Flying Safety

HEADQUARTERS UNITED STATES AIR FORCE • RESTRICTED

NOVEMBER, 1950

RESTRICTED

JETS CAN TAKE IT

Until F-80 Shooting Stars fought in Korea, pilots and designers wondered what would happen to a high speed jet plane if its smooth skin was ripped by enemy fire. The close support missions flown by jets in Korea frequently resulted in the planes being damaged by small arms fire, light flak, cables and ground wires and even flying debris from bomb and rocket blasts. Despite this battle damage, the rugged construction of the F-80 has made it possible for all but a very few to return safely to their home bases. Planes with crumpled wings, cracked canopies, torn tail assemblies and damaged control surfaces have been brought home by their pilots.

Many jet fighters have withstood stresses for in excess of design limitations without structural failure; however, this is not an indorsement that you should exceed G limits.

The left wing tip of an F-80 (top picture) was sheared off when the pilot struck a cable during a low altitude strafing run on North Korean forces.

A burst of flak knocked out the hydraulic system of the plane shown resting in a rice paddy, preventing the lowering of the landing gear. The pilot was uninjured, after making an emergency wheels-up landing.

The two lower photos show a damaged F-80, its landing gear shot away by tank cannon fire, as it was belly-landed at a base in Korea. The pilot chose to land on the rice paddy rather than on the paved strip and he walked away unhurt. In the first of these two pictures the plane is bouncing back into the air after initial touchdown.

Another F-80 flew into a trap (cables strung between two peaks) lost both tiptanks and wingtips—had two 40 mm shells through the nose section, shattering the windshield and bending the barrel of the tunnel gun so that it stuck out at right angle to the original position —sheared off approximately 14 inches of the vertical fin and rudder. The pilot then climbed to 13,000 feet and bailed out. He claimed the controls were a little sloppy and was afraid he might lose control so elected to get out while he could.

A shell entered the aft section of another F-80, tearing a hole in the tailpipe two inches square where it entered and another hole five inches square where it came out. The shell tore part of bulkhead 376 and finally blew a hole in the stabilizer approximately four inches square. The pilot said the aircraft handled normally. Other F-80C's have had single shells pierce the burner cans. The pilots claimed the engines operated normally.

A clincher about the toughness of a jet airplane is this one: Hit by ground fire, a pilot lost the fuel in his tiptanks but was able to get to an abandoned grass strip where he made a belly landing. He found enough fuel to fill the fuselage tank and got enough Koreans to pick the plane up on their backs while he lowered the gear. He started up the engine, took off, and flew on home.

GUEST EDITORIAL—

PRACTICING FLYING SAFETY

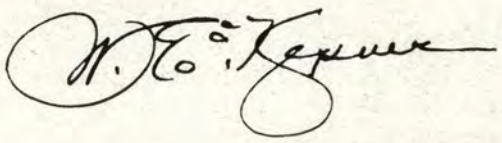
Practicing flying safety saves lives — this fact alone would be worth all the effort exerted even if that were all it did. However, it does much more than that. It governs and assures quantities of air weapons being on hand when needed, either for training vital personnel or for use in combat operations, that would not otherwise be available. It increases the Air Force's ability to carry out its mission by eliminating unnecessary waste caused by preventable aircraft accidents. It assures the maximum airpower for funds expended.

The individual who fails to practice flying safety should not be entrusted with our nation's assets which are so necessary for our security through Air Power. A larger and larger portion of the nation's resources is being required to produce the aircraft so vital to our military effort. Since our resources are not unlimited it is imperative that every defense dollar be made to count toward increasing our strength and not be wasted replacing equipment that someone's carelessness has destroyed. The old adage, "a dollar saved is a dollar earned," when changed to read "an airplane saved is an airplane earned," appropriately expresses one of the aims of flying safety.

The importance of practicing flying safety can hardly be over-stressed at this critical period when every aircraft accident gives aid and comfort to the enemy, and obviously requires no effort on his part. A person may not realize it but he is helping the enemy every time his carelessness or ignorance destroys or damages an aircraft. In fact, this puts him on the enemy's side. To question a man's loyalty because of such carelessness or ignorance would be a drastic measure, but the implication is there. The airplane has been equipped with practically everything but brains—the pilot should at least furnish those, or the job should be given to someone who can.

The Air Force Flying Safety Program has been designed to reach every individual concerned with the operation and maintenance of aircraft to make him thoroughly aware of the urgent need for preventing any further squandering of our resources through aircraft accidents. It is obvious that the responsibility for eliminating this unnecessary waste rests with every individual in the Air Force who may be concerned in any way with the operation or maintenance of aircraft. It is his responsibility and duty to learn everything possible about the equipment he is using so as to reduce to the minimum the possibility of errors. Our ultimate goal through the Flying Safety program should be the elimination of preventable aircraft accidents. Every such accident eliminated is a step in the right direction and will work to prove that they are not necessarily "inevitable."

We have made great strides in flying safety since the early days of the Air Force, but there is still much to be done. We all have a stake in this program because it is not just "something for the other fellow to observe," but applies to us all. Our individual responsibility cannot be delegated to someone else, and the desired results of the whole Air Force Flying Safety Program will be realized directly in proportion to the cooperation and effort we all give it. Let every pilot, every maintenance crew, every supervisor, take stock of his capabilities and work constantly to improve.



W. E. KEPNER
Lieutenant General, USAF
Commander-in-Chief
Alaskan Command

EXPECT

IT'S GREAT FOR WINTER SPORTS BUT IT CAN BE A HAZARD ON AN AIRFIELD

Footballs, hunting rifles, tire chains, skis, winter uniforms, snow shovels—these are some of the things we dig out of the closet with the coming of fall and winter. Let's also dig out one more thing: the lessons learned the hard way through bitter experience last winter concerning the ground operation of aircraft on ice and snow.

Even though you may be stationed in the sunny south and are not expecting any snow this winter, a knowledge of winter operating procedures is equally important. Many accidents last year and the year before, although they occurred at northern bases, involved pilots stationed in the south. It is usually too late to brief yourself adequately on cold weather operations after you have been ordered to make a flight to a winter-zone air base like Westover, Selfridge or Hill.

With the advent of winter, additional hazards are met, not only in the air but also on the ground. Blowing snow, glare, slippery surfaces, slush, snowbanks and numerous other wintertime phenomena await the unwary operator of a plane, be he either ground crewman or pilot.

Last winter, 17 USAF aircraft accidents were caused by ice or snow on runways, ramps and taxiways. Two aircraft were completely destroyed, nine sustained major damage and six sustained minor damage. Of these 17 accidents, 10 occurred during taxiing operations, four during takeoff, two while landing, and one accident took place after the engines were shut off and the aircraft continued to slide into a hangar.

Attempting to taxi on surfaces covered with ice, slush or snow, contributes to a large share of winter accidents. Slippery surfaces greatly reduce the effectiveness of brakes in steering or stopping. You should taxi slowly, use extreme caution, and if you think you might damage your plane taxiing or parking, call for a tug. That's why they're there.

Remember that it has always been a pilot's prerogative to refuse to taxi under unsafe conditions. Once a skid starts on an icy ramp, there isn't much you can do to stop it. Don't let a skid start. Also, give yourself twice as much room to maneuver your plane than you do when there is no ice or snow. All of these things

SNOW

might take a little longer, but not as long as an accident board inquiry.

Another accident type resulting from winter surface conditions is caused by applying excessive power to pull the plane out of deep snow, ruts or slush, and nosing up. Here again—don't do it. Get a tug or let it sit.

Snowbanks piled up beside runways, across the ends of runways, along taxi strips and on ramps have taken their toll of AF planes every winter. Sheared or damaged gears, bashed-in fuselages, rudders, elevators, stabilizers, props, wingtips and flaps bear witness to the solidness of man-made snowbanks. A particularly hazardous condition is the leaving of snowbanks across the ends of runways, since they are extremely difficult to see from the final approach. Particularly if the runway length is critical and you are attempting to land as short as possible, be especially alert for a snowbank across the approach end of the runway. Also, a snowbank across the far end of the runway creates a sad state of affairs if you are unable to stop on the runway. It is a lot less serious to run off the runway into the soft snow than it is to run into a wall of hard-packed snow and ice.

When taxiing close to snowbanks, be particularly careful in making turns or in swinging the tail around. When you swing around to run up the engines before taking the runway for takeoff, for instance, check carefully to make absolutely certain that there is sufficient clearance behind you.

You personally can see to it that something is done about snowbanks piled too close to operating areas, by informing your Flying Safety Officer and Operations Officer of the hazards. They will take it from there. Snow removal means not only clearing off hard surfaces but also getting it far enough off the sides so that a plane can be operated on the ground with impunity.

Slush on the runways after a thaw can cause a great deal of concern to air crews on takeoffs and landings. After gear retraction, slush thrown into wheel wells can freeze the gear into an up-and-locked position, which, in extreme cases can result in a wheels-up landing. On both takeoff and landing, slush thrown by the wheels and props can badly damage flaps, wheel well doors

and other skin surfaces. If at all possible, avoid takeoffs and landings under such conditions.

Another winter flying hazard is restricted visibility caused by blowing snow or by glare of sunlight on snow. Glare can reduce a pilot's depth perception to such an extent that he can either stall out high above the runway or drive his plane into the ground — both being notoriously hard on airplanes. Under such conditions, a pair of sun glasses becomes a safety item.

Remove every trace of frost, ice or snow from wings, fuselage, tail surfaces and propellers before takeoff. Even though the accumulation of snow on the plane is not of sufficient weight to do any harm, drag induced by rough surfaces can drastically alter a plane's flying characteristics to such an extent that it might never get off the ground.

Another important pre-takeoff item is to check all controls for freedom of movement. Light snow can sift into the smallest openings and also slush thrown up by the wheels the day before might have frozen during the night. Make certain both by visual inspection of all openings and by moving controls and flaps through their full travel that they are not restricted by ice or snow.

Airfield conditions can change rapidly during the winter months. Consequently, all flights must be carefully planned and particular care should be taken in checking Notams. Even though you might have been into a field the day before, check the Notams again before clearing for the same field. A few inches of snow or a change in temperature in the meantime could have made a tremendous difference.

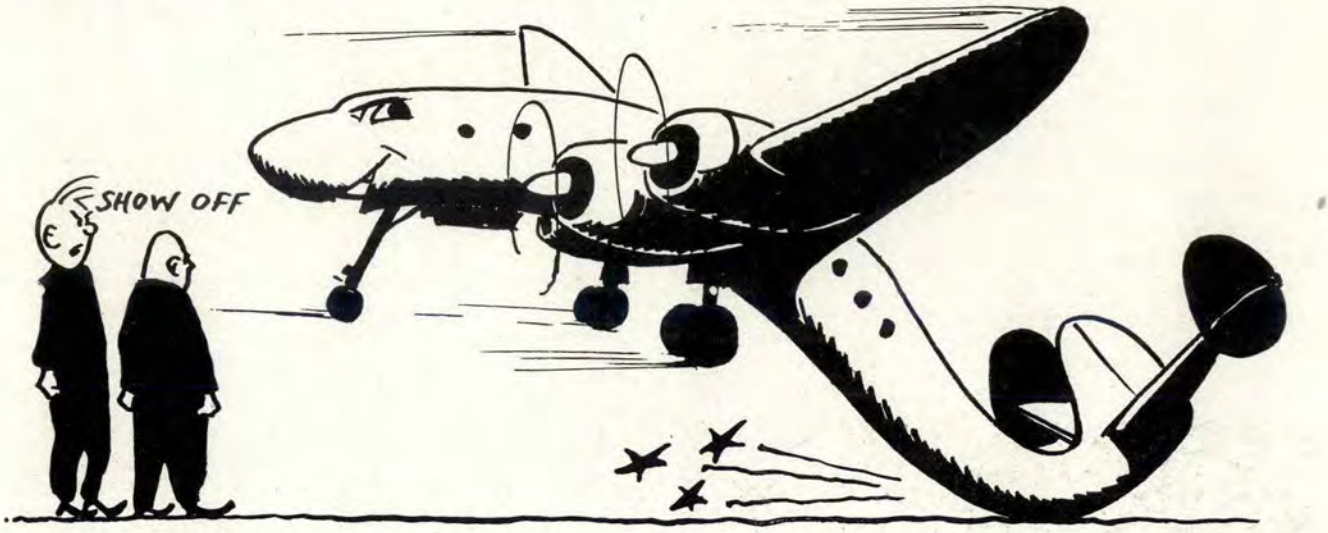
There are many other matters concerning winter flying hazards with which you must become familiar. Peculiarities in local weather behavior and airfield conditions, peculiarities of the particular type of aircraft you are flying, the local SOP for winter operations — all of these should be studied carefully.

The annual flood of reports of accidents resulting from winter conditions can be cut down to a trickle if an all-out effort is made by all concerned.

WINTER DO'S

- Taxi slowly.
- Have airplane towed if you cannot taxi safely.
- Wear sun glasses if the glare is bad.
- Avoid landing or taking off in slush.
- Swing the tail around cautiously in the vicinity of snowbanks.
- Be alert for snowbanks on ends of runway.
- Check freedom of control movement before takeoff.
- Check Notams.
- Report all hazardous conditions.
- Make sure all surfaces are free of ice, snow and frost.

See-Saw OR WHAT'S UP, DOC?



In many aircraft accidents the plane comes down and screeches to a stop, resting on its nose section with the tail sticking up. This is usually described in flying safety parlance as a "nose-up" because the nose is down. Yet, when the opposite type of accident happens and the aircraft comes to a halt resting on its tail section, with the nose up, it is not described as a "tail-up" accident because the tail is down. The nose, in this case, is obviously up and to follow parlance the accident cannot be called a "nose-up" since the nose *IS* up and not down.

This leads to a confusing state of affairs and leaves everyone up in the air (except of course the pilot, who is down and a little vague about the details). Eventually, the whole thing boils down to the accident investigating board which immediately wants to know "What's up?" This question is not meant to be confusing because it is generally understood that the plane is not up —it's down and the nose is up, which brought up the entire matter to begin with.

It all started when the pilot of a C-121 was asked to taxi his plane from the parking area to a point near a fire hydrant in order to have a quantity of wet snow removed from the wings, fuselage and tail section. Since the C-121 could not be taxied forward because of another parked transport, the passengers were loaded and the pilot started the engines. With all four props reversed and power applied to the engines, the plane began moving backward when the nose section raised from the ground. The pilot's spirits dropped as the tail of the plane went down and the passengers' hair stood up.

All four props were immediately placed in forward pitch, but this did not prevent the tail section from striking the ground. Rapidly evaluating this baffling action of the C-121, the pilot ordered the passengers to walk up forward in the plane, one at a time. After five of the passengers had done as the pilot ordered, the plane's nose went down and the tail came up. Before anyone could get into the spirit of this novel "See-Saw, Margery-Daw" game, everyone got out and the plane was inspected. Major damage had been caused to the tail section. Consequently, the pilot's face fell, while the maintenance officer's blood pressure went up.

Here is where the accident investigating board entered the picture and wanted to know what was up. Nothing was up anymore, but since the tail of an Air Force C-121 had been down, the board figured that something had been up. Getting down to business, the board found that the chocking action of a ridge of hard-packed snow on the parking ramp behind the main gear, combined with the possibility of improper loading, plus the large quantity of wet snow on the tail and fuselage, had aggravated the tail-heavy condition of the plane and caused the nose of the plane to go up and the tail to go down.

By this time you must have been reminded of that old Pullman berth joke about the lower being higher than the upper because the upper is higher than the lower, etc. But this joke, however, has nothing to do with the Air Force or flying safety either for that matter. It certainly doesn't clarify any aircraft nose-up accidents, so you can forget it.

The board recommended that C-121 aircraft not be taxied backward by reversing the props; that reversing props be used only for braking action after landing.

Glacier landings

IT WILL BE A COLD DAY WHEN YOU TAKE OFF AGAIN

By 1ST LT. T. W. PRIOR II
10th Rescue Squadron
Air Rescue Service

The 10th Rescue Squadron of the Air Rescue Service has been assigned many and varied projects by the Alaskan Air Command, but according to veteran pilots, one of the most interesting has been landings on the Taku and Seward Glaciers, both within 200 miles of Juneau, Alaska.

They wanted to know how a ski-equipped C-47 would be for glacier operations and what surface conditions were best for landing and takeoff. It is all part of a long-range plan to make rescues in areas and under conditions previously not attempted because of lack of experience and knowledge. The Rescue Squadron started solving these problems when they air-lifted a seismographic station, personnel and equipment, to the Taku Glacier camp of the American Geographical Society's Ice Field Research Project. The 10th has flown a commuter's special for the glacier scientists for the past two years in a C-47B with ski-wheels. The plane also is fitted for the attachment of four 1,000-pound, 12-second JATO units, wired to be fired simultaneously.

Snow and ice conditions aren't always the same on a glacier. Sometimes you don't have the powdery snow loved by skiers. Last August, a mission began with an aerial reconnaissance of the proposed landing strip on a glacier. The surface conditions appeared satisfactory, but the pilots decided to land in the early morning hours when the usual depressed night temperatures would have hardened the snow surface. The early morning hours are also desirable because they put the sun on your tail instead of your nose when landing on an upslope glacier. The Taku and Seward glaciers run East-West, emptying into the Gulf of Alaska. Morning, in the summer in Alaska, may be as early as 0200, and evening as late as 2200, with light from the midnight sun.

It was thought that a landing could be made without difficulty around 0500 hours. On board the C-47 were 400 gallons of fuel, 1,500 pounds of cargo, crew and passengers totaling eight people, and normal survival food and equipment. The gross landing weight would be 24,864 pounds.

The landing on the glacier was made at 0535 hours and at the point of touchdown the altimeter indicated 3560 feet, and the outside temperature was 4° Centigrade. Winds were 25 mph and gusty. The surface consisted of wet snow to a depth of 4 inches which brought the C-47 to an abrupt halt within 200 feet.

After unloading the cargo and four passengers, a takeoff was attempted. Taxiing to takeoff position required 25" manifold pressure and high RPM, so the engines had to be cut for cooling. On re-starting the engines, full throttle plus vertical control oscillations of the tail failed to allow breakaway of the skis. The engines were cut again and the impacted snow on and forward of the skis was cleared. Taxiing was then started in a wide 360° arc to permit the C-47 to hold on previously impacted snow.

The takeoff run began at 1410 over snow surfaces not previously used. The acceleration was slow as the plane thumped and bumped over the irregular surface. After 58 seconds full power the airspeed was an indicated 40 mph. The JATO bottles were fired and the airspeed increased to 60 mph, but they were inadequate to help the plane off before they were expended after 12 seconds. It was then necessary to taxi back to the point of takeoff and cut the overheated engines for cooling. The decision was made to wait for the sun angle to decrease when the temperatures would drop and the snow surface form a crust.

A second takeoff was attempted at 1630 over the previous ski tracks, but the acceleration was so slow that it was not deemed advisable even to fire the JATO. The C-47 was taxied back and engines stopped once again.

At 1730, a third takeoff was attempted. Using 22° of flaps, improved acceleration was noted to 55 mph. A transition was noted in that the aircraft instead of galloping over surface irregularities seemed to settle down to a fairly stable horizontal motion with the skis skipping from peak to peak of the rough surface. The JATO bottles were fired and the C-47 took off in a tail low attitude after approximately seven seconds. The takeoff run consumed about 5,000 feet, however.

Upon landing back in Juneau, it was noted that only one JATO bottle, of the two they had planned to use, had fired. It was assumed that this takeoff could have been successfully completed with engine thrust alone.

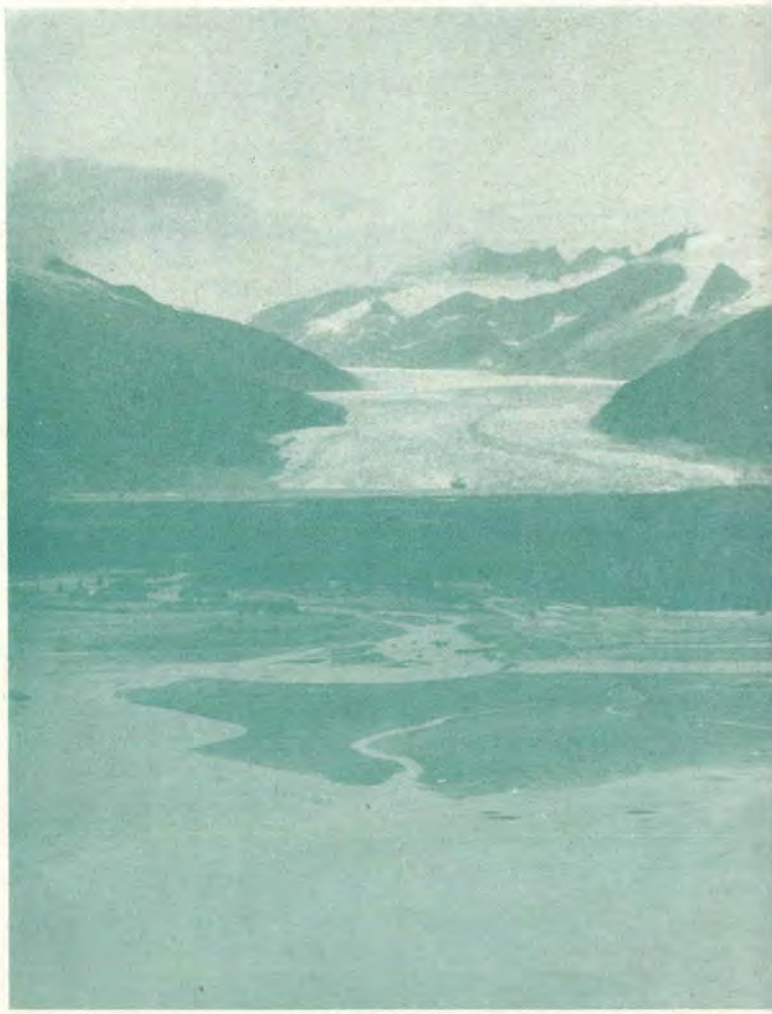
The conclusions drawn by 10th Rescue Squadron pilots during the last two years of glacier operations are:

That C-47 type aircraft with ski-wheel landing assembly can be operated successfully, but with some difficulty, from glacier ice caps.

That the use of JATO units materially assisted in takeoff operations.

That conditions should be selected to obtain a clear weather (or less than 5/10 overcast) with the sun in a tail-ward aspect when landing, to facilitate judging height above the surface. Slight variations in surface contours will be more easily detected since glare is minimized.

The last conclusion drawn, based on surface conditions on the Taku and Seward Glaciers, is that similar operations could be accomplished with little difficulty using pontoon or boat-hull type aircraft.



the DAEDALIAN TROPHY

Last August the commanding general of the Air Proving Ground received word from General Hoyt S. Vandenberg, that the APG had earned the award of the Daedalian Trophy for the most outstanding flying safety record among the major air commands.

In part, the letter from the Air Force's Chief of Staff read like this:

"It is with great pleasure that I inform you that your command has been selected for the award of the Daedalian Trophy for 1949. As you know, this trophy is presented annually to the major air command having the lowest adjusted aircraft accident rate for the preceding calendar year.

"The operational testing of aircraft and equipment necessarily creates additional problems in flying safety. That your command, with its attendant responsibilities for the proving of new aircraft and equipment, has at the same time been successful in achieving a lower adjusted aircraft accident rate than the other major commands, is particularly commendable.

"I wish to congratulate you and all members and former members of your command whose daily efforts earned this merited recognition . . ."

The Air Proving Ground, presently commanded by Major General Bryant L. Boatner, and its former leader, Lieutenant General William E. Kepner, can remain proud for a long time on these words from General Vandenberg, because the winning of the Daedalian Trophy is an outstanding achievement. Of all USAF awards, the Daedalian Trophy for flying safety is the most significant.

The history of the Daedalian Trophy goes way back into Greek mythology—to the myth of Daedalus, the famous Greek architect, and his son, Icarus. According to the myth, Daedalus and his son were imprisoned by the King of Crete in an intricate labyrinth, and rather than remain prisoners forever, Daedalus designed wings for himself and his son, in order to escape.

The famous architect made the wings and after repeated cautions to his son not to venture too high, lest the sun's heat melt the wax fixing the feathers to the frame, Daedalus bade his son to don the wings and fly to a country where they would be free.

" 'My Icarus!' he says, 'I warn
thee fly
Along the middle tracks: nor low,
nor high;
If low, thy plumes may flag with
ocean spray;
If high, the sun may dart his fiery
ray.' "

Delighted with this new mode of travel, Icarus flew swiftly along. Then he forgot the danger and his father's caution, and rose up higher and higher until he could bask in the direct rays of the sun. The heat soon softened and melted the wax on his wings; and Icarus, no longer supported by the light feathers, fell into the sea where he was drowned, and which, in memory of him, bears the name of Icarian to this day.

From the Greek myth the story shifts to the Order of Daedalians, an organization of American World War I pilots named after Daedalus, who was the first exponent of safety in flight. On March 3, 1937, the wing commander (the late Major General H. A. Dargue) of the Order of Daedalians, offered to present to the Air Corps a cup for competition, possibly between its major units, as a safety trophy. The rules for governing the competition for the trophy were to be drawn up by the office of the Chief of Air Corps.

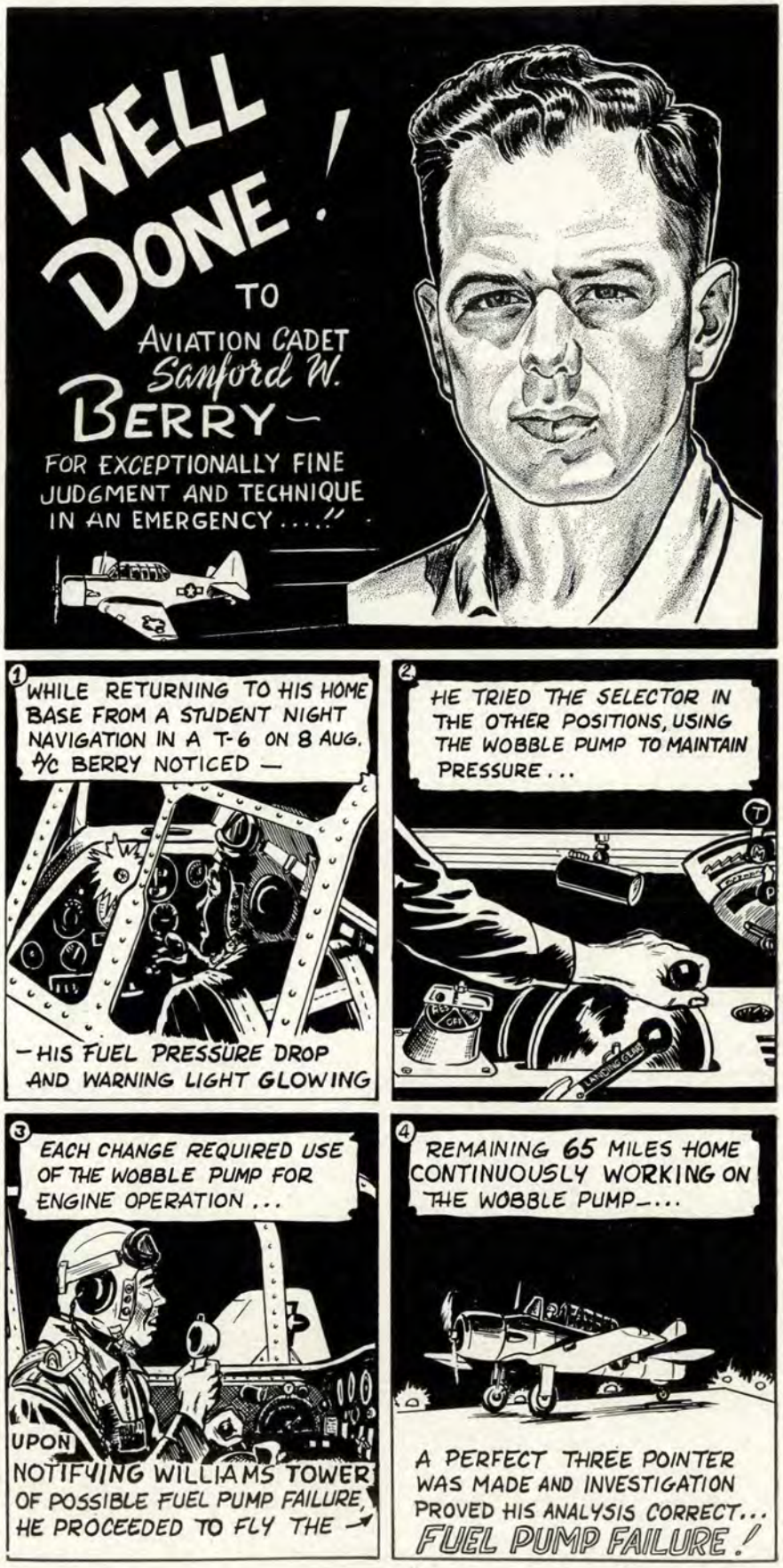
But it was not until two years later, in March of 1939, that the Chief of the Air Corps approved the proposal and appointed a board of officers to recommend rules to control the competition for the trophy. After study, the board decided that the trophy should be awarded to the wing having the best record for safety. But when the

board's recommendations were approved, the unit to receive the award was designated as a group rather than a wing.

On the basis of the lowest accident rate per 1,000 hours of flying time for the fiscal year under consideraation, the 19th Bombardment Group, then stationed at March Field, California, was awarded the first Daedalian Trophy, September 21, 1938. The flying safety record of the 19th Group showed only one accident (caused by materiel failure) in 10,942.9 hours flown.

In 1939 a board meeting to consider all units eligible for the award, was told that the Daedalian Trophy would, in the future, be awarded to the GHQ Air Corps Wing having the lowest accident rate per 1,000 flying hours. Under these rules the First Wing was awarded the trophy for the fiscal years 1939 and 1940. No awards were made between the years 1940 and 1948.

When the awarding of the trophy was resumed in 1948, it was decided that it should go to the major Air Force command having the lowest adjusted accident rate for the calendar year under consideration. Thus, with the Daedalian Trophy going to a major air command; the Columbia Trophy to be awarded to the group, and a proposed flight safety plaque award for a base, the over-all promotion of flying safety honors will be rounded out by recognition to all levels of command.



LONG HAUL

SEVEN-LEAGUE BOOTS ARE BABY SHOES WHEN COMPARED WITH MATS' BIG HOP TO THE FAR EAST WITH TROOPS AND SUPPLIES

One would think that a rush job like supplying the Korean beachhead when it was compressed, and then increasing the tempo to back up an offensive, would just about throw Flying Safety out of the window. But it didn't. True, the record was not a perfect no accidents, no troubles, no errors, as the airlift got under way almost overnight and roared into a steady stream of high priority cargo and personnel. But the safety emphasis was there, and there is no doubt in anyone's mind, among those who flew it or organized it or received the help at the other end, that a few plane loads lost through carelessness might have allowed the battle to surge the other way at a critical time.

Rear Admiral W. G. Tomlinson, Commander of the Pacific Division, MATS, had some comments for the personnel of his command when they were called to participate in the lift. What he, in Hawaii, thought about the operation obviously reflected the thinking and planning of the entire Air Lift Task Force operating from headquarters at Fairfield-Suisun Air Force Base.

"The recent increase in our schedules and aircraft utilization, plus the corresponding heavy maintenance load imposed on our units by increased transient traffic over Pacific Division routes, requires renewed emphasis on the part of all personnel as regards safety of flight," Admiral Tomlinson told all his organizations.

"The chance for maintenance errors and omissions has necessarily increased. We are accomplishing an expanded operation with little increase in personnel. This means that our maintenance people are called upon for a greater workload resulting in a certain amount of fatigue and a corresponding decrease in efficiency.

"Flight crews and maintenance personnel share the responsibility of insuring that the aircraft is safe for flight," Air Lift personnel were told. "The pilot's exterior check of the plane is the most important part of the pre-departure routine. The concept 'This is an emergency, RUSH' is definitely not acceptable when safety is compromised.

"Flight crews are being called upon to perform the maximum authorized flying time, and although a specified flying hour limit has been established in directives, this does not mean that every individual is physically capable of such performance. This fact is doubly important when considering the short supply of Flight Surgeons in this Command. The Squadron Commander, who is in close contact with and has personal knowledge of his flight crews, has to be on the alert for signs of flying fatigue or of decreased efficiency on the part of his crew personnel.

"Flying Safety has always been the personal responsibility and a function of primary concern of each unit commander. This concept is doubly important now that the risk has, to a certain extent, increased. It is a cut and dried fact that the more hours you fly, the greater the exposure to accidents. However, with a concentrated effort by all concerned, there is no reason why the Pa-

cific Division cannot continue to enjoy its low aircraft accident record."

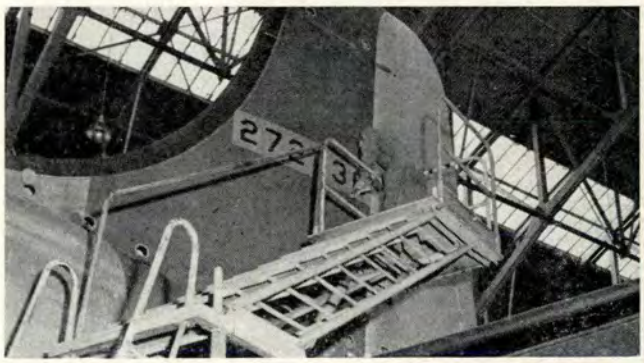
That is the safety concept as it was summed up for MATS Pacific Division personnel.

As the Airlift over the Pacific passed 100 tons per day, this was the way the operation was described by M/Sgt. William C. Hautz, who watched military transports and chartered airliners arrive and depart from McChord and Fairfield-Suisun:

That DC-4 taking off from McChord AFB is going 5,688 miles and in approximately 33 hours from now will set down on a field near Tokyo, Japan. That C-97 parked over there is scheduled to leave at 1500 hours via the Mid-Pacific route and will arrive at Kadena in approximately 38 hours after covering 6,772 miles. The C-74 that just landed has been en route from Japan via the Southern Route for the past 45 hours and has completed 8,083 miles.

Mechanics swarm over planes, performing last minute checks, insuring that the aircraft are in readiness for the long trip ahead. Pilots and crews are briefed in great detail on the weather that they will find along each stage of the trip. The prevalent thought in everyone's mind is Safety In Flight—check the weight and balance, check the emergency equipment, oxygen, fuel, oil, radios—check everything from pitot tube to rudder trim tab.

Fairfield-Suisun's bustling passenger terminal is crowded with men who are on their way "Over There";



scenes are reminiscent of days not too far gone. Short but concise briefings are given to passengers on the use of the Mae West and other survival equipment just prior to the departure.

"Operation Recess" is in full progress. This is the set-up where wives and children are taken care of by the Grey Ladies, after the long trip back to the States. Red Cross volunteers from nearby communities lend their help.

A huge tractor and van painted yellow with a large Red Cross meets the incoming planes to transfer the wounded evacuees from the combat areas. By placing five stretcher beds in three tiers on each side of the van, you accommodate 30 patients and eliminate the need for eight to twelve smaller ambulances which would be backing up to the airplanes and taking on patients, with the possibility of running into the plane and causing damage or hitting a pedestrian in the confusion. Further, the size of the tractor and van makes it much easier for pilots taxiing planes to see their way along the crowded ramps.

In Operations, the clatter of the teletypes continues around the clock relaying position reports of the planes en route. These reports are radioed in hourly from each plane and consist of position, amount of gas and oil remaining, weather and other pertinent information. This information is then plotted on the chart board where an operations officer can tell at a glance whether or not the plane is in danger of using too much gas and oil to reach its destination.

Pilots and crews awaiting "On Deck" calls from the operations officer of the 1704th air transport group spend their time making last minute checks of their survival equipment and planes, for the haul from Fairfield to Hickam is the longest overwater hop on any of the three routes. In the Air freight terminal, cargo is being stripped of excess weight.

At McChord, a new working ramp of macadam 1,000 feet by 1,600 feet is under construction and eight huge nose docks are being constructed to enable faster maintenance. Airmen mechanics of the 1705th Air Transport Wing work side by side with civilian mechanics and the mechanics of the Royal Canadian Air Force with their North Stars (C-54's with Rolls-Royce Merlin engines).

Col. Richard F. Bromiley, Commanding Officer of the 1705th Air Transport Wing and Commanding Officer of the Provisional North Pacific Wing, continually stresses and demands qualitative effort rather than quantitative effort. Precision and exactness on the part of all personnel are a must in order for this Wing to perform its mission. Experience in Arctic flying has shown that Flight Safety is continuous. It must be accomplished on the ground prior to the flight, in the air during the flight and on the ground after the flight.

Crews must get their rest after each flight and a minimum of 12 hours is spent in eating and sleeping after each flight. One crew will take a plane on the first leg of the trip, leave it with a fresh crew who will, in turn, leave it at the next leg with a new crew. MATS has not relaxed its restrictions. In order to be a plane commander, a minimum of 1500 hours must have been flown in that type of plane and a strict check-out must be passed.

In the MATS hangars all emergency rescue equipment is checked. Rafts and vests are actually inflated and each piece of equipment is individually gone over. If there is any doubt, the equipment is replaced or repaired. Passengers taking the northern route are equipped with individual exposure suits, in addition to other survival gear.

Replacements for combat troops are assembled at Pier 91, Seattle, where the MATS liaison officers, 1st Lieutenants J. T. Scott and L. E. Duncan, brief each planeload of troops, as a group, on the type of plane, the route the plane will take and above all the use of survival equipment that is on board the plane. A complete 10-man raft kit, exposure suit, Gibson Girl radio and Mae West jackets are on display and after the lecture the men are encouraged to examine them and ask questions until they know how to use them.

And then they get their gear together and file out to a waiting bus for the ride to the airbase where another airlift flight is almost ready to span the vast reaches of the Pacific—a flight that has been planned, readied and double checked to insure the maximum of flying safety for both the combat troop passengers and the aircrews, who are keenly aware of their responsibility for the safe delivery of America's fighting men "over there."

1st Lt. J. T. Scott gives overwater briefing to combat troops.

LETDOWN IN A HURRY

By CAPT. JOHN J. HERBERT, Jr.
57th Fighter-Interceptor Group
Elmendorf AFB, Alaska

The formation of sixteen F-80's broke out on top of the clouds at 34,000 feet. When they took off from Elmendorf AFB, Alaska, the ceiling had been 2,000 feet, with scattered showers, so the clear sky on top, by comparison, seemed bright and warm.

1st Lt. Eugene E. Schlueter, flying as a wingman, shifted to a more comfortable position after the tense watchfulness that he had maintained during the climb up through the murk. Everything was fine.

But those pleasant thoughts were fleeting. He realized he wasn't getting enough oxygen, checked the gage. Empty!

He hit the mike button and called Maj. William P. Benedict.

"Drop your dive boards, use 80 per cent, ride the Mach to 15,000," was Major Benedict's reply.

While Lieutenant Schlueter nosed down until he reached the maximum safe diving speed, the leader, knowing the flight's exact position, instantly gave him a heading to fly which would intercept the Anchorage Radio Range.

On the way down, Lieutenant Schlueter almost lost consciousness from lack of oxygen, and as his head cleared upon reaching heavier air he discovered that his gyro had tumbled. He recovered and set about tuning in the radio range but found his radio compass needle would not home on the station. He oriented himself with Major Benedict calling out bi-sectors and beam headings, then completed a letdown and landed.

The oxygen failure was caused by a leak in the system, and when the emergency occurred, the flight was over rugged terrain, 130 miles from Elmendorf. Alaskan pilots think twice before bailing out over remote, souped in mountains.

Here is how training as conducted by the 57th Fighter-Interceptor Group prevented an accident:

1. The flight leader knew his exact position and was able to give Lieutenant Schlueter headings which would avoid mountains.

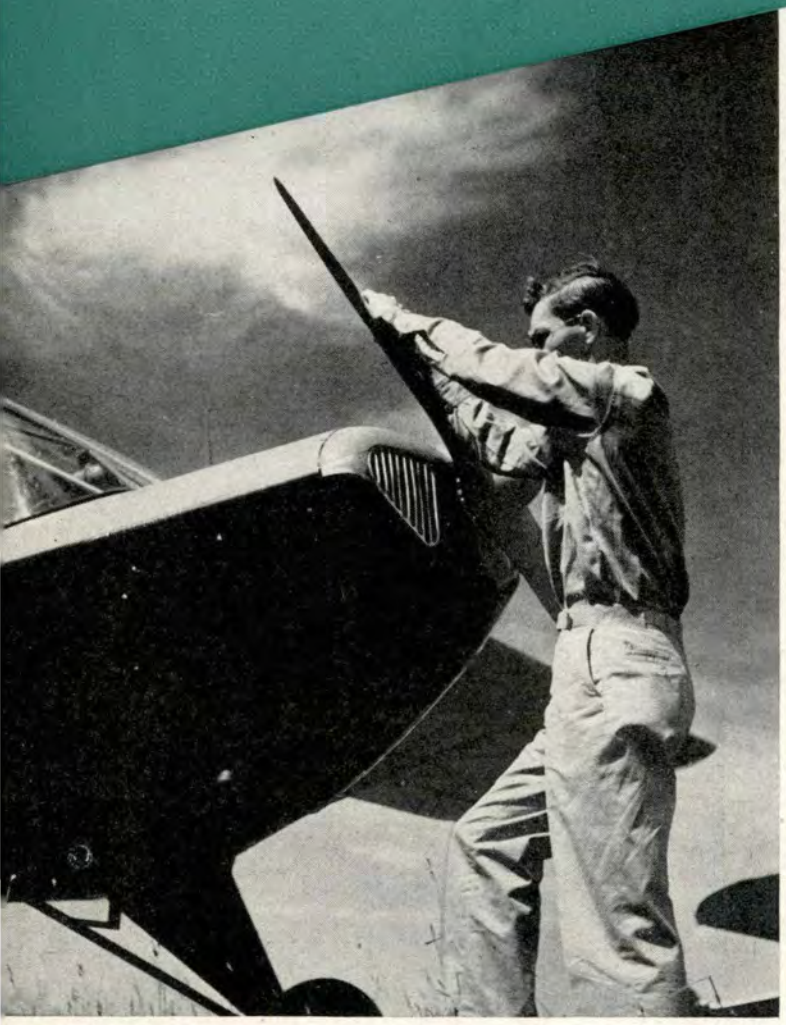
2. The pilot knew how to recover from an unusual position on basic instruments.

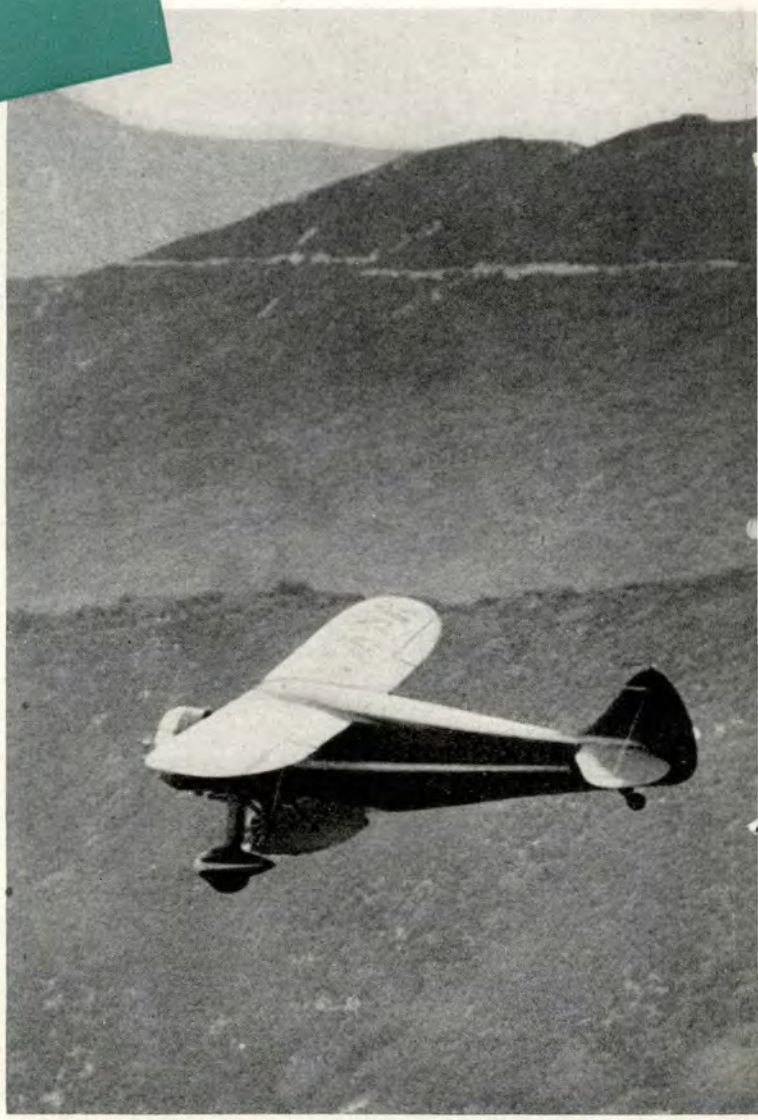
3. Radio discipline. All other pilots in the formation maintained silence so that Lieutenant Schlueter could receive and call back for verification of the letdown instructions.

Lt. Eugene E. Schlueter

Maj. William P. Benedict

SARCAP





To a central location they came from all parts of the the hamlets, communities and cities—with the engines of their planes buzzing, sputtering, roaring and humming. This was Operation Sarcap—Search and Rescue, Civil Air Patrol—and the pilots, the long, the short and the tall, each was looking forward to important training missions with the USAF's Air Rescue Service.

Although the Civil Air Patrol had carried out other training missions in the past, either alone or with the Air Rescue Service, SARCAP was the first big, over-all training program in which all ARS and CAP activities in the same locale would train under standard, full-scale air rescue operations. The big plan was search and rescue practice missions carried out by the CAP Wing in each state, the District of Columbia, Alaska, Hawaii and Puerto Rico.

Behind these missions is an organization almost literally composed of doctors, lawyers, Indian chiefs. Chartered by Congress in 1946, the Civil Air Patrol is made up of civil pilots, mechanics, radio operators, rescue parties, doctors and nurses, who work on a volunteer basis, and operate as an "Air Force" of some 170,000 members within the Air Force, with headquarters at Bolling Air Force Base, D. C.

CAP membership is entirely voluntary and falls into two main categories—senior members and cadets. The senior members are those 18 years of age or more, while the cadets are those up to 17 years of age, who make up the student groups within the wings and squadrons of the CAP.

Virtually all CAP aircraft are privately owned and maintained; there are no "pay days" for the pilots and other volunteers for the time away from their jobs, or for their planes, except the gas and oil used while on a mission.

During the past year, CAP pilots flew over 10,000 hours on special missions. Four CAP pilots were killed on search and rescue missions; and two others died on a mercy flight during the midwest blizzard in the winter of 48-49.

Through fast action, skill and initiative, the CAP has found many survivors of aircraft accidents who would have been lost otherwise.

PULLING

AN AIRCRAFT DESIGN ENGINEER ANSWERS QUESTIONS ABOUT HIGH SPEED FLIGHT

Pilots get into trouble when they exceed the structural limitations of jet aircraft.

To assist Air Force personnel in learning how to safely operate new jet planes, The Directorate of Flight Safety Research, USAF, with the cooperation of Headquarters, Air Materiel Command, arranged for representatives from the various aircraft manufacturing plants to present the problems of high speed flight as they apply to their particular product. These engineers visit bases throughout the Air Force, lecturing, demonstrating and answering questions. Among the most vital of the questions that arise among pilots are the following, answered for *Flying Safety* magazine by Mr. R. G. Bowman, Assistant Chief Engineer, Republic Aviation Corporation.

• *Do accelerometers in airplanes give a true reading for shock loads?*

I have found that many pilots are concerned with the gust loads which show on their accelerometer. The type of accelerometer used in airplanes does not read correctly for gust loads. The measurement of dynamic loads is quite a tricky procedure. If the instrument were designed to read shock load correctly, it would not give a true reading for the G's encountered in normal maneuvers, and, conversely, if the instrument reads correctly for normal maneuvers it would indicate too high for shock type of loads. The high G's recorded in rough landings prove the point that the accelerometer does not read correctly for gust loads. For gust and shock loads the instrument reads too high so that the actual loads are much less than indicated.

• *Does this mean that gusts are not important?*

Fighter airplanes need not be concerned with gusts as much as other types of airplanes because fighters are designed for loads much greater than those due to gusts. When maneuvers are performed in gusty weather, an allowance should be made for gusts which might increase the load factor. If the airplane limit load factor is 7.33, the pilot should not intend to exceed 5.0 G. An allowance of 2.3 G for additional loads due to gusts should be sufficient to prevent overloading of the airplane structure.

• *Can a jet airplane withstand the same G forces at any airspeed?*

The airplane can withstand the same G forces at any airspeed up to the limit Mach number. Beyond the number the stability of the airplane may become excessive and the loads required to produce maneuvers may exceed the strength of the tail.

• *Is it true that either a stall or compressibility, with subsequent loss of control, permits the airplane inadvertently to pull G forces in excess of allowable limits?*

I do not believe that it is fully correct to say that a stall permits the airplane inadvertently to pull G forces in excess of allowable limits. In general, if the airplane will stall before the wing will break, the maneuver is fairly safe. Accelerated stalls are sometimes followed by violent snap maneuvers, and the danger arises from the fact that the loss of control in an accelerated stall may put the airplane in a steep dive from which recovery may be difficult.

• *In the past, airplanes have been torn apart because of some inherent trick which caused it to pull more G's than the pilot intended. Some of these tricks have been center of gravity displacement, stick force reversals, tiptank troubles and tail stalls. It is up to design engineers to put out an airplane that does what the pilot wants it to and one that will not enter some violent maneuver of its own accord. But how does the pilot help in the solution of these problems?*

In discussing stability, I think we should make it clear that the airplane must not pull G's unless the pilot wants G and pulls on the stick. I have explained to pilots that an airplane is stable if the G's increase as the pull on the stick is increased. In addition to this idea, I have always explained the other thought which I believe equally important, which is, that the airplane will not produce G's unless the pilot starts it by pulling on the stick. Engineers can eliminate most causes of uncontrolled maneuvers, but all planes have limits of strength or speed which are reached under different conditions as a result of pilot manipulation of controls.

• *Upon hitting compressibility, do jets tend to pitch up or pitch down?*

Most present-day jets with straight wings tend to pitch up. I am not sufficiently conversant with all of the new jet airplanes to be sure that they pitch up. However, I believe that it is true that most of them pitch up. The severity of this pitch-up decreases with altitude. At higher altitudes it can be overcome with forward stick pressure, and the pilot who tries it at 30,000 feet might be lulled into a false sense of security. Below 10,000 feet, the pitch-up gets violent and can tear wings off.

Jet pilots have noticed that at

30,000 feet you can pull only four G's without getting a stall buffet or compressibility buffet. At lower altitudes, however, they can pull enough G's to damage the airplane without stalling or hitting compressibility.

While the pitch-up at altitude is not severe, it would be more appropriate to say that you have enough elevator control and that the stick forces are reasonable so that you can handle the pitch-up. In the event the airplane gets away from the pilot, it will stall before it will break the wings, thus giving the pilot another chance to regain control of the aircraft.

• *If you are sitting on the red line at any altitude and pull G's, will you hit compressibility?*

This subject of pulling G's when the airplane is at red line speed needs to be enlarged upon considerably. In answer to a previous question, we made the point that the compressibility effects are not very noticeable at altitude and that even if noticeable it is possible to control the airplane. This may cause a pilot to forget the danger. It is possible to pull G's safely starting at the red line

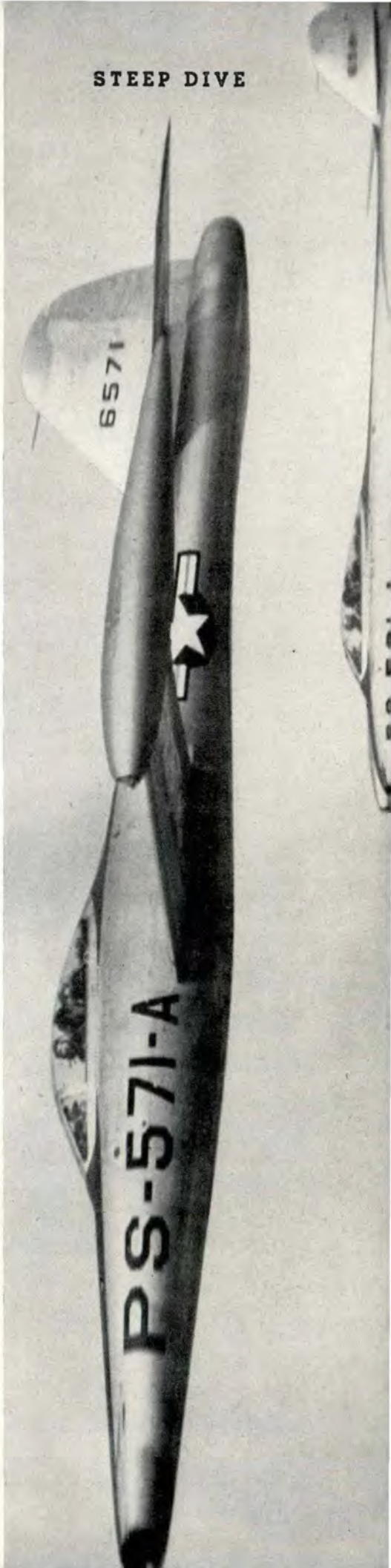
airspeed at any altitude provided the airplane is in a level flight attitude or in a shallow dive at the red line. This is another effect which can lead to that false sense of security. I have explained to pilots that it is perfectly safe to pull 7.33 G on F-84's, starting at red line airspeed and level flight. Whenever such a maneuver is entered from level flight or shallow dive attitude the airplane slows up as the G's are applied. By the time the load has built up to 7.33 G, the airplane has lost 35 - 50 mph. The airplane automatically loses airspeed as G's are applied and it does this fast enough to avoid compressibility effects.

The important consideration is the attitude of the airplane when it is at the red line airspeed. If the airplane is in a steep dive and has been gaining speed it will not slow down as the G's are applied. In this case the speed of the airplane is increasing while G's are being applied, and the addition of G loads is decreasing the limiting Mach number. This will cause the airplane to experience compressibility effects which may consist of a change in trim, a change in G forces, and a change in the effectiveness of the control. The point that must be emphasized is "steep dives at low altitude." Where the dive is so steep that the airplane will not slow down as G's are applied, it is impossible to maneuver starting at the red line airspeed without getting into trouble. Starting from red line airspeed in level flight at sea level, a pull-up is safe because the airplane slows down as G's are applied. The most dangerous condition is attempting a pull-up from a steep dive at low altitude.

• *What is a steep dive?*

The best definition that I have been able to develop is based upon the action of the airspeed needle and the red line airspeed needle. As an airplane descends in a dive, the indicated airspeed is increasing and the red line airspeed is increasing. If these two needles are increasing at the same rate, the airplane is in a shallow dive. In such a descent the distance between the airspeed and the red line speed will remain constant as both needles travel around the instrument. A steep dive is one in which the airspeed needle is getting closer to the red line as the airplane descends in altitude. If the dive is continued the airspeed will become equal to the red line speed

STEEP DIVE



and will exceed the red line airspeed. When the airspeed needle has been gaining on the red line it means that the descent is steep and if the pilot waits until the airspeed reaches the red line speed, it is too late to make a carefully controlled pull-out.

In such steep descents the pull-up should be started far enough from the red line so that the maximum G's are reached before the airspeed is closer than 40 mph to the red line. Extremely steep descents may be made if the airplane starts at an airspeed far below the red line and provided the pull-up is completed before the airspeed comes within 40 miles of the red line speed.

• *Is there danger of structural failure if the pilot suddenly releases pressure on the controls?*

In reply to this question, the elevator control is the only one which need be considered since it is the only control which develops high structural loads.

In general, the answer is "no." There is no danger of structural failure if the pilot suddenly releases pressure on the controls. This answer is valid for reasonable pressures on the controls such as 15 to 20 pounds. If the pilot is holding a force on the controls it must be because he is pulling G's or because he is flying at a speed other than the speed at which the airplane was trimmed. If the airplane is stable and the pilot has been holding a force to hold a a certain number of G's, releasing the pressure on the controls should cause the G's to decrease and the airplane should return to steady unaccelerated flight.

If pressure is required to hold the airplane at some airspeed in steady flight, the sudden release of this pressure will cause the airplane to pull G's in an attempt to return to the airspeed at which it was last trimmed. If the forces involved are moderate, the accelerations will be moderate. If the pilot has been holding a force of 15 pounds and the airplane has a stick force characteristic of five pounds per G, the sudden release of the pressure will produce an additional acceleration of 15 divided by five, or three G.

I believe it would be well to summarize the important points of high speed flight:

First, remember that red line airspeed means the highest MACH number at which stability and control of the airplane is normal. Beyond this speed the airplane may pull G's even though the pilot does not pull on the stick. Trim tabs are not effective and in some cases even the elevator control is not very effective.

Second, remember that experiments at altitude will not show compressibility effects in their true nature. They may exist in a much milder form which would lead the pilot to believe that he can handle the airplane beyond the red line. While this may be true at altitude, these effects are much more severe at low altitude and high indicated airspeeds, so that experiments at altitude do not mean that the airplane can be controlled at altitudes below 15,000 feet and particularly below 10,000 feet.

Third, at low altitude, pull-ups which are started at red line airspeed are safe only if they are entered from level flight or from a shallow dive, because the airplane slows up automatically as G's are applied. By the time the airplane reaches 7.33 G, the speed has decreased far enough to avoid compressibility effects.

Fourth, a steep nose-down attitude at or near the red line at low altitude is very different from a level flight attitude at or near the red line. The difference is due to the fact that in a steep attitude the speed does not decrease as the pilot pulls G's. This makes all the difference in the world because it means that the stability or control of the airplane will change before the pilot can pull out, and that this change will occur when the airplane is approaching the ground rapidly.

And, fifth, all airplanes do not behave in the same fashion when compressibility effects are encountered. Since these effects are most dangerous at low altitude, every pilot should be familiar with the compressibility effects on the particular type of airplane he is flying. The airplane will be approaching the ground so rapidly that there will be no time to experiment. The pilot should be forewarned to avoid such attitudes and airspeeds, and in the event that he finds himself in such a situation he must be familiar with the best procedure for safe recovery.

HOW TO FLY A *Search Mission*

By CAPT. HAL J. BASHAM

Flight "B" 1st Rescue Squadron ARS
Albrook Air Force Base, Canal Zone

To the men on the raft the world was rolling and endless water, alive with hissing white wave crests that constantly sloshed over their wet bodies. Above the tossing water, slate-gray clouds scudded ahead of a damp south wind that gave endless motion to the world they had known for nearly three days.

One of the men raised his head and turned slightly in a listening attitude. Another plane! Instantly the others in the crowded raft stirred, fighting up out of the stupor that was like a heavy drug on them all. All eyes scanned the horizon. The man holding the Gibson Girl between his knees began cranking frantically.

"There it is!" one man shouted, pointing low on the horizon to the east. While the nine men watched, a B-17 droned past less than two miles away and finally disappeared from sight. It was the sixth time in two days they had seen a plane pass them by. But before they could settle into their bitter hopelessness once more, they heard the sound again.

"He's coming back!" A watcher pointed excitedly. The B-17 had made a turn and was flying back in the other direction. This time it would pass almost overhead. Dye marker was tossed overboard. Shirts were hoisted on the metal oars. One man clutched a signal mirror and cursed bitterly because the sun was hidden by the leaden clouds. Hardly breathing, the men watched the approach of the B-17. It was low. Not more than 700 feet high. Sometimes a wave momentarily hid the plane from view as the raft dropped into a trough. It would pass less than a quarter mile to the east this time. The plane was nearly even with them. Now it was even with them. It passed. The right wing dipped abruptly and the B-17 swung toward them, banking tightly. It circled the raft once and roared down over the heads of the frantically waving men. The big yellow bands that marked the plane an Air Rescue Service SB-17 stood out plainly against the gray sky. Then it went back up a few hundred feet and began circling round and around the raft. The bearded, water-logged airmen knew they were saved.

Hours later a Canadian destroyer guided by the circling SB-17 and other planes that had joined over the raft picked up the men and also their nine buddies in another raft. Another search mission was completed.

Behind this story there is a greater story. The story of the Air Rescue Service and the men who train day by day in the art of finding and saving those who go down in the sea and in the deserts and in the jungles. This web of airmen trained to save those who are lost is spread over the entire world where American military planes fly.

But it is a thin web and one that must be reinforced by planes and crews from other organizations whenever an unusually large-scale search is on.

If you are a crew member of an Air Force plane, sooner or later you may be called upon to fly a search mission. Or the man in the next bunk may be called on to search for you!

There is a lot more to flying a successful search mission than just climbing aboard your plane and flying it over a designated area of land or water. The crews in the first five planes that passed by the men in the raft described above didn't fail to see the raft because they were not looking. They failed to spot it because they were not *seeing*.

The past year *Flying Safety* has carried various "survival" articles covering the subject of attracting a search plane if you are down in distress. Now we are dealing with the problem of the men in the air doing the looking. There is a difference between flying over a search area and looking at it and flying over a search area and *seeing* the ground or water you are covering.

The difference is this: You can *look* at a wide area of land or water from the windows of your plane. But you can actually *see* only one very small section of that area at a time. By *seeing* it we mean seeing what is in it. Everything that is in it. It is looking at only this very small area you can actually *see* that will spell the difference between life and death for those who are down.

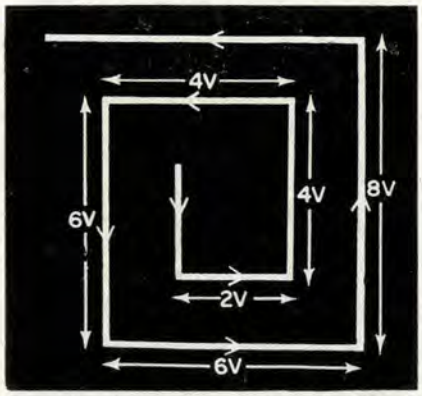
Of course, different size and color objects can be seen at varying distances. From its years of experience in searching for people who have gone down at sea and in various types of terrain, Air Rescue Service has acquired an exceptional knowledge of the best searching technique. Several different search patterns, each appropriate to a different type of search, have been set up.

Distances at which various objects can be readily seen have been established. Because you may be searching for your own friends or they may be searching for you tomorrow or next week or next year, it is to your advantage to know all you can about flying a search mission.

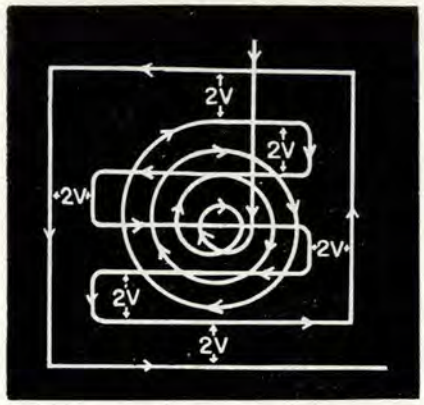
When you are called upon to fly a search mission you will be operating under a "controller" of Air Rescue Service, a trained officer whose function will be to tell you where to search, and what type pattern to fly, how far and how high to fly and how far apart to space the legs of your pattern. *Seeing* all the area over which you fly will be up to you.

Standard search patterns include the expanding square, the creeping line, expanding rectangle, combined parallel and expanding square and the contour search. Each of these patterns is best for a specific type of search.

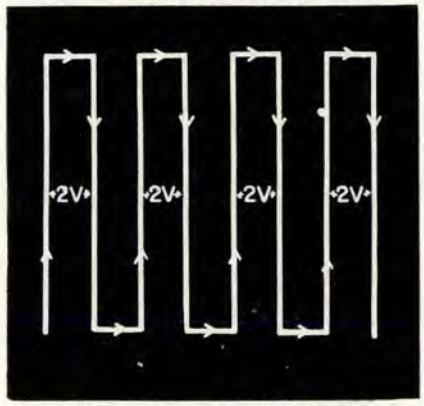
These five basic search patterns may be modified to fit any given situation, but they provide the basis for practically all extensive search missions. They permit maximum coverage of a given area with the available aircraft.



Expanding Square Search (above). V indicates distance of visibility.

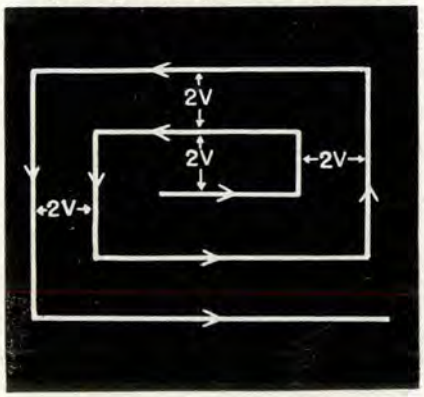


Combined parallel Expanding Square.



Creeping Line Search (above).

Expanding Rectangle Search (below).



The size and shape of any search pattern will depend largely upon two things, the object being sought and the visibility. A table of average distances at which objects may be seen from a searching aircraft has been set up by Air Rescue Service to serve as a guide.

Table of Average Distances

OBJECT	DISTANCE
Man in a Mae West (in calm sea)	one-half mile
Man in small liferaft (in calm sea)	three-fourths mile
Crash in wooded area	one-half mile
Man in wooded area	one-half mile
Crash in desert or open plain	two miles
Man in desert or open plain	one mile or less

If these distances seem small to you, remember that even these short distances are *maximum* distances at which you may expect to find these objects from a plane. You could fly right past a man in a Mae West, for instance, at much less than one-half mile without seeing him unless you were *seeing* your search area and not just looking over it.

Visibility is the determining factor in the distance separating search legs of a pattern. This means not only the visibility in terms of weather, but the degree of contrast which you may expect between the object of your search and the surrounding terrain or water. The position of the sun is of primary importance. An object you could sight a mile away with your back to the sun might be invisible to you less than one-fourth mile away if you were facing the sun. There is the natural desire not to look toward the sun which must be overcome when you are searching. When the visibility is less in one direction than another, the pilot must adjust the legs of his pattern to compensate for this difference and cover all the area thoroughly.

The speed and altitude at which you fly a search mission will depend upon your type of aircraft and the object for which you are searching. The slower you fly the longer you can stay aloft and the better your scanners will be able to cover the area. If you are searching for a large object such as a ship you may fly as high as 2000 feet day or night. If you are searching for a man in the desert, you will probably be instructed to fly at 500 to 700 feet. This is the most practical altitude

for most searches. At night you will fly at higher altitudes (usually 1500 feet) both for safety's sake and because you can see lights at night just as well from a higher altitude. Night searching is particularly effective over water because of the limited number of lights to be seen.

The more eyes you have covering the search area the better chance you will have of finding the people or crash. Utilize as many scanners as practicable. It is very important to have the scanners exchange positions frequently. This will reduce fatigue and help keep them alert.

The closest possible cooperation not only between scanners and pilot, but among the entire crew is of utmost importance. Each crewmember must report to the pilot every single thing he sees that could possibly be the object of the search. The rule to follow is "when in doubt, check it." If you consider that it might be you clinging to a bit of wreckage, you will never pass by any suspicious object without checking it.

The importance of *seeing* the area, that is covering everything in it as minutely as possible, cannot be overemphasized. The one instant you relax and gaze off toward the horizon instead of giving your full attention to the small area you should be covering, might be the instant you pass over the man you are trying to find. Let the horizon take care of itself. You will be over that way on the next leg of your flight, so devote your full attention to the one-half mile or mile-wide strip of area which you should be covering.

Because his attention is frequently required by other things than looking at the ground, the pilot is largely dependent upon his scanners throughout the plane to find the object of the search. Scanners should be in the nose, in the tail and on all possible side blisters and windows. A number of wrecks have been spotted by the man in the tail after the plane had flown directly over the spot.

The radio compass should be kept tuned to 500 KC throughout the search mission. The frequency should be monitored by one man on board at all times. If a radio transmission is picked up a flick of the switch will give you at least an approximate bearing to the man in distress. If an IFF interrogator or VHF homing adapter is installed they should be guarded always, for they, too, can be used to home on transmission.

When the object of the search is spotted, especialy if it is a raft or man in the water, someone in the plane must have his eyes on it at all times. When the pilot first starts to establish his circle over a raft he should instruct the copilot to help hold the proper altitude and airspeed and watch all instruments as the pilot will not dare take his eyes off the object until he has established a proper circle above it. It is very easy for everyone on board to lose sight of a man or small raft in the water from an altitude of 500 feet, especially if the water is rough. Steps should be taken immediately to mark the spot with a smoke bomb, dye marker or anything else available. As a matter of information, smoked rose flying glasses greatly enhance a person's ability to see sea marker dye in the water.

A plane spotting the object of a search should never leave it until other planes are overhead and have it in sight or people on the surface reach it. The exact position should of course be relayed to the search controller, immediately. If possible, do not rely entirely on dead reckoning for this position report. Make every attempt to supplement it with a DF bearing, radar or radio bearing or fix. A single radar or radio bearing will be of assistance to the controller in establishing your position.

Radioman, navigator are too busy to be used as scanners. Scanners should change positions often. Below pre-search briefing.

CROSS FEED

FLYING SAFETY IDEA EXCHANGE

PILOT'S COMMENT CARD

This month, pilots will again have the opportunity of evaluating the weather service received at Air Force bases in the ZI.

The 2059th Air Weather Wing has devised a Pilot's Comment Card which enables pilots to make an appraisal of weather service rendered at departure and arrival stations.

The Pilot's Comment Card Program is an attempt to obtain an objective evaluation of weather service rendered. The logical persons to make the necessary ratings are the pilots who use the service.

Distribution of these cards will be made to all weather stations and flight operations sections. Upon closing of the flight plan in base operations or after de-briefing in the weather station, the pilot will be given a comment card to fill out. By entering check marks in the appropriate spaces provided on the card, the pilot can rate the promptness of the weather briefing and the accuracy of reported terminal conditions and forecasts.

Since ratings are made only on a "satisfactory" or "unsatisfactory" basis, suggestions, explanation of entries and pertinent comments should be added.

Comments made by pilots throughout the United States will provide a wealth of information concerning the operational effectiveness of the Air Weather Service and, in pointing out discrepancies, will enable weather personnel to make substantial improvement in the quality of the service.

If each pilot will contribute a few seconds of his time after each flight in completing one of these cards, the groundwork will be laid for a more efficient weather service—safer and more economical flying.

Col. H. L. Smith, C.O.,
2059th Air Weather Wing
Tinker, AFB

BOTTLENECK

Frequently, pilots arrive in metropolitan areas on instruments and, due to a lack of knowledge and information, become an air traffic bottleneck, a hazard and a nuisance to other planes and pilots. Confusion reigns, except when pilots have familiarized themselves with the area prior to their arrival.

During instrument weather, far too many pilots are entering the Washington control zone with little or no knowledge of the position and identification of the various fixes and holding patterns, or what to expect from ATC or Approach Control. Due to the tremendous amount of traffic handled in this area and other metropolitan traffic centers during inclement weather, Approach Control does not have the time to explain to every pilot the location of each radio range, holding pattern, and intersection. Therefore, review your proposed in-bound route prior to receiving your holding and approach instructions and be familiar with the ranges, holding patterns and fixes you may be directed to use.

Good advice from the Washington Air Route Traffic Control Center is to arrive with a substantial reserve of gas and be prepared to hold several hours when traffic is heavy. It is interesting to note that there are approximately 25 standard and non-standard holding patterns used by Washington ATC to control traffic prior to final approach clearance.

Some pilots are reluctant to spend their time holding, prior to an instrument approach because of poor visibility. Consequently, they sashay on in, feeling their way along visually and definitely creating a hazard to all other traffic making normal instrument approaches. If there is any doubt as to the possibility of maintaining VFR flight, proceed in on an instrument flight plan and cancel only when you are absolutely sure of making the airport visually.

Air traffic in and around Washington, D. C., is now listed as the heaviest in the country, with over 81,000 air fixes posted by ARTC during one month, and over 35,000 landings and takeoffs made at the four major airfields located within a ten-mile-radius of Bolling AFB and all controlled by Washington ARTC during instrument weather.

Only too frequently have flights carrying high ranking military officers been delayed in landing due to military pilots becoming lost, not making required automatic radio reports rapidly and concisely, or not adhering closely to approach control instructions. Since much of the traffic will be using the same radio frequencies, all pilots can help alleviate the radio congestion by strict radio discipline and by making reports short and to the point.

Detailed information pertaining to the Washington, D. C., metropolitan area can be found in the Radio Facility Chart (08-15-1). Therefore, by careful pre-planning and study, an instrument flight to Washington, D. C., can be routine and uneventful.

1st Lt. Jack E. Umbaugh, USAF

CHECK BEFORE STARTING

Two recent aircraft accidents caused by movement of aircraft before obstructions had been cleared from the immediate area have resulted in Air Rescue Service's changing the last item in the pilot's check-off list from "Before Starting Engines Procedure" to "Aircraft Clear of Obstructions, All Clear."

Emphasis was made that it is the pilot's direct responsibility not to move aircraft or start engines unless he is positive that the area surrounding the aircraft is clear. Any accident resulting from not doing so will cast serious doubt as to the judgment and foresight exercised by the pilot.

WINDSTORMS

When a hurricane advances in the area of an air base, there is feverish activity. Planes are flown to distant fields or sheltered in hangars. Every precaution is taken to avoid damage and storm warnings assure that no aircraft need be left unprotected. There is another kind of windstorm, however, which no one can forecast.

The high-powered military airplane is a potential windstorm menace around light planes, and propeller-driven, multi-engine planes are especially capable of developing prop wash heavy enough to do damage. Pilots are taught, when they first learn to fly, to be careful with this prop-blast. But after they have been used to operating around heavy aircraft they often forget about the danger when they land at a civilian or military field where light planes are parked.

Likewise, operators of liaison and other light planes should be careful all the time not to taxi into the path of a large airplane when its props are turning over. Also, it is hazardous to park a light plane within the blast area of a powerful engine when its propeller is not ticking over. Someone may come out and start it up without checking to see if a plane is parked to the rear.

Preventing such prop blast hazards is mostly a matter of courtesy. Not to show consideration for the other fellow exhibits complete indifference to rules of safety.

Convair has installed prop wash breakers at its Fort Worth plant to protect other aircraft operating on Carswell AFB.

Velocity of the prop wash from a B-36, when it hits these deflectors, is approximately 60 to 70 miles an hour. (Flying speed for most light planes.) It is several hundred feet from the B-36 run-up area to a runway, however, so that by the time the prop wash reached the runway it would be traveling at only 20 to 25 miles an hour even without the deflectors. This side wind would not be much of a problem for a B-36 landing or taking off, but it might cause accidents to light airplanes, particularly if the pilots were unaware of the crosswind coming from the B-36 ramp.

Accordingly, Convair installed six deflectors, each 160 feet long and 18 feet high, built of two by six timbers. A deflector is set approximately 300 feet behind each B-36 that has its tail pointing towards the runways of Carswell AFB.

DON'T GO DEAF, USE HF

The Airways and Air Communications Service (AACS) which operates most of the navigational aids and communications facilities used by military aircraft within the Continental United States and overseas is sharing with all of you the problem of congestions on communications frequencies in the VHF (Very High Frequency) band.

Since the number of VHF channels is limited to eight in many aircraft and four channels in many more, the only immediate solution is to get some of the traffic off the VHF frequencies and on to the high and low frequencies. Many of our aircraft are equipped with facilities to communicate adequately on the frequencies and most of the ground stations, including GCA and towers, are equipped to communicate on high and low frequencies. It is thought that the reason more communications are not conducted on these frequencies is because pilots are not familiar with the operation of the equipment available to them. It can be just as simple to use these high frequencies as it is to use the VHF channels and certainly you will find them less congested and, in many cases, more capable of handling your needs.

The liaison transmitter, ART-13, is capable of transmitting on ten different frequencies merely by turning the control switch either at the set or the remote switch in the pilot's cockpit. Tuning the liaison receiver is not always possible from the pilot's position, but can be done by the copilot or radio operator at the set.

In many aircraft a low frequency receiver (200 to 400 kcs) is available at the pilot's position. All AACS towers transmit on a low frequency. In some aircraft receiving equipment is available in the cockpit for reception on high frequencies. All GCA units transmit on high frequencies. It is especially important that increased use of high and low frequencies be made in congested flying areas such as Washington, New York, Chicago, San Francisco, etc. By using these frequencies you will help yourself, other pilots and AACS to increase flying safety through better communications. You will save time and find it possible to communicate at greater distances with less trouble. You will find it unnecessary to try to out-shout the other fellow. You will receive clearances and instructions more promptly and when you do want to use VHF you will be able to do so.

Your local AACS organization is eager to help you get re-acquainted with the use of low and high frequencies in air/ground communications. Remember these points:

a. Know your HF and LF equipment and how it operates.

b. Consult TO 08-15-1, Radio facility Charts, for those ground stations operating on LF and HF.

c. Go to your local AACS station for communications information. Remember "Don't Go Deaf, Use HF."

—Headquarters, Airways and Air Communications Service.

KEEPING CURRENT

AUTOMATIC SOS—A new device that will send distress signals automatically from a plane in flight when an emergency exists has been developed for the USAF. When turned on by a crewman, the instrument switches to an emergency frequency and signals SOS three times, gives the aircraft's call sign, then sends a series of four-second dashes spaced one second apart. The whole sequence is repeated until the device is turned off.

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'COPTER ANTI-ICING—A prototype anti-icing system for the H-5 helicopter has been developed by engineers of the AMC propeller laboratory and the Sikorsky Aircraft Company. The system works on a heated air principle in that a heater, attached to the 'copter, provides a stream of hot air that is conveyed to the rotor blades. Mounted on the side of the aircraft at the base of the cabin, the heater is the same type as used with the C-119 and C-124 and can turn out 200,000 BTU's an hour. The system consists of a blower, flexible asbestos-glass ducting, a collector ring, and ducting to the rotor blades.

TESTS FOR BIGGEST PROP—Designed by Curtiss-Wright engineers, the world's largest and most powerful aircraft propeller—an eight-bladed giant over 19 feet in diameter—is being tested by AMC. Called the "Octoprop" because of its streamlined resemblance to an octopus, the new propeller is a flight model designed for use with a gas-turbine engine of 10,000 to 15,000 hp. A dual-rotation type, the "Octoprop" has two rows of four blades each whirling in opposite directions on a specially-geared shaft which has a rated thrust far in excess of the force required to lift a DC-6 type transport off the ground with maximum load.

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PACIFIC LIFT—While Operation Vittles, the supplying of Berlin by air, averaged 242,000 plane miles a day, the Pacific Lift rushing vital cargo and personnel to Korea averaged 252,000 plane miles per day during September.

NEW TURBOSUPERCHARGER—Making possible great fuel savings a new turbosupercharger has been developed by General Electric which will enable piston-powered airliners to fly non-stop from Chicago to London with heavy payloads, officials have announced. Designated the CHg, the new turbo is small and powerful supplying the engine with the highest airflow—350 pounds a minute—and under greater pressure than any turbo yet developed, GE engineers said.

SAFETY SEATS—High-strength aircraft seats which face aft to provide extra safety for passengers, are being installed in MATS aircraft. Designed by AMC after studies showed that humans riding backward can withstand greater shock, the seat has three times the strength of present installations. The new seat is also lighter and has foam-rubber arm rests and cushions. Wool fabric has been replaced by a waterproof material.

NEW GYRO IN PRODUCTION—Latest word from AMC's Equipment Laboratory is that a new type J-8 attitude indicator is in production. The J-8 has the standard horizon bar presentation similar to the A-1, the main difference between the two being the incorporation of a manual caging feature on the J-8. The gyro requires approximately 30 seconds to come up to speed and the pilot merely has to cage the gyro manually, erecting it, and is ready for takeoff.

TELEVISION TESTING—Flight testing by TV will become a definite reality as soon as experimental remote control systems are perfected. The X planes of the future will still undergo the same rigid tests, but the television camera is expected to replace the pilot by recording the instrument findings. Radio waves from the ground will control the loops and dives of the supersonic aricraft. At present, both Air Force and civilian engineers are working to improve presently used television for this purpose.

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TRAINING SITE MOVED—The desert survival training phase for land and pararescue teams has been changed from Texas to Indio, California. Formerly conducted in the West Texas-New Mexico desert near Biggs AFB, arrangements have been made with the Air Rescue Service squadron at March AFB to furnish support for the teams while at Indio. Jungle and water training will continue in Florida, with the mountain and arctic phase in the Rocky Mountains.

WELL, TWEET, TWEET—After visiting a British Aircraft Constructors show in London, a Christian Science Monitor correspondent sent a report like this to his aviation editor: ". . . The DeHavilland Comet is a sweet-looking craft. It's so beautiful the other jets whistle as she sails by . . ."

A regular "blow torch," what?

SAFETY RECORD—As reported by the Flight Safety Foundation, in the four years 1946-1949 all but one out of every 100,000 passengers traveling U. S. scheduled airlines were carried safely. It is estimated that 23 per cent of all passenger fatalities in these four years resulted from the passenger's inability to escape the fire which followed after a crash, while another 13 per cent were lost as a result of fire in flight. Both of these fire problems are under continued study by the CAA, NACA and other agencies.

B-45's SET RECORD—Four North American B-45 jet bombers recently set new Air Force records with flights across the Pacific and continental United States. Three B-45's flew what is believed to be the first group jet bomber flight across the Pacific to Hawaii. The jet bombers landed at Hickam Field, after a flight from an undesignated U. S. field, at "exceedingly high speeds." Another B-45 streaked non-stop from March AFB, California, to Langley AFB, Virginia, in four hours and six minutes, setting a record for a flight between these two points with an average speed of 569 miles per hour.

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BRITISH TRAINER—A British training plane will fly against United States-produced models in trials extending over several months in a bid for adoption as a USAF and Navy trainer. The plane is the Boulton Paul Balliol Advanced Trainer, a two-seater, with instructor and pupil sitting side by side. Powered by a 1280-hp. Rolls-Royce Merlin in-line engine, it has a top speed of 305 mph.

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TAKES ALL KINDS—After the survivors of an Air Force B-50 crash had been successfully evacuated from the wilds of Labrador, one of them marveled over the various types of transportation he had experienced: ". . . I took off in a bomber, landed in a parachute, walked through the wilderness, flew to a lake in a helicopter, rode by life-raft to an amphibian and ended up in an ambulance going to a hospital."

CAP IN CIVIL DEFENSE—In order to help state directors of civil defense planning, the Civil Air Patrol is planning to make their resources available for civil defense missions throughout the nation. The specific plan for coordinating CAP civil defense operations with the nation's over-all defense plan has not been completed, but regardless of the status of civil defense in any state, the existing CAP facilities are available for any emergency.

RESCUES IN KOREA—Utilizing SB-29's, SB-17's and H-5 helicopters, the 3rd Air Rescue Squadron attached to the Fifth Air Force to cover the Korean Air War, has racked up over 1200 missions in rescuing 137 American airmen. Also, 258 critically wounded UN personnel were evacuated from front-line battle positions via helicopters. In addition, the 3rd ARS intercepted and escorted 22 distressed aircraft returning from missions with battle damage or low on fuel.

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STALL TECHNIQUE — Renewing emphasis on the proper technique for bringing airplanes out of stalls, CAA has conducted a tour in seven mid-western states with a specially-equipped plane to show hundreds of pilots the better methods of recovery from stalls. Principal difference in the technique is that the plane is not dived sharply to recover from a stall, but flown with the nose on the horizon. The result is a slower recovery from the stall, but the loss in altitude is less by about two-thirds. The special features of the test plane are instruments that show the difference in stall recovery techniques.

USE YOUR DINGHY—During a recent Flight Safety survey, it was noted that some fighter pilots were not using the C-2 emergency one-man life raft in their over-water missions. It was determined that the lack of use of this dinghy was predicated on a misunderstanding of the results to the human body in cases where the ejection seat would be fired.

In answer to an inquiry made by Flight Safety Research, the Aero-Medical Laboratory reported that the use of a seat type parachute or a one-man life raft in the pan of the ejection seat will cause no harmful effects or injuries to the vertebral column if the ejection seat is fired. The cushioning effect of a life raft will not raise the peak loads of the applied "G" forces to levels which are considered dangerous.

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BAILOUT TRAINER—Working on the theory that flying is here to stay, the U. S. Navy has set up realistic training programs for practice bailouts on the ground. A plane is tied down with the tail elevated to flight position. Utilizing the slipstream of the plane's own propeller, the student dives into nets alongside the airplane. Besides reducing the time it takes to clear the cockpit, the student learns correct techniques and what not to do in bailing out.

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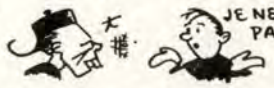
'CHUTING LANDINGS — The new Lockheed F-94C is the first jet fighter plane to have an installation of a landing parachute as standard equipment. Production airplanes will be equipped with a sixteen-foot 'chute which will cut landing distances in half. Landing F-94C's can use their parachutes and then taxi with them extended. The jet blast keeps them open and out of the way. The landing parachutes can be repacked in five minutes. Other characteristics of the fighter is its ability to cruise at slow flight speeds, and the emergency power which permits a takeoff, after touch-down, and roll, using the afterburner power.

SURVIVAL PRIORITY—At the USAF Rescue and Survival Conference members arranged seventeen different classes of component items in a priority list for a survival kit for the arctic winter. Tabulation showed the following priorities: shelter and sleeping, body protection, fire starting, identification, food, medical aid kit, tools, food procurement, instruction manual, sun goggles and ointment, water and its procurement, protection against insects, travel aids, cooking equipment, sewing and repair, sanitation, miscellaneous.



SPEECH INTELLIGIBILITY—Civil Aeronautics Administration's Psychology Branch is currently conducting a study on speech intelligibility to determine the most commonly used words in the English language that are used in every-day give-and-take between tower and pilots.

Wartime investigations in this field showed that some words such as woodpecker, dynamite, cornfield and highway are very intelligible, while on the other hand words such as food, rings, nine and dry were easily garbled, and confusion and unnecessary repeats were necessary.

The International Civil Aviation Organization recently requested that the United States recommend a standard English vocabulary for use in world airways indicating that the nations of the world realize that the present system has room for improvement.

DIVING TYPE HELMETS SEEN — Take it from the Navy's Aero Medical Acceleration Laboratory, it is not unlikely that the near future will see the development of a single-piece headgear which will entirely enclose the head of a pilot. Lab officials envision this type of helmet will be an extension of the present helmet-visor combination with room to accommodate an oxygen mask of minimal size and weight. Navy flight surgeons have stressed the need for combining the helmet with other related equipment such as goggles, oxygen masks and communication units.

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PARACHUTE HARNESSES—Pending the availability of new nylon replacement harnesses for parachutes, AMC has extended the service life of the present cotton harnesses past the limit of seven and three-quarters years. Meanwhile, AMC has directed that extreme care will be taken during periodic inspections, but if any doubt exists as to the serviceability of a parachute harness assembly, it should be condemned and eliminated.

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FUEL PUMP SHORTAGE—Due to a critical shortage of emergency fuel pumps used in the F-80A and F-80B, all pilots have been requested positively to turn off the emergency fuel pump when flying over 5,000 feet altitude unless fuel system trouble is encountered. By observing this usage limitation pilots can lengthen the service life of these emergency pumps.

T-6 "TERROR" — Commenting on the USAF in action over Korea, several captured North Korean Reds have said that the T-6, used as an air control spotter, is the most dreaded combat aircraft. When they saw the T-6 circling over their positions, they knew they would be strafed by fighter planes within a few minutes.

SCOUTS VISIT WITH USAF — Continental Air Command has launched a new cooperative program with the Boy Scouts of America, and by which over 6,000 Explorer Scouts, 14 to 18 years of age, spent one to two weeks at Air Force bases during the past summer. They received instruction in the latest developments in aviation, meteorology, communications and maintenance.

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BRIEFLY NOTED—Britain's latest jet interceptor is the Hawker P-1081. Armament is four 20-mm. cannon. Span is 31 feet and length 37 feet 4 inches . . . The RAF is putting lead weights into the nose of the DeHavilland Vampires to get them down without "skimming." According to the British, a Vampire recently glided 160 miles when its turbojet cut out at 30,000 feet . . . The Lockheed P2V-4 is the world's first plane to fly with the combination piston-turbine engines . . . Douglas is ready to offer the Super DC-3 in several versions. One possible military version is equipped with reversible props, tail parachute and jet assist, and could serve as an evacuation and rescue plane for short field operation . . . A modified version of the Fairchild T-31 trainer is undergoing new evaluation testing at Randolph AFB. The new trainer is the first primary basic-training craft built to meet present-day military requirements, and will give the cadet his primary and basic flight training in one type aircraft. Its design places the controls and instruments in easily accessible positions, carefully worked out for manual efficiency.

EJECTION SEAT TRAINER—A 100-foot ejection tower designed to acquaint pilots with methods of firing themselves out of fast moving jet planes at a speed which will overcome the danger of their being hit by the tail surfaces has been built and installed at Williams Air Force Base, Chandler, Arizona. The pilots are shot up the tower by a shell of approximately 37mm. bore. They attain a speed of 40 mph in the first five feet. The shell will send pilot and seat an average of 50 to 60 feet up the tower; the additional 40 feet is for safety.

The tower covers a 45 by 74-foot area and is said to be the first of its height with variable angle of ejection. Its bottom rests on a sled which can be moved back and forth to vary the angle. A motor-driven windlass retrieves the seat and its occupant once they are shot up the tower and held there by a braking action. A ladder for emergency use extends the entire height of the tower.

LAST PASS FOR BLUE TWO

Lieutenant Williams was flying number 2 in Blue Flight on an aerial gunnery mission and he was having a good day, too. Carefully he established his curve of pursuit and set the pip on the target.

"Looks like another good pass," he thought. "Easy does it now, that's it right there. Little low, maybe, but otherwise OK."

He raised the nose just a hair, squeezed the trigger, and smiled with satisfaction as he watched the tracers arcing toward the target.

Just as he was about to release the trigger and break off, the target jumped back at him.

"What the—" He slammed the stick forward and kicked rudder, but it was too late. Suddenly everything went black.

Next morning the coffee shop was doing its usual rushing business. Possibly the place was a little more subdued than normal, but that was about all.

"Hey, Pete, if you are going to finish that coffee, you better shake it up, we have that meeting in five minutes, you know."

"Yeah, that's right. I wonder what the colonel is going to talk about."

"Probably about Shorty Williams running into the target yesterday. Sure was a rough deal."

"Sure was. Did you see it?"

"No. I was out on the ground gunnery range. Mac said, though, that the target came off right in his face—didn't have a chance of missing it."

"Mac says if you're going to be a fighter pilot, you got to take chances like that. You can't live forever."

"That's not the way I see it."

"Me, either. Well, let's go see what the old man has to say about it."

Colonel Jordan, the group commander, waited until the shuffling of feet and scraping of chairs had quieted.

"I have called this meeting," he said, "not only because of yesterday's accident, but also because the frequency of this type of accident is increasing.

"There have been three target collisions at this base in the past two months. Air Force-wide, 61 aircraft have collided with tow targets or cables in the past six months. In 35 cases the target was shot off and in 26 cases, the target was not shot off. Four other accidents resulted from bullets striking the tow ship.

"In yesterday's accident, why Lieutenant Williams did not get out has not yet been determined. Possibly he was stunned by the collision, or maybe he never gave up trying to regain control of his plane. But that is another subject. Today we are concerned with why he struck the target and how it could have been avoided.

"First, let's take up this business of shooting the targets off. The most frequent cause is firing at too low an angle-off. Now I know that most of you have thought that establishing 15° as the minimum angle-off was to keep bullets from striking the tow ship. True enough, it does do that, but it also lessens the chances of shooting the target off. All of our targets are equipped with a double cable or safety cable for the first hundred feet ahead of the target. This means that if you fired at 90°—which you don't, of course—you would have to miss the target by more than a hundred feet before you hit the cable ahead of the safety cable.

"As your angle-off decreases, this margin for error or effective safety factor decreases accordingly. For you mathematicians in the crowd, it is the projection of the safety cable perpendicular to your line of fire and is equal to the sine of the angle-off times 100. At 30° this safety factor is 50 feet; at 20° it is 34 feet; at 15°, which is your minimum allowable firing angle, it is 26 feet. From there on it decreases rapidly to become only 17 feet at 10° and 9 feet at 5°. In addition to increasing your possibility of shooting off the target, firing in trail also places you in the position where you are most likely to collide with the target, should it come off.

"One more word of caution—don't ever, ever make a pass at a target when either the main cable or safety cable has been severed. Now—yes, Major, what is it?"

"Colonel, in spite of all the precautions we take, a target is still going to be shot off once in a while, and it seems like it always happens when you're real close in on it. There just isn't time to change course enough to miss it."

"That's right," the Colonel said, "when you're that close you can't alter course much after the target comes off. The answer is that you must make every pass in such a manner that you will miss the target regardless of whether it comes off or not. That target may do un-

predictable things, but one thing it will never to is go up. It will either continue in a level path or, if shot off, will stop and go down. Therefore, if you stay at or above the target level and go over the top of it on the breakaway, there is very little chance of your colliding with it. One of the most dangerous things you can do is to sit almost in trail, firing up at the target, yet I see that very thing around here almost every day."

A captain in the back of the room stood up. "Sir," he said, "in going over the top of the target, you lose sight of it. That doesn't seem so safe either."

"By the time the target disappears under the wing," the Colonel answered, "you are already going by it. And consider this—in firing you are in a bank and holding a certain amount of back pressure on the stick. To climb you need only to roll out a little and hold the back pressure or possibly increase it slightly. To dive from this position, on the other hand, is a considerably more awkward maneuver."

"Colonel," said Bob Walker, one of the flight leaders, "maybe once you could fool around during a pass and make corrections, but these jets are pretty hot and the short time you can stay in firing range just doesn't allow time for error corrections. In other words, once a pilot commences a bad pass, he is stuck with it. And with all these new pilots we are training, you can't expect them to make a perfect pass every time."

"To be specific," the Colonel answered, "with the guns harmonized at 800 yards, a 170 mph target speed and a 400 mph fighter speed, you can stay in firing range about four seconds. Admittedly, you aren't going to do any great amount of correcting, but nothing says you have to fire on those bad passes. If it isn't right, pull up and make a better pass the next time. Look at it this way: Which means the most to us and to the Air Force—a few more holes in a target or Lieutenant Williams and that '80 he was flying yesterday? And before someone thinks to ask—sure we are training for combat, and certainly there you would never worry about whether you were shooting up or down. In combat you are justified in taking many more risks than you are in training. Furthermore, when you are shooting at another plane, it isn't going to stop suddenly and start to drop the way a tow target does. The plane will usually keep on going away from you for a while after it is hit, which gives you a better chance of avoiding it.

"So far we have talked of shot-off targets and how to avoid them. Even more inexcusable are the accidents caused by running into targets that are not shot off. The two major cause factors are poor target visibility and failure to judge rate of closure properly.

"Target visibility will vary greatly against varying backgrounds such as sand, trees, water and clouds. Tests have indicated that the white targets with black borders that we are using here are the best against most background conditions. However, if you men think that some other color would be better for our local gunnery ranges, we can so specify the next time we requisition targets.

"It is possible for you to have the target clearly in sight at the start of a pass and then to lose it as the background changes. Should this happen, break off your pass immediately and pull up. Also avoid passes that will cause you to lose the target in the sun. Before take-off, make sure that your windshield and canopy are perfectly clean and free from grease or oil.

"Judging your rate of closure is pretty rough. With a target speed of 170 and a fighter speed of 400, you are closing at about 115 yards a second. And I know that you newer men have observed that most of the more experienced pilots who make good scores drill in there pretty close. But you can't do it on the first mission, or the second, or the third. Get some experience first. Even then, don't try to poke the nose through the target. You older pilots acting as instructors, be a little more careful about telling your students to get in as close as you do until they get their feet on the ground. And no matter how experienced you are, 600 feet is close enough for anybody.

TOW TARGET TIPS FOR FIGHTER PILOTS

- Stay above the target level.
- Go over the target on the breakaway.
- Observe the 15° minimum angle off.
- Never make a pass at a target with either cable severed.
- Don't fire on bad passes.
- Pull up immediately if you lose sight of the target.
- Don't make passes into the sun.
- Keep your windshield and canopies clean.
- Gain experience before trying to press your passes to minimum range.
- Know the position of the plane ahead of you before shooting.

YOUR JOB

The success of any flying mission, whether in training or in combat operations over land or sea, depends primarily upon the pilot or flight commander. As commander of an airplane in flight, or as a leader, your responsibilities become two-fold. You are responsible for the exercising of sound judgment based upon your professional knowledge of the art of flying and you are responsible for your airplane. This is most important to you and to your crew.

Although all of your duties make up a long and formidable list, you can discharge each of them by systematic planning and by attaining a high degree of skill in your assignment. Be current and proficient. The United States Air Force is proud of its men. Operational fitness of men and machines—this is air power.

The goal of *Flying Safety* Magazine is to help you perform your job in a professional manner and thereby provide maximum safety for yourself, your crew and your passengers.

We hope you like the Magazine's new appearance and invite you to help make it a more useful publication by contributing ideas, articles and pictures.

Victor E. Bertrandias

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Deputy Inspector General for
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Flying Safety

RESTRICTED

DEPARTMENT OF THE AIR FORCE
THE INSPECTOR GENERAL, USAF

Major General Victor E. Bertrandias
Deputy Inspector General
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KNOW ABOUT OXYGEN

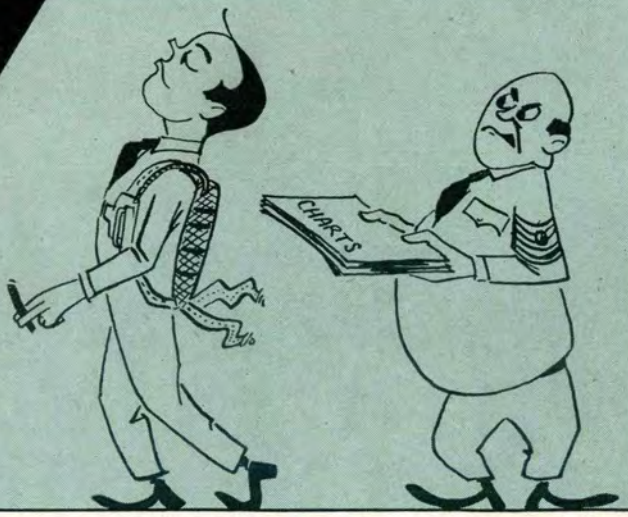
BEFORE YOU CLIMB

Climbing a ladder, Ann Blyth, Universal Star, is not a bit worried about lack of oxygen. But it's a different story when you fly. Your airplane was designed to operate at high altitude. Your body wasn't. As you go up, there is less air above you. Therefore, the air you breathe becomes thinner, and your body is less able to get the required amount of oxygen out of it. At 10,000 feet your body is getting barely sufficient oxygen and you begin to lose efficiency. Somewhere above that altitude—varying with the individual—you'll become unconscious, and then, unless you get some extra oxygen quick—that's all brother!

Lack of oxygen gives no warning—Check your equipment

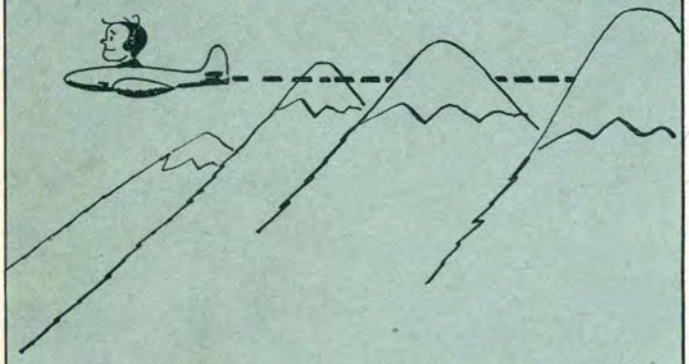
BEFORE YOU CLIMB

Mal Function

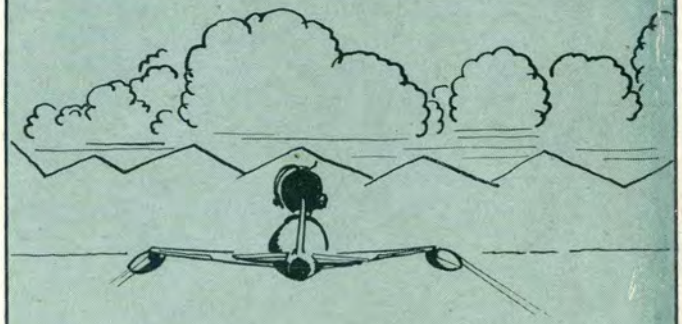


Mal, all briefed, spurns aero charts;
Such stupid poop—he knows these parts

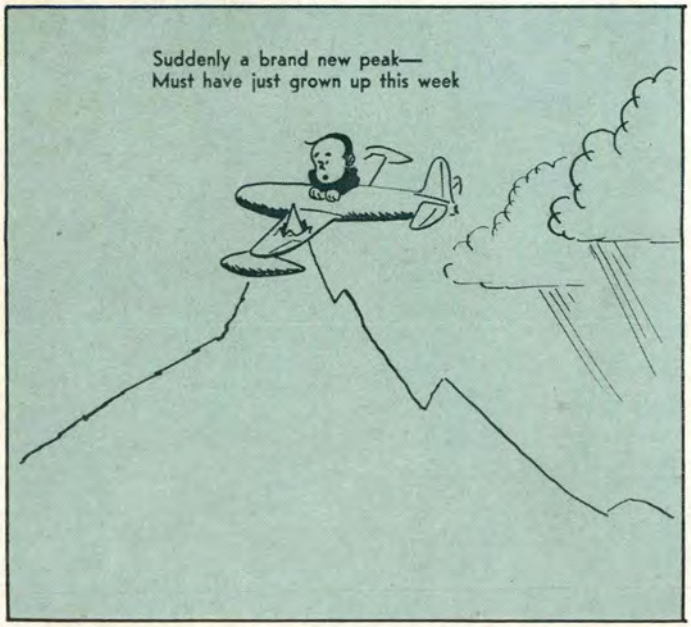
Peaks don't scare this pigmy brain—
His pointed head goes with terrain

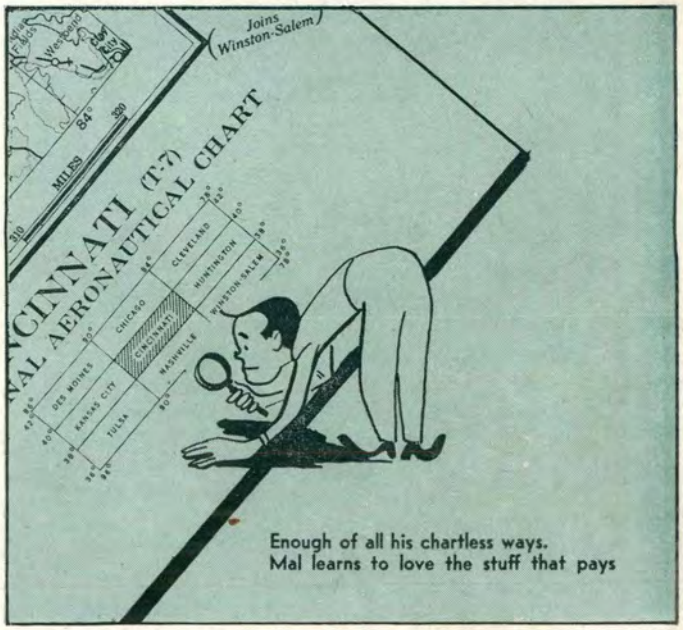


Storm ahead; Mal, blunder-bound
Keeps going straight and not around



Suddenly a brand new peak—
Must have just grown up this week





Enough of all his chartless ways.
Mal learns to love the stuff that pays

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