is accomplished by using an A-14 regulator with an A-13A oxygen mask.

This regulator consists of a demand diluter system which will automatically mix the proper amounts of oxygen required for altitudes up to 35,000 feet. After that altitude has been passed it may be converted to a positive pressure system.

Surveys of many fighter groups produce evidence of a consistent pattern of misuse of this oxygen system, which can be traced, in most cases, to inadequate training. In many organizations the impression seems to be that once a pilot has had a course in altitude physiology no further training is necessary. Only in a few cases were supervisory personnel running close checks on technique for usage of the A-14 regulator and the A-13A mask. If hypoxia is to be avoided it behooves the pilot to have a thorough understanding of this mask and regulator.

Some of the critical "neglect" factors in the use and care of the oxygen system the pilot can correct alone. On others, he will need the help of his personal equipment officer. Here they are:

- Poor fit and improper maintenance of oxygen masks.
- The practice of using safety position on the A-14 regulator when the cabin altitude does not exceed 35,000 feet.
- Failure to comply with TO-50B-23 which requires that the mask be positively fitted to the helmet and equipped with the new nylon anti-blast strap.
- The use of the oxygen system when pressure falls below 50 pounds.
- Failure to connect the bailout bottle to the oxygen mask before flight.
- Failure of pilots to allow enough slack in the oxygen hose to prevent disconnects during flight.
- Failure to check the functioning of the oxygen regulator prior to takeoff.

PARACHUTE—

The size and location of your parachute depends on the type of aircraft you fly, and, of course, whether or not you brought it along. The latest incorporates a 28-foot canopy equipped with an F-1 automatic ripcord release, and quick detachable buckles located in the main

riser straps. This combination slows the rate of descent and will allow for automatic barometric setting of the ripcord release mechanism. The pilot, on contact with the ground or water, can detach the canopy and retain the parachute harness, under which is attached survival or flotation gear.

Lack of adequate training in parachute landing technique accounts for about 60 per cent of all non-fatal bailout injuries. Such training could easily be combined with the required physical fitness program. A complete training rig with jump pits and suspension swings employing riser lines can be built at very low cost. Tech Order 13-5-1 gives detailed instructions on this essential subject.

ED. NOTE: For details on use and care of the parachute, see "Your Chute and You," page 26.

CLOTHING—

The Anti-G suit is provided as a means of increasing the pilot's G tolerance and to enable him to remain alert instead of graying or blacking out. Also, the effect of the G-suit in reducing pilot fatigue is well established. Pilots are most apt to make uncoordinated control maneuvers in pulling out from high speed dives without a G-suit. Snap maneuvers due to lack of coordination have long been suspected as a reason for some structural failures in high speed aircraft.

The gravest misuse of the Anti-G suit is its lack of use by pilots. Many pilots have expressed the opinion that they do not need the G-suit as they know their tolerances. The G tolerance varies with the amount of rest, social activity and other physical conditions. It may not come up to snuff tomorrow as it did today.

Bulky outer clothing and electrically heated suits are unnecessary in the pressurized and air conditioned cockpit . . . except in areas where survival would depend on heavy clothing.

A combat type flying boot which combines excellent foot support, adequate warmth, and is a strong walking shoe will soon be available. This boot is high-laced, of soft non-oiled leather and closely resembles a paratrooper's boot.

WATER SURVIVAL—

For all flights being conducted over water, an immersion suit and a Mae West, in addition to a one-man life-raft, are considered essential equipment.

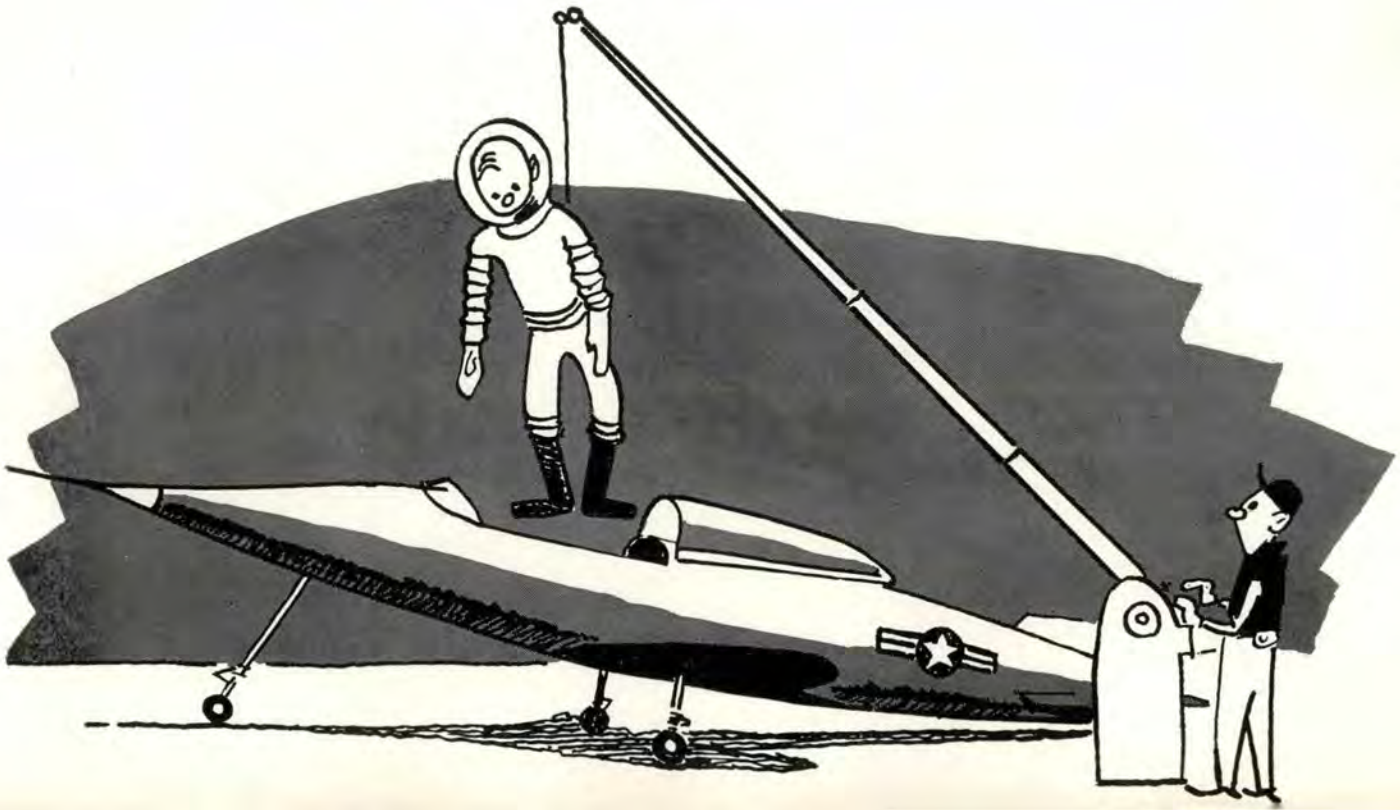
The immersion suit is a quick donning type of clothing worn over all normal flying equipment other than the parachute and Mae West. Without this suit, a pilot dropped into very cold water would be immobilized in a few minutes. Crew versions of this suit will soon be available.

The Mae West is issued to assist in flotation until the pilot can enter the life raft. It has been around long enough so that everyone should be familiar with it by now.

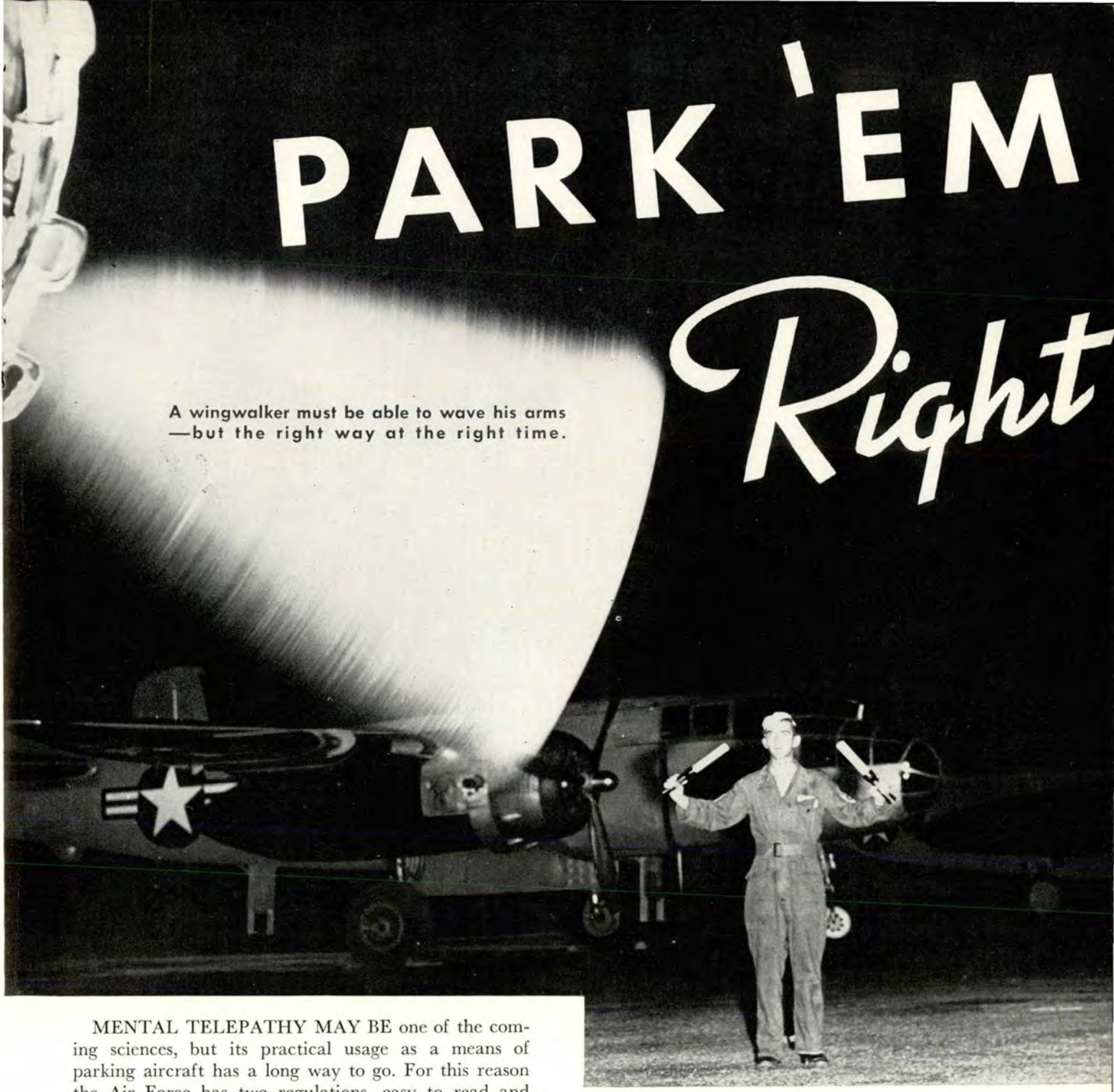
The one-man life raft which is worn under the seat is attached to the parachute D-rings by a lanyard to prevent loss when entering the water. Needless to say, when flights are not over water this equipment which is both bulky and uncomfortable, need not be "worn."

To put and keep the "survive" in survival, better training methods and regular inspection and maintenance of equipment must be instituted. Equipment on hand is neither new nor in the best of condition. For this reason, unusually good maintenance and inspection should be a subject of special interest to the pilot.

It might be fun to be around to tell the youngsters what flying was like in the old pre-rocket era. Probably it will sound dangerous to them, but you will be able to talk far into the night about all the little items that kept you safe . . . if you understand them, take care of them and use them.



PARK 'EM Right



A wingwalker must be able to wave his arms —but the right way at the right time.

MENTAL TELEPATHY MAY BE one of the coming sciences, but its practical usage as a means of parking aircraft has a long way to go. For this reason the Air Force has two regulations, easy to read and fortified with pictures, on the subject of parking. Both are issued in the cause of furthering flying safety and for the consumption of both pilots and alert crew personnel. This pair of AF Regulations just can't be ignored.

All of the desired hand signals, which can easily be executed by anyone directing and assisting a pilot into a parking spot, and which can be as readily understood by the pilot are shown in AFR 62-10. Judgment, which usually dictates which hand should move and when, is not taken up in the regulation. That is supposed to be acquired through training. AFR 60-16 is slanted more toward the pilot, and among other things gives him the prerogative of requesting a man or men to "direct and assist" in the taxi and parking operation.

During the past year there were 433 accidents on the ground which involved aircraft taxiing or with engines running. A review of these accidents revealed that the largest proportion occurred during parking. Lack of judgment on the part of alert crewmen and failure to ask for adequate assistance on the part of pilots stand out as the main contributing causes of these needless and embarrassing accidents. A battered wing is not a desirable calling card for a transient pilot nor is it indicative of the desired "welcome to our base" attitude on the part of the alert crewmen involved.

(Continued)

(1) Attention (2) Right Turn (3) Come ahead (4) Stop!

Too many of these accidents are being caused by alert crewmen who, when directing an aircraft into a tight spot, wait "until it comes a little closer to see if it can make it." In every such accident, by the time the alert decided that the aircraft was too big for the spot and gave the emergency stop signal, it was impossible for the pilot to stop the aircraft in time to avert a collision.

At crowded bases it is sometimes necessary to allot small spaces for parking. These conditions make night parking an especially ticklish operation. A rash of accidents resulting from night parking in crowded areas brought forth at one base the following directive: "The practice of towing rather than taxiing aircraft in congested areas, particularly during the hours of darkness, has been found necessary and will be initiated immediately."

There are many good examples of the mental telepathy method, and the ease with which an alert crewman can fall into the trap of using it instead of his head. One example was the case of an aircraft being taxied parallel to a wire fence which separated the parking area from an automobile parking area. As the aircraft was turned left into the parking spot, the alert crewman realized the tail surface would not clear the wire. Here, in his own words, is the way the alert crewman handled the situation:

"The pilot was taxiing the plane into a parking spot under my guidance. A turn to the left was started. I saw that his tail section would hit the fence if he continued to turn. Since the plane was moving slowly, I gave the signal to come straight ahead in time to clear the fence before continuing to turn." Mind reading is not normally required of pilots, yet in a case like this, how, if he's not a mind reader, can the pilot know just what is in the wingwalker's mind? The pilot "misinterpreted" the signals, continued his turn and became entangled in the fence.

A typical "emergency stop too late" which could serve as a warning to alert crewmen confronted with the same situation is the following: A pilot and instructor pilot were taxiing a twin-engined aircraft into a tight spot at night. The IP was seated on the right, watching the right wingwalker for signals. "When almost abreast of the C-54 parked on the right, the wingwalker threw his arms into the emergency stop signal, at which time the right wing of our ship collided with the left wing of the other."

Nearly all of these parking accidents occur to transient pilots at strange fields. These facts point up the necessity for a transient pilot to be more than usually on the ball about parking and for the alert crewman to realize that it is his job to "direct and assist"—not to see how close he can come.

One of the "pet peeves" of a veteran jet pilot when going into strange fields is the practice of alert crewmen of bringing him exactly opposite a parking space before indicating that this is his spot. This necessitates practically a 90° turn or a series of "S'es" . . . all very unprofessional looking at the very least, and under some conditions potentially hazardous.

On the other hand, as in nearly everything else in life, it generally "takes two." A good many pilots, eager to wind up the day, taxi in to crowded parking areas without asking for wingwalkers. Others, against their better judgment, follow the direction of alerts in

(5) Emergency Stop

(6) Cut Engines

tight places where they should cut all switches and insist on a tug. In the larger aircraft the pilots involved in accidents of this type are so busy watching their wings that they fail to note other types of obstructions or paraphernalia left on the ramp.

In some situations it would pay off for a pilot to be more stubborn and wait for a tug, enough wingwalkers, a larger spot, or anything that would mark his parking "Safe." Some alert crewmen do not have such excellent depth perception as the pilots. When a pilot sees that a wingwalker is trying to fit his multi-engine plane into a spot obviously designed for a Cub, why doesn't he put the stop signal to himself?

On the other hand, the wingwalkers' lack of understanding of different type aircrafts' limitations, and of the pilots' visibility make it obvious that they have either been in the habit of parking only one type of aircraft, or none at all. It is apparent that in many cases they believe that all they have to do is to wave their arms for emergency stop and as if by magic the tires will stick to the ground without advancing another inch. In situations of this type it would be well for the alert to mumble over and over to himself until it is part of his subconscious, "When there is the slightest doubt, STOP!"

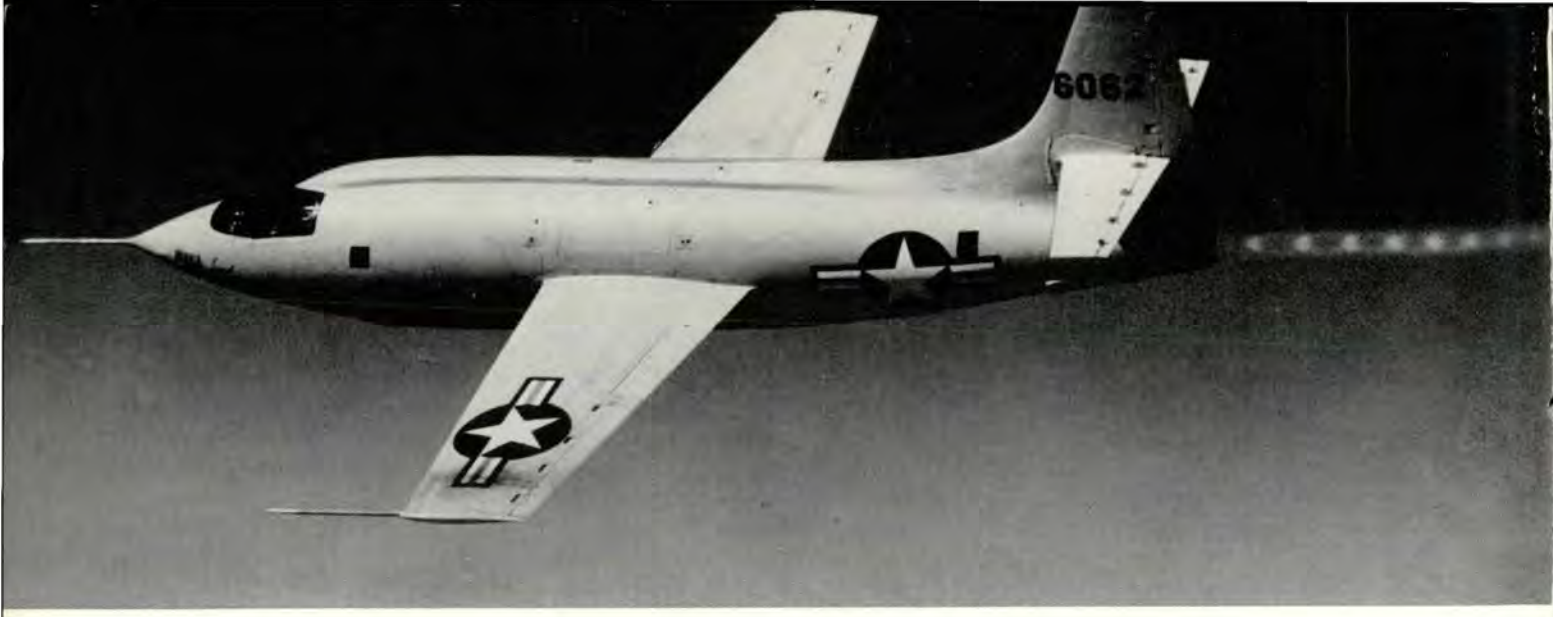
The average person can learn almost anything, including the correct signals and judgment necessary to park safely the variety of aircraft which make up the Air Force. If he cannot, he should be removed from that duty while still in his training period instead of being turned loose on the ramp to prey on unsuspecting pilots, and to add statistics to already crowded files. The high number of parking accidents, when analyzed even superficially, clearly point to lack of proper training and continued follow up of training by supervisory personnel.

This is pointed up by a visit to a base at which parking accidents are extreme rarities and where constant vigilance on the flight line is a matter of course. At this base all potential alert crewmen are given two weeks on-the-job training under the supervision of qualified supervisors. And a qualified supervisor does not mean someone who once saw an airplane. The men are trained with a vengeance. They are taught how fast to drive the "Follow Me" jeep on the ramp; starting procedure of aircraft; taxi speeds; safety precautions, and are checked out, taxi-wise, on every different make of aircraft. They follow AFR 62-10 to the letter. "Hotrods" are quickly eliminated and any tendency to flail the arms and not make signals clear and concise is ironed out. The Flying Safety officer gives talks periodically to both civilian and military alert personnel. Operations constantly keeps an eye on parking and the slightest tendency toward carelessness is instantly picked up before it can become a menace to safety on the ramp. There is a base rule requiring a minimum of 10 feet between aircraft when parked. Only the best qualified men are put on as alert crewmen and only the best stay.

Not content with excellent initial training, this is a base where training never stops. Supervisory personnel pointed out that they had only been able to maintain their excellent record by constant re-emphasis of the same old points. These alert crewmen are trained in the ways of good judgment and are kept that way. Each one knows what the parking spot and the approach to it looks like from the pilot's point of view because he has been trained that way. None of these last-minute Johnnies, "I'll wait a minute, I think he can make it," on this base.

A majority of parking accidents occur at night in aircraft of the type from which the pilots cannot see both wings. It might be well for all bases to make it SOP for a minimum of two alert crewmen to meet aircraft of this type. This method might well serve as a finger in the dike of parking accidents.

Wings have by now proven to be very handy gadgets when attached to the aircraft in the air. It is the job of everyone concerned to see to it that they are not clipped in the routine process of directing them to a resting spot on the ground.



Flying For The Future

New airplane designs have been tested by experts before they reach the USAF. Herbert Hoover, NACA research pilot, is one of the experts.

Half-blinded from the blood flowing into his eyes and the slipstream whipping into the open cockpit, the pilot of the SB2C was looking for a place to land. He hadn't had time to wonder what had caused the canopy to suddenly blow off and strike him a glancing blow on the head. He'd just been coasting home after making some routine dive tests in the plane. Now he was nearing the base with the radio out and over water at 3,500 feet altitude. The field was a definite and urgent objective if this wasn't to be a one-way ticket.

At last he came in from over the choppy water of the bay on the approach to his home field—an eastern air base. Lowering the landing gear he flew the plane low by the tower to indicate his emeergency and then he racked the plane around to land even as the tower operator was clearing the area of other aircraft.

As the plane rolled to a stop after a bumpy landing, eager hands helped the pilot out of the cockpit. The test flight was over and the NACA pilot, Herbert H. Hoover, was glad of it. Hurt and shaky from the blow on the head, he knew that the hard hat he was wearing had saved his life.

This happened to Hoover in 1943 and as the safety record stands was the only time he suffered any injury from numerous minor emergencies in some 16 years of working at the job of flying over 100 different types and models of airplanes from the super-simple Piper Cub J-3 to the supersonic Bell X-1 rocket plane. To Herb, this job of always checking out in a new, untried plane was an interesting SOP and sometimes he would fly the tried and proven for the evaluation of modifications and new safety features.

In the case of the Curtiss SB2C they never found out the cause of the canopy failure, but they did learn that several canopies of the same design and manufacture had similarly blown off other planes of the same type. Herb's accident in the SB2C had served to focus the attention of the NACA troubleshooters on canopy failures in this type of plane. To Hoover, now a settled 37 with a family, the accident was just another incident in his career as an aeronautical research pilot for the NACA. Later he was to be one of the first pilots to deliberately fly through the center of a thunderstorm for the sake of scientific investigation and to fly the rocket-propelled Bell X-1 through the sonic barrier.

Air Force trained as a pilot and observer at Kelly and Randolph fields after his graduation from the University of Tennessee as a mechanical engineer in 1934, Hoover saw pre-war tactical flying duty at Mitchel AFB, New York. Subsequently, he went to work as a pilot with Standard Oil Company and saw four years of flying duty in South America. He joined the NACA as a research pilot in 1940.

With only one accident logged in over 6,000 hours of flying time, Herb attributed his personal safety record to using his personal equipment plus just plain common sense and keeping cool and calm when faced with emergency situations.

When test flying all types and models of aircraft Herb kept his motto of "Flying Safety First" in mind. Some of his early research test flying was done with the now ancient P-40 which at the time posed some major re-design problems. A more specific and spectacular example of his research 'flying for the future' was his work and flight missions with a faster-than-sound airplane, the Bell X-1.

When transonic and supersonic flight tests were begun at Muroc, Hoover initiated NACA's flight operations with the Bell X-1 as the USAF and NACA launched joint programs using two of the research airplanes.

Previously, the NACA laboratory at Langley had conducted extensive wind tunnel tests and other experimental work to provide data useful to the designers of the rocket plane.

Hoover flew the X-1 in exploratory tests in the transonic range, and he indoctrinated other pilots in the technique of handling the faster-than-sound aircraft. Herb was the second pilot ever known to fly faster than sound, when he pushed the NACA's X-1 through the sonic barrier. Major Yeager made the first faster-than-sound flight in the Air Force's X-1. Altogether, Herb made a dozen flights of around 20 minutes each in the research plane. Just how fast he traveled was never disclosed. At altitude the cockpit of the X-1 was pressurized with nitrogen and the pilot stayed on 100 per cent oxygen at all times.

He classifies his dozen flights in the X-1 as wonderful experience, and exciting in that the rocket plane either made a normal landing or didn't. Twice, Herb was faced with emergency situations in the X-1. On the first flight the nosewheel collapsed on landing and he brought the plane to a sliding, sandy stop on the runway at Muroc. On another flight the nosegear would not come down, but again Herb landed the rocket plane safely. "Normally, Chuck Yeager would be chasing me," he explained, "and he gave me considerable help in flying by to tell me the position of the X-1's nosegear. Safety here, was a matter of good judgment."

The safety belt and shoulder harness saved Herb from injury in his emergency landings of the X-1. "The X-1 was landed without power and touchdown was made around 150 mph," Herb said, "but the pilot had plenty of boost control. And in this type of aircraft you don't use any elevator control to eliminate a bounce in landing," he added.

In flying the rocket plane faster than sound, Herb had few worries. He had flown the X-1 several times previously and had served as NACA's chief test pilot during the initial stages of testing the supersonic research plane at Muroc Dry Lake, California. According to Herb, the faster-than-sound flight was "very smooth" in the dark blue cold of high altitude. The controls were sensitive and positive.

In January, 1950, nearly two years later at Langley AFB, Herb was awarded the Air Medal by President Truman in recognition of his contributions to flight research beyond the speed of sound. The presentation was made by Major General Willis H. Hale, then commander of the Ninth Air Force. A citation, signed by President Truman, commended Hoover "... for meritorious achievement while participating in aerial flight on 10 March 1948 ... in piloting an experimental aircraft faster than the speed of sound, thereby providing valuable scientific data for research in the supersonic field."

It was several months after this that Herb had his second accident—but this one was not connected with flying and happened in his home workshop. The pilot who had safely flown the world's fastest airplane, briefly relaxed his safety rules while working with a power-driven joiner and lost the tip of a finger on his left hand. Herb smiled wryly at the memory. "I guess I should have treated that joiner with more respect," he said. "Safety begins at home for the pilot, too."

SAFETY TIPS FROM A RESEARCH PILOT

- **Follow through flight planning and use good judgment.**
- **Always use the cockpit checklist.**
- **Know as much as possible about aircraft aerodynamics.**
- **Learn all you can about the particular type of plane you fly.**
- **Know personal as well as equipment limitations.**
- **In cold weather figure 10 per cent altimeter error—on the danger side.**
- **In severe turbulence allow for an extra margin of terrain clearance.**
- **Anticipate situations and know emergency procedures.**
- **Remember, takeoffs and landings are long in hot weather.**
- **Stay calm and THINK in an emergency.**

For his research work in flying the X-1 faster than sound, Hoover received the Air Medal and a Presidential commendation with the presentation being made by Maj. General Hale. Below, Hoover flies an F-51 used by the NACA for experimental work.

Panic Light

A BRIGHT RED LIGHT flashing on any time during flight has the power to cause stout-hearted lads to break out in a cold sweat . . . especially if it's the fire warning light on a jet fighter.

Actually the situation is not as critical as first impressions might lead one to believe. If the pilot follows standard operating procedures in situations of this type, the sweat and strain may be in vain.

To illustrate this point, during a four-months period the jet fighter school at Williams AFB had a total of 48 panic light cases. In each of these cases the planes were brought in to successful precautionary landings, with no actual fire.

The reasons for the fire warning lights going on were varied, but usually they could be traced to one or more of the following malfunctions:

- Improperly adjusted or loose "C" clamps
- Cracked tailpipe adapter
- Loose electrical wire connection
- Electric switch malfunctions
- Bulb trouble.

Another fairly common cause for the fire warning light going on was the building up of excessive heat in the aft fuselage section. This could be caused by touch and go landings, hot spots or a break in the flame tube, leaky tailpipe, tail cone or connections, advancing the throttle too rapidly causing the flame to burn in the tailpipe, or climbing at low airspeed and high power setting. A number of other things could also cause excessive heat.

Still another condition that will cause the fire warning light to glow is fire in the tail section. This can be spotted quickly because smoke will be emitted from the aft fuselage section and the tailpipe temperature will usually indicate above 700 degrees.

After being plagued with warning light trouble for some time, flight personnel at Williams AFB set up an SOP to cope with the situation in the F-80 and T-33 type aircraft.

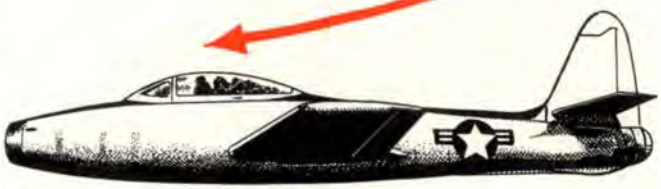
This emergency procedure covers practically every situation the pilot might encounter. When the fire warning light flashes on during the takeoff run, and groundspeed and length of runway permit, the procedure is to chop the throttle and stop as soon as practical. But first, the pilot must check the tailpipe temperature gage and also check for smoke. If the temperature is OK and there is no smoke, the SOP calls for him to continue the takeoff. The reason for this is that accidents have been caused by power being cut without sufficient room to stop.

Of course, disregarding the warning of the light is not the best possible procedure, but if no other indications of fire are present, it is usually better to continue the takeoff rather than to risk an accident by trying to stop with insufficient runway.

Another critical time for the warning light to come on is immediately after becoming airborne. Approximately 80 per cent of the cases at Williams occurred in this phase of flight, yet none of these had actual fires. Here again a calm analysis and SOP help relieve the panic. First, throttle back as far as possible (approximately 95 per cent) still maintaining flight. Then make a visual check of tailpipe temperature and for the presence of smoke. If the fire warning light still continues to burn and black smoke is pouring out of the tailpipe, the pilot should decide to either chop throttle, land straight ahead, or continue on around the field and land on any runway. One important factor to consider in this decision is that there will be crash equipment immediately available on the field, but it may take some time for it to get to an off-the-field location.

While airborne, either climbing or cruising, the panic light is not so critical. If it does come on, the power

the flash of a fire warning light need not cause panic in the jet cockpit



should be reduced to approximately 80 per cent. The tailpipe temperature should be checked for excessive or zero reading. Now here's an angle. A zero indication shows the possibility of fire, as the fire may have burned out the tailpipe temperature gage connections. A visual check for smoke should be made. If it's there, the throttle should be retarded to the stop-cock position and a decision made either to bail out or make a flame-out landing.

If after reducing power to 80 per cent the light goes out and no excessive black smoke is seen, the pilot should continue to fly at reduced throttle setting, and land as soon as possible. A good point to remember is that where there is no smoke there is no fire. However, the aircraft should be landed as soon as possible so it can be thoroughly inspected to determine the cause of the light coming on.

The above procedure was developed for F-80's and T-33's. Basically, the procedure is the same for F-84's, F-86's and F-94's. Variations are due to differences in presentations of the warning.

The F-84 has two warning lights. One (amber) is an overheat warning and the other is the regular red fire warning light. The overheat light is a frequent offender, but if the fire warning light comes on shortly (a minute or so) after the overheat warning, fire is almost a certainty. The F-86 also has a two warning light system although they are both fire warning. Covering both forward and aft, these lights give the pilot a "location" of his trouble. The F-94 has a somewhat similar system to the F-84. The overheat light means use throttle back procedure and the first warning (red) light calls for a complete engine shutdown.

Student officer, 2nd Lt. Don H. Payne of 51-E, Section I, told of his reaction to his first fire warning light experience. "It came on during the climb after takeoff. I had about 3,000 feet at the time. Reducing power, I observed the tailpipe temperature which was normal. Checked for smoke and found none. By that time the light had gone out so I entered the traffic pattern and landed. Scared? No, sir. I knew what to look for and the procedure to use in this type of emergency. The briefing and training on this subject, plus having been confronted with the simulated condition in the captivair, removed the panic."

This shows the poise and self-confidence that can be instilled in a student through solid fundamentals and training in a comparatively short time.

A Williams AFB instructor, Capt. Max T. Beall, says of his second panic light experience (first one happened in Japan—no fire), "It gave me more of a start, I believe, than the first and was quite a bit more annoying as it happened at night and there is no dimmer on the darn thing. The light flashed on at 8,000 feet during a climb to altitude. I retarded power and headed back down toward the field. Finally, the light went out and I came in for a landing. The brightness sure monopolizes the cockpit."

Up to this point there has been emphasis on the fire warning light aglow with no resultant fire but the attitude of students and instructor alike toward the reliability and accuracy of the fire warning system is unshaken. Complete confidence is placed in the unit.

In many of the overheated cases where no fire existed there was enough excess heat that a fire could have developed if corrective action had not been taken. The pilots and students at Williams are impressed with the fact that in accidents where a fire developed or an explosion occurred, the fire warning lights invariably came on first.

To date at Williams AFB there has been but one accident as a result of fire warning light panic and in this particular case the student pilot did not follow the base SOP.

VIOLATIONS

FLYING REGULATIONS are your best "rules of thumb" for a career of safe flying. They represent the crystallized know-how of Air Force flying experience. Breaking a flying regulation is not sure death but it increases your exposure. Pilots, young and old, are casualties to the violation of flying regulations. The highest rate of loss is among the less experienced who have not learned that flying regulations and directives are intended for their safety. The rules are guide lines for everyday usage.

Take a copy of AFR 60-16 and run your finger down the titles. It is difficult to stop on a subject which does not represent more than one fatal accident of which you yourself have a personal knowledge. Beginning with the General Flight Rules and Requirements, "Careless or Reckless Operation," and running through the entire regulation, you will find that compliance with paragraph after paragraph would have prevented serious accidents.

Failure to maintain assigned altitudes has resulted in fatal accidents. The horizontal, vertical and time separation provided for your safety by Air Traffic Control is effective only so long as pilots comply with instructions. If there is one aircraft in the traffic system whose pilot knowingly or negligently fails to adhere to the prescribed ARTC procedures, all aircraft in that vicinity are endangered. Minimum altitude of flight, acrobatic flight, use of oxygen and safety equipment are all requirements which, if followed, will contribute materially to your chance of having your career culminate in retirement rather than in untimely pay-off of your Government life insurance.

An encouraging sign is developing within the Air Force. The professional pilot is more and more becoming the rule rather than the exception. By far, the great majority of Air Force pilots today realize that a failure to adhere to flying regulations must indicate either that they are negligent in their duty to know and abide by the regulations, or that they have wilfully refused to adhere to the requirements. Either of these conclusions will seriously reflect upon their standings as professional pilots and may adversely affect their careers in the Air Force. In the most recent six-months period ending 30 June 1951, the Air Force on a world-wide basis processed 279 reports of violations of flying regulations. Notwithstanding the substantial increase in flying over the first six months of this fiscal year, the number of violations remained constant, indicating a downward trend in the rate of violations as compared to amount of flying performed.

Airplanes and crews are becoming more and more expensive. Accidents can be reduced, and each individual pilot has a basic responsibility to decrease the exposure of his crew, his aircraft and himself to accident hazard through continuous adherence to flying regulations and the rules of good operating practice.

Failure to adhere to flying regulations pays off in destroyed aircraft, thwarted careers and dead pilots. Some place in the history of the majority of major accidents there is a violation of flying regulations. The violation may not in itself be the primary cause but certainly and surely because of the failure to comply, the pilot had less time or fewer alternative chances to overcome a continuously increasing danger or emergency. Take, for example, the pilot who clears VFR

Trying to stay VFR under IFR conditions is a common violation of flying regulations which often leads to disaster. In the case illustrated by this photo, a supposedly proficient instrument pilot tried to stay under the clouds, flew into the ground, killing all aboard.

and continues flying on such clearance into IFR weather conditions and then encounters radio or engine failure. Without benefit of the proper fuel reserve and the resources of instrument flight rule planning, his emergency may well become a catastrophe. The pilot who considers it a minor thing on a VFR clearance to get "a little bit" into a thunderstorm often finds that the situation is beyond his control.

Flying regulations necessarily lag behind the development and technology of the Air Force. This is all to the good because this lag assures that only the essence of flying wisdom will reach the form of regulation. As a pilot lives to grow older, he no longer considers it "panty-waist" to conduct his flight in accordance with regulations. The rules of flight have been learned literally with the blood and broken bodies of those who tried the impracticable with an airplane. A repetition of these errors pointed out a need and there arose in the regulations a guide line to safeguard the pilot of the future. The rules for flying are reasonable, practical and the finest type of insurance that you can have.

Take the case of airspace reservations—in the first place, by far the great majority of airspace restrictions are established to protect you from a hazard to flight which exists in that portion of the airspace. Gunnery practice or special aerial tests dictate that aircraft be instructed to avoid the area.

Now, let's look at the airspace reservations from a professional standpoint. By executive order, flight of aircraft has been absolutely prohibited over the Atomic Energy Prohibited Areas. In the present five such areas, there are a relatively few square miles of absolutely prohibited airspace. Flight through the identification zone merely requires the employment of flight plan and reporting procedures. Any professional pilot who is "worth his salt" should be able to navigate his aircraft so that he will avoid those AEC reservations. With the existing air navigational facilities and equipment in military aircraft, it is a serious reflection upon the professional ability and integrity of any military pilot who finds that he has blundered into one of the AEC prohibited zones.

No pilot need ever be concerned if in the interest of safety it becomes necessary for him to fail to comply with existing regulations. There is a clear procedure set forth in paragraph 49, AFR 60-16, which provides that deviations may be made whenever emergency or special circumstances exist, provided that the pilot reports in writing by mail, TWX, or other means, the details of the incident within 24 hours after its occurrence. To protect the pilot, paragraph 49a (2) further provides that his commander will immediately forward this statement to The Inspector General, USAF.

The Inspector General, in carrying out his responsibility to secure compliance with flying regulations, has sought to secure whatever additional corrective action might be necessary to minimize or elminate the violation and the hazard. When it becomes apparent that a trend is being established in a certain type of violation, it is not sufficient merely to follow through in the application of corrective action to the pilot. Sometimes ground facilities must be improved or operations personnel changed. On the other hand, it may be found that a regulation should be amended or corrected. And regulations are changed whenever the need becomes apparent. Each rated officer in the Air Force may, through channels, bring to the attention of The Inspector General any condition or flying regulations which he believes to be adverse to the best interest of the Air Force.

Flying regulations are yours; hold them high and live by them.

Buzzing, like crime, doesn't pay. Flying along at about 30 feet altitude, the pilot of this T-6 spotted some civilian vehicles on a beach. The temptation was too great and he buzzed them. The T-6 struck one of the vehicles, with the results shown below.

CROSS FEED

FLYING SAFETY IDEA EXCHANGE

FLYING SAFETY SKIT

An article on visual inspections which appeared in the May issue of Flying Safety Magazine inspired the preparation of a skit which was recently presented at this base. The skit was well received and I am passing it on to you for any use you may care to make of it.

1st Lt. DALE T. BALL
Wing Flying Safety Officer
Mather AFB, California

• • •

Scene I (two chairs, desk phone)
Flying Safety Officer: (dials phone) Hello, J.K.! I need a skit writer for the June pilots' flying safety meeting. (pause) Fine. Send him right over. (hangs up.)
Sound—(knock on door)
FSO: Come in. (enter script writer)
SW: I'm the skit writer. J.K. sent me. What's the pitch this time?
FSO: Want some skits for the flying safety meeting in June. We've had a lot of trouble with visual inspections and I think we oughta jack the boys up a little.
SW: You mean to tell me we have to jack up a bunch of Air Force pilots on visual inspections? Brother, you oughta go down to Bedell's some night about cocktail time. They inspect the hell out of things.
FSO: Well, this is a little different. I mean inspection of aircraft.
SW: Where're these guys slipping?
FSO: Well, for one . . . tie-down of cargo. That's an important one they miss a lot.
SW: That's easy. Let's see. I've got it! We take a big room, see? . . . and get a sign that reads: "Mather Base Ops". Something like this.
Scene II (Base Ops counter and clerk. Pilot enters, wearing flying suit.)
Pilot: Hey, Mac! What aircraft I got this trip for Special Services? (looks at manifest) Of all the crazy damned fool cargoes. 200 bowling balls for Chanute. What they for??
Clerk: I don't know, sir. All I know is this guy calls up and says: "Hey, Mac—we got a cargo of 200 bowling balls to be airlifted to Chanute." I don't argue with the guy. Says his name's Lacey.
Pilot: (popping to) Of course . . . bowling balls, naturally—good for morale of the troops—they make damn swell bowling balls. Where's my clearance? Is the cargo secure?
Clerk: Yeah. I guess so.
Pilot: Good. I won't have to check it. See ya when we get back.
Scene III (Base Ops sign "Chanute Base Ops". Beat-up-looking pilot approaches.)
Clerk II: What happened to you?
Pilot: THEM BALLS! THEM DIRTY BOWLING BALLS!! Everything was going fine till we got on the final approach and then them *BALLS* let go—I'll never fly another bowling ball as long as I live. (Begins to fall. Clerk catches him and drags him off stage.)
Pilot: (muttering) Tie down the balls . . . Tie down the balls . . .
Scene IV (FSO and skit writer)
FSO: We can use that one. Now, how about one on controls?
SW: (refers to call file) Ah! Here's one that oughta do the job.
Scene V (two pilots sitting behind table, with large sign saying B-25)
Pilot: (flying the plane) Full flaps —(simulates very rough landing) (looks at copilot) Sweet landing, wasn't it? (scowls at CP) Well . . ?
CP: (stares at pilot) Want the truth or do you wanta feel good?
Pilot: Pull up the flaps and SHUT UP!
CP: Flaps comin' up.
(both disappear; pilot reappears)
Pilot: That's the gear, stupid.
Scene VI (Three airmen carrying signs, "aileron", "rudder", "elevator", line up at center of stage.)
Pilot: (walks on stage and inspects each control, steps back and salutes. The three controls salute back. He continues across stage and off.)
CP: (walks on stage and heads straight across. Three controls yell at him. He stops. Three controls walk over and take turns kicking him. They walk back and line up.)
Trio:
We're on the checklist every flight
Just treat us right, we love ya!
Forget us once. That's all she wrote.
We'll kick the hell out of ya.
Scene VII (FSO and skit writer)
FSO: Damn! but you're clever. What about something on tires?
SW: Production . . . Court . . . Lt. Dumbjohn on trial. How about this?
Scene VIII (table and chair. Sign above heads: "Tire Court." "Judge Goodyear" presides; prosecutor is "Firestone, D.A." Bailiff Fisk brings in defendant.)
Bailiff: Lt. Dumbjohn, your Honor.
Judge: Sit down.
Prosecutor: Where were you last night?
Lt. D.: On a cross-country.
Prosecutor: Did you check your tires?
Lt. D.: Yes, I think so.
Prosecutor: Bring in Exhibits "A" and "B". (two beat up, bandaged airmen enter, carrying signs, "amalgamated retread.") Do you recognize these two tires?
Lt. D.: Are those tires???
Prosecutor: Last night they were tires. Your Honor, I charge Lt. Dumbjohn with gross negligence of tire inspection, complete disregard for red paint slippage and excessive pressure on landing. I DEMAND the stiffest penalty.
Judge: How do you plead?
Lt. D.: Guilty—by reason of insanity.
Judge: So be it. I hereby sentence you to a complete recap and vulcanizing job—425 pounds of compressed air and 65 hours of taxiing on the Officers Club lawn. TAKE HIM AWAY!
(clerks drag Lt. Dumbjohn away, pounding on his head)
Scene IX (same three airmen carrying signs, "windows", "doors",

"hatches", walk to center of stage. Same routine as scene VI.)
Scene X (FSO and SW)
FSO: What about radio equipment and procedure?
SW: Got an idea. How's this?
Scene XI (pilots sitting behind table, card in front reading "B-25")
Pilot: Tune in Mt. Everest range.
CP: I can't. Command Set is out.
Pilot: Get it on the Liaison set.
CP: They took it out before we took off.
Pilot: Try the Radio Compass?
CP: I'm using it. Got Harry James and Doris Day doin' a number.
Pilot: What are they playing?
CP: "BENNY'S from Heaven."
Pilot: Sounds good. Turn up the volume. Can't hear that brass.
(airman walks slowly across stage toward them, carrying cut-out of snowcapped mountain, reading "Mt. Everest".)
CP: How's it coming in now?
Pilot: Pretty good.
("Mt. Everest" reaches them, and as it comes alongside, the two airmen get up and start following it. They wear angel wings.)
CP: He's sure using a lot of harps in his band these days!

Scene XII (same three airmen, carrying signs "fuel quantity", "hydraulic pressure" and "relief tube", repeat routine scene VI. At end all exit off stage, beating CP on head with relief tube.)

Scene XIII (FSO and SW)
FSO: Not bad—could be better.
SW: Look, Bud, these are high class skits. If you don't like 'em, go write some yourself.
FSO: All right—Don't blow your stack. How about oxygen?
SW: Oxygen? How's this?

Scene XIV (two airmen sitting behind a huge altimeter showing 20,000 feet)
No. 1: Did you bring a mask?
No. 2: Nah! Don't need one.
No. 1: Let's see, 20,000. Naw, that's 200,000 feet and still climbing. We're really high.
No. 2: Ya know, I *feel* a little high.
(both sing "Sweet Adeline")
No. 1: I gotta helluva idea.
No. 2: Whatz zat?
No. 1: Let's bail out.
No. 2: S'fine wit me.
(both stand up, remove chutes and jump off stage . . . large crash)

(END)

Flight Safety

WHAT IS IT?

MANY THINGS ARE NECESSARY TO ACHIEVE SAFETY IN FLIGHT; ALL OF THEM PROMOTE COMBAT EFFECTIVENESS.

As all Americans enjoy or seek the basic Four Freedoms, we in the United States Air Force seek the freedom from danger or hazard in flight. Complete attainment of this freedom would be the fruition of our ultimate objective—to stop the loss of men and airplanes.

Safety has been pursued progressively through the years. In modern transportation basic accident prevention principles have been employed in promoting automobile, marine, and railroad safety. These principles also have been applied to aviation which has developed as a safe method of transporting people and materials from one place to another quickly and efficiently. This is true equally for civil and military aviation. However, in addition to transporting men and materials, military aircraft are designed as weapons of defense and war. We have specific designs as troop carriers, fighters, bombers, radar and camera carriers, and the many others. These variety of aircraft types, each with its specific mission, presents a more difficult problem in the prevention of accidents. Further, while we are designing new types of aircraft, design requirements are becoming more complex and aircraft speeds are advancing into new spectrums. A definition of flight safety, therefore, starts with the design board.

Although an awareness to safety in design has existed for a number of years, safety was often subordinated to satisfy tactical requirements. "Built-in safety" is a new concept of technological emphasis being placed on safety features in the design of new aircraft (and also the modification of existing equipment). Implementing this new emphasis, USAF has authorized the Directorate of Flight Safety Reesearch a voting membership on all engineering, design, and evaluation boards. These boards are responsible for the examination of new aircraft in the mock-up or prototype stage, safety inspections of new and modified aircraft, and evaluation of the equipment to afford maximum protection to the aircrew while performing its designed mission efficiently and safely. There is little guarantee of flight safety without this built-in safety. It is accident prevention in its most basic form.

Flight Safety also includes an attack on "bugs." There always has been, and undoubtedly always will be the so-called bugs that come to light during shakedown or

pre-operational tests despite the most exacting design, fabrication and assembly. The Air Force is conducting these pre-operational suitability tests on many types of aircraft. One which typifies this program is on the B-47 Stratojet, designated Project WIBAC. It is anticipated that the exhaustive testing of new types will remove many of the dangers which formerly existed when operational units employed unproved aircraft. It has been found that certain aircraft react differently under normal tests than they do when placed under the strains of operational use. This phase of the accident prevention program is flight safety's approach to the unknown equipment factors that are accident potentials.

Flight Safety is also the attempt to cure specific ills such as operational peculiarities of certain aircraft. An example of this was a study of accident trends which revealed that fighter accidents were gaining in numbers out of proportion to normal expectancy. Detailed studies were made, plus investigation of selected accidents, resulting in formation of fighter indoctrination teams from Flight Safety Research. These teams, which included manufacturers representatives, visited all jet fighter bases to indoctrinate pilots and other personnel in the operational peculiarities of their equipment.

Flight Safety has been enhanced by the new engineering type of accident investigation which does not recog-

nize "undetermined cause" as a conclusion. An engineering investigation of a serious accident involves the pooling of aviation experience from many sources because the complexities of our aircraft demand the scrutiny of many specialists. This exhaustive form of investigation produces facts for immediate follow-up action and thereby prevents many potential accidents.

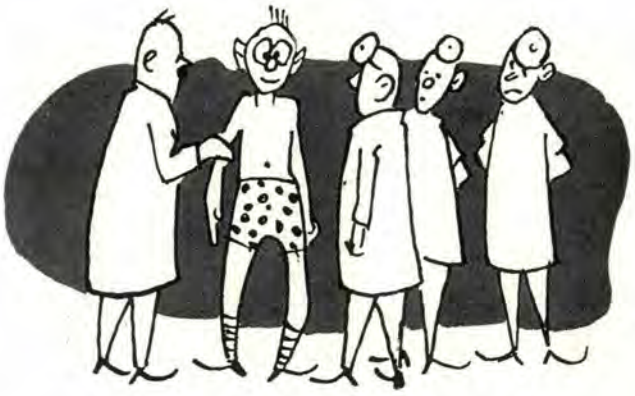
Flight Safety also consists of studies and reviews of aircraft accidents. Analysts will recognize dangerous trends and make recommendations for correction. Materiel deficiencies, lack of training, and operational procedures will be recommended for immediate corrective action through proper Air Force channels. Materiel failure has been recognized for many years as one of the major contributors to accidents. However, detailed in-

vestigations and studies have revealed that faulty maintenance contributed directly or indirectly to many accidents which appeared as personnel or materiel failure. As a result of this new consideration for maintenance, there was established the Directorate of Technical Inspection. This organization augments and complements the extensive activities conducted by the Directorate of Flight Safety Research and contributes greatly to the Air Force-wide accident prevention program.

Flight Safety today gives the utmost consideration to the human cause factors which contribute to the largest number of aircraft accidents. Human research, involving physiological and psychological factors, is conducted to obtain information upon which preventive recommendations can be based. Again, the complexity of the airplane presents a problem—matching the man with the machine. Personal equipment is continuously being improved and cockpit controls and instrumentation are being standardized as much as possible. Much is done to assure the pilot and crew maximum protection. Today's pilots, in the new high speed, high altitude aircraft, must be able to act and think in the same capacity as they would under less highly stressed conditions. Psychologists are continually conducting research into pilot age and experience versus aptitudes and types of flying. These human factors are long range but should improve the safety in flight of the Air Force.

Flight Safety is "safety thinking." If personnel can be induced to think in terms of safety they will act in safety. Safety consciousness is promoted through the media of publications—a good example of this is your reading this magazine. There are other periodicals, bulletins, posters, safety awards and incentives. Indoctrination conferences are held, direct-approach presentations are made for specific problems, and special courses are given for Flight Safety Officers.

The base level is where immediate results in the prevention of accidents can be achieved. A cooperative program between Flight Safety Research and Flight Safety Officers from command level down through wings and groups has resulted in direct advantage to Air Force units. This coordination with organizations in the field



has been enhanced by frequent visits by accident investigators and analysts from Flight Safety Research. The effectiveness of base accident prevention is increased by having a good prevention program—this consists of four essentials: education of personnel, an inspection program, enforcement of regulations, and, most important, the sound and accurate reporting, investigation, and analysis of an aircraft accident.

Flight Safety is also a concentrated action to save the most precious thing in this world—lives. The cost of the lives lost through aircraft accidents is beyond the computations of statisticians; however, the cost of airplanes, although microscopic by comparison, is definite and accountable—in the many millions of dollars. There are other indirect costs: property damage, death claims, search and rescue operations, investigation and boards. The Air Force accident prevention program is reducing these losses in lives, equipment and dollars—all natural resources of our nation.

Summarizing the definitions and interpretations: Flight Safety is an ever-alert consciousness by the designers and engineers, the ground crew and their chiefs, the operations group, the flight commander and his men, the topside planners and their military and civilian chiefs —by the entire United States Air Force team, toward the elimination of all aircraft accidents.

your chute and you

The bailout is complete when you're safely on the ground and free of your chute.

By Lt. LEWIS A. DAYTON, Jr.
Parachute Training Instructor
Davis-Monthan Air Force Base, Arizona

There is probably never a more serious point in a man's life than when for the first time he entrusts his life to that mysterious package known as a parachute —which through habit he carries with him whenever he flies in an airplane. Most pilots and crewmembers look upon the parachute as a lifesaver. And it is. But pitifully few of those same people know the secrets of the chute which can spell the difference between spending the night at home or in a hospital—even between life and death. If you take proper care of your parachute, and if you know how to use it, a bailout can be less dangerous than driving in Sunday traffic.

Every person flying should thoroughly check his chute prior to departing on a flight. It might do well to think that this flight might be the one in which he may have to make use of the chute. Knowing that it is in good condition will pay dividends some day, and not insurance payments to the next of kin.

Anytime that a chute is taken out of personal equipment or the parachute shop, inspect it yourself. You will be the person who will use it. Thoroughly inspect the harness and the parachute pack; make sure that they are in good condition. Check for oil, grease, acid stains, and see that the canopy or suspension lines are not wet. Anytime that a chute does not meet your approval, turn it in or draw another, or take it to the parachute shop and have them repair it for you. Check over the ripcord handle, the cable for free movement, the conduit which the cable runs through, open up the flap that houses the ripcord pins and the packer's seal. If the pins are not in straight, or if the packer's seal is broken, turn the chute in. Next, check the bungee cords (the elastic bands that pull the pack open); they should be in good condition.

After you have inspected the chute and it meets with your approval, have it fitted to you over the clothing that you will be wearing when flying. The re-designed harness of the B-12 Chute permits adjustment by the individual. A chute should be fitted to you when you are sitting down. The connector links on the risers should be set with the top just below your collar bone. The chest strap and buckle (or quick-release box) should be at least 12 inches below your chin. If the chest piece is not in the proper position, the opening shock can snap it up into your face. Make sure that the backstrap is tight. The leg straps should be snug and not so tight that they double you up. Never have the adjustment links for the leg-straps more than about four inches from the end of the strap. **Never** down between your legs, as the straps will be pulled tighter when the chute opens and the links will have a scissor action. Your chute should fit snug when you are standing, but will be looser when you sit down.

A little on the statistics of the chute and harness. The canopy will withstand pressures of 50 pounds per square inch. The suspension lines have a tensile strength of 550 pounds; in each suspension line or shroud-line, there are from seven to nine core lines with a tensile strength of about 35 pounds each. There are 24 suspension lines, each 14 feet long from the riser to the canopy. The chute is designed in such a way that the suspension lines are sewed in and run from one riser up across the canopy and down to an adjacent riser. The risers have a tensile strength of 3,000 pounds. Each of the four risers are a continuation of the seat sling which is designed to support you. The chest-strap, back-strap and leg-straps are primarily to keep you from falling out of the sling.

Every chute should be repacked at least every 60 days, every 30 days in the tropics, and inspected every 10 days. Sewed on every chute, there is a little pocket in which the Parachute Log and small Survival Booklet are kept—check it.

Prior to each flight, the aircraft commander should run his crew through a practice bailout drill, making sure that each crewmember or passenger is familiar with the procedure and all exits. Chutes should be worn at all times and if this is not possible, on occasions, then they should be within easy reach. A few seconds delay may mean the difference between getting out and not. One person blocking an exit while trying to put his chute on can cause the deaths of fellow

crewmembers—think it over.

Bailing out at altitude has its own problems. All bailouts at altitude should be delayed jumps due to high rate of fall, lack of oxygen, and extreme cold. At 45,000 feet the opening shock amounts to approximately 33 G's and your fall is approximately 200 miles per hour. At 25,000 feet the opening force decreases to about 20 G's and rate of fall decreases. At 10,000 feet, it will only be about three to nine G's and a rate of fall of about 130 miles per hour. At 7,000 feet, your body slows up to a maximum velocity of 125 miles per hour.

On daylight bailouts, if you delay your jump until you begin to distinguish objects on the ground clearly, i.e., cars, houses, etc., then you have reached a good altitude: 6 or 7,000 feet for opening. (If you are extremely nearsighted, it is best to count.) On night jumps—count. Even with a bailout bottle, it is best to delay your opening as there is a possibility of losing the bottle and mask. From 35,000 feet, it will take about a minute and a half to two minutes to fall to 12,000 feet or a total of 23,000 feet.

On all exits, leave from the rear side of the exit or hatch—go head first or cannon-ball out and be sure that you kick yourself well out.

On low altitude bailouts, it is just a matter of getting yourself clear of the plane and pulling the ripcord. The best way to tell if you are clear of the plane is when the air blast and engine noises can't be heard. Going out through the nosewheel well of a bomber or through small exits which require "cannon-balling" causing an end-over-end tumble, can result in possible tangling in the chute. Stopping this tumbling or spinning motion is done in much the same manner as in diving into a swimming pool, merely straighten out your body—or for side spinning—stick out your arms.

The following is the correct body position for opening the chute. When you pull the ripcord, use both hands and pull down and out forward, keeping your feet and legs together. When using a chest-pack, keep your head back and to one side of the pack to prevent being hit in the face by the pilot chute. After pulling the ripcord, be sure and give the chute time to get out of the pack and open. It only takes a matter of a second or two for it to start operating, although it may seem like hours.

After the chute is open, look up and check the canopy. Your chance of a malfunction is very remote, but there are several things that can happen and your chances of their happening are about one in ten thousand. The first thing is a stream. It is exactly as it implies, the chute streams out above you. It happens when the air fails to get into the air channel of the canopy. Every chute is packed so that it will have an air channel. In the event of a stream, reach up and grasp the two front risers and whip them out sharply to the front, continuing to do so until the canopy begins to open. In the event that it is not worked out to where the chute opens, don't panic; assume the normal landing and trust to luck. There's a good chance of coming out alive. Remember, the drag of the chute behind you is enough to cut down your rate of descent considerably.

The next thing is blown panels. In high-speed bailouts or at altitude, this can happen. If you have two or three panels torn out, don't worry, they will increase your rate of descent a little but not enough that you'd notice it.

There is a third condition—a "Mae West" or "Brassiere Effect." It is caused by a suspension line or lines over the canopy. This may be worked out by observing which riser the line is attached to and working the line loose by snapping and pulling the riser. A full "Mae West" is where the line is over the center or apex of the chute. Don't try to work it out as it is practically impossible. A full "Mae West" will double the rate of descent so get prepared for a rough landing. **Do not** cut the lines as you will lose the support of the canopy.

After your chute is open, the next problem will be that of oscillation. That is where you have a pendulum action beneath the chute. Oscillation can become rather violent and cause trouble on landing. At higher altitudes, you will not have any sensation of swinging. If there are clouds in the sky above you, the canopy will appear to be swinging back and forth above you.

Lt. Dayton, author of this article, conducts a regular course of instruction on care and use of parachute for B-50 combat crews.

Getting the feel of hanging in a chute and maneuvering by manipulating the risers may some day come in handy for crewmembers.

Inasmuch as there is quite a bit of effort involved in stopping this oscillation, wait until you are between 1,000 and 2,000 feet above the ground to begin stopping it. Oscillation can be stopped by grasping two adjacent risers, one back and one opposite front riser, and pulling down. Hold them down for about 30 seconds and then slowly release. Continue this action until it stops. Oscillation is caused by an uneven flow of air from the canopy. Be sure and reach up as far as you can on the risers. A light man will tend to oscillate more than a heavy man and might possibly have to work all the way down. Various air levels can cause oscillation also.

You can slip a chute in any desired direction by reaching well up the two risers on the side to which you desire to slip. Pull the risers well down and hold until ready to release or stop the slip, and when you release the risers, let go completely. Don't play them out slowly. By slipping, you can pick out a more suitable landing area and avoid serious obstacles. For a thousand feet of altitude, you can slip about 500 feet over the ground.

A minimum altitude for all maneuvers with a chute is 500 feet or 200 in an emergency. Below that altitude, prepare for landing.

Proper landing is important. Look at the horizon or up at the canopy; never look down at the ground when landing. The body position for all landings is hands well up in the risers, legs together, knees slightly bent, feet together and toes pointed slightly down. Keep your legs together as one will support the other even on bad landings. By clamping your knees together, you will get a slight muscular action that will absorb quite a bit of the shock. Never "lock" your legs (keeping them straight) as you will break an ankle or a leg.

On contact with the ground, you should try to roll. As the balls of your feet slap the ground, keep your knees together and twist them away from your intended direction of roll. Fall so that you will hit on the calf of your leg, thigh, twisting around to roll to buttock, and then back of your shoulder. Done properly, you can roll back up on your feet. Since your chances of rolling back up on your feet are not too likely, you may be in for a dragging. If you have a quick-release type harness, you will be set for release on landing. In the event that there is a failure of the box, then follow the same procedure as with the standard harness. When being dragged, roll over on your back immediately. Keep your head up, reach up and grasp two risers (can be done with one riser), keep your feet together and pull down on the riser sharply, and at the same time swing your feet up and around to face the chute. Don't swing them directly over your head or shoulder as you will tangle them in the lines. When you have turned to face the chute, dig your heels in and let the chute pull you up on your feet, drop the risers and then run around the chute or grab it and collapse the canopy. In high winds or when injured, roll over on your back, reach back with one hand and grab one of the risers, roll back around on your stomach on the side that the riser is on and pull in until the chute is collapsed. If you get tired before you get the chute collapsed, don't release the risers as the next time you won't climb up as far.

For landings in trees or through wires, use the same body position as for normal landings. Cross your arms across in front of your face by grasping the opposite front risers, turning your head to one side to protect your face and chin.

For a water landing, the first thing to do is make sure that you are well back in the seat sling. Next, unbuckle the leg straps, cross your arms and unbuckle the chest strap. Keep your arms crossed until your feet hit the water. As your feet hit, throw your arms up and over your head, arching your back at the same time. **Do not let go before your feet hit the water.** If the wind is blowing toward shore, hang on to the leg strap and let the chute pull you in part way. It will travel several hundred yards before it will fully collapse.

Once the natural fear of bailing out is overcome, complete procedures are well fixed in your mind, the chances of injury are negligible.

Inasmuch as it isn't possible to make practice jumps, it is the ground training that counts. Do it right and make it count.

Simulating the post-landing phase of a parachute jump, the student's next step will be to attempt to gain his feet and collapse his chute. When wind is not available to provide the dragging force, other students attending Lt. Dayton's "jump school" will grasp chute end of risers and pull student over the ground to give him practice in getting back on his feet.

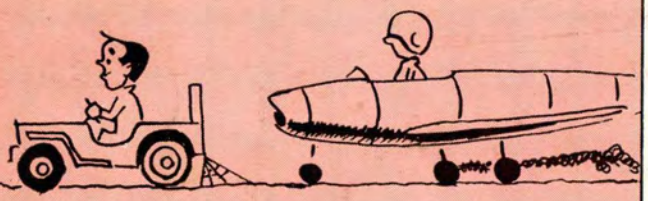
Your learning days aren't over when you walk out of school. As long as you fly or work around airplanes, you've got a lot to learn. In school, you proved on a blackboard that you'd learned your lessons. In an airplane, you prove it more practically — and the penalty for not knowing your lessons may be much more painful than staying after school.

—Debra Paget, 20th Century-Fox Player—

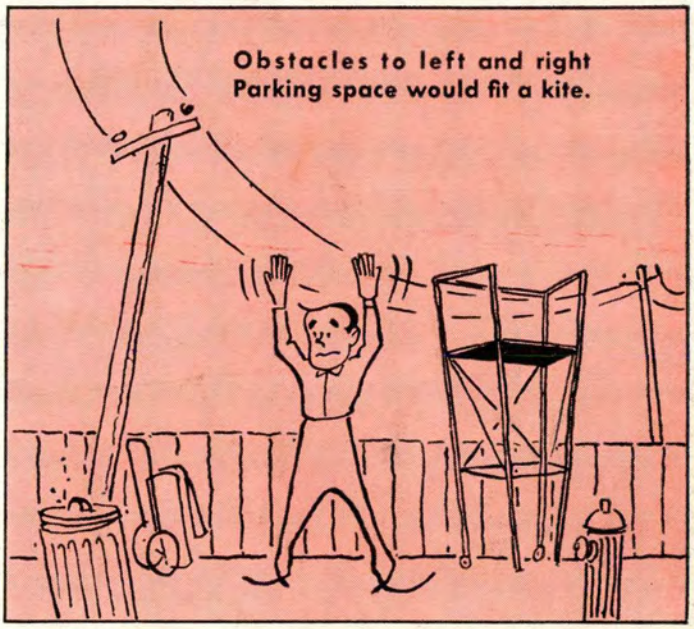
Mal Function

Pilot fidgeting on ramp
Waiting for a place to camp.

Mal in FOLLOW ME is pokey;
86's brakes get smokey.

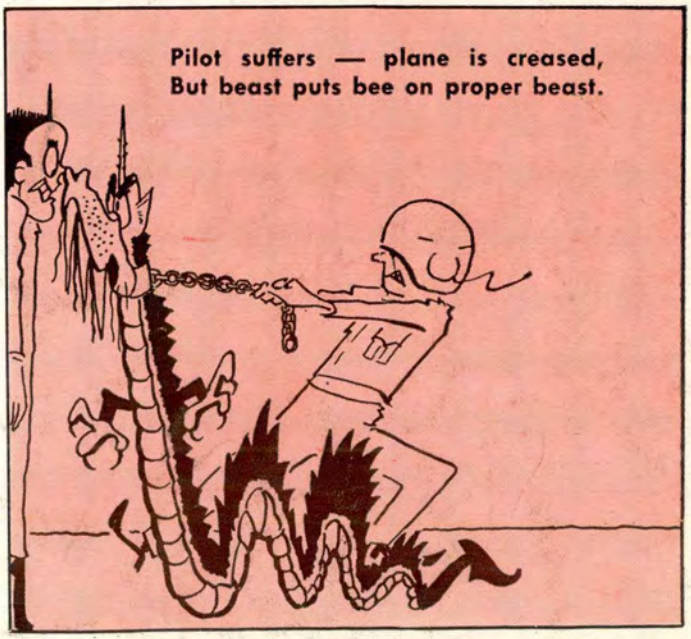


Obstacles to left and right
Parking space would fit a kite.



Two bits he hit the garbage can
Pilot error for the man.

Pilot suffers — plane is creased,
But beast puts bee on proper beast.



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