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spotlight

War is an ugly thing, but not the ugliest thing: the decayed and degraded state of moral and patriotic feeling which thinks nothing worth a war is worse . . . . A man who has nothing which he cares about more than his personal safety is a miserable creature who has no chance of being free, unless made and kept so by the exertions of better men than himself."

John Stuart Mill

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OUR COVER

One of our atmosphere's most horrifying and destructive forces — unpredictable in movement and time, and relentless and merciless in its wake — the funnel cloud of the tornado. See pages 8, 9, 20, and back cover of this issue for helpful hints of self-protection against these severest of nature's elements.

memo

from the CHIEF OF SAFETY

101 CRITICAL DAYS

I attended a Ground Safety conference not too long ago that grouped many of the so-called Safety experts in the area. One of the loudest of these crusaders of truth and seat belts and motherhood harangued the group unmercifully for hours on how if we don't stop the drinking and the driving, the whole world's going up in smoke, broken glass, and skid marks – and he had a lot of charts, graphs, and statistics to prove his point. He allowed that our young people are going to hell on the highways and all they want to do is booze it up and beat up the asphalt. This kind of shouting continued on into the afternoon and into the cocktail party where, after a couple of highballs (he lost the roll), I asked him how he was getting home. He said, "What do you mean, how am I getting home? – I'm driving!" and we all did.

I have another ridiculous parallel philosophy; an almost absolute sure fire system to reduce our total accident rates to zero in the next 101 critical days of exposure from Memorial Day to Labor Day. This is the time most of us go to parties, go fishing, picnicking, vacationing, swimming, hiking, flying, camping, etc. – this is the action season – so here are the rules to prevent the following:

Drownings – Don't ever get your bathing suit wet.

Automobile accidents – Don't take it out of the garage.

Aircraft – Don't even start it up!

Lock yourself in your house or room, pull down the shades, and hibernate! If you don't live in a tornado area, you'll probably be safe right up to the time you starve or die of thirst!

Well, I can tell you this from our statistics – the next young ADC troop we lose in a fatal accident will probably be travelling home, by himself, about 0200 to 0400 in the morning. He will have had a few glasses of "refreshment," but not necessarily be drunk. He will be tired, dead tired, and most likely fall asleep at the wheel after a long period of activity – dancing, partying, etc. This is how we kill ourselves – by not using the good sense that God gave us as human beings. If you are going to expose yourself to lots of physical activity, late hours, and food and drinks – use your head! Recognize the fact that your exposure to getting out of this world tragically is at its greatest during these periods and react with common sense. We've all seen the guy who thinks he can walk on water after a few drinks and tries it. It can't be done. This is the kind of a guy who's going to kill himself, or a loved one, or a loved one of someone else.

My point is this – enjoy the 101 critical days and the wonderful summer ahead – have a ball in your car, at the beach, the woods, or wherever, and while you're doing it, use your intelligence, your common sense, and you'll be around next summer.

COL THOMAS F. PAKENHAM

HOT LINE

T-33 FUEL GAUGE SETTING

It has been brought to our attention that some units are in the process of complying with a 4 June 1965 revision to T.O. 1T-33A-2, paragraph 4-843. This revision involves setting the fuselage fuel tank quantity indicator to read full at the 88 gallon mark instead of 95 gallons. Some T-bird pilots have expressed disbelief, to put it mildly, at the modification. So here is a little of the background behind it.

An earlier revision to the Tech Order called for adjusting the upper float stop to a position 1 to 1½ inches from the top of the tank. This was done to prevent the cork float from hanging up on the filler well attaching nuts when the tank was full. It eliminated the possibility of the quantity gauge showing full while the tank was actually empty. A side effect of the float adjustment was that the quantity gauge would continue to read full until the fuel level dropped 1 to 1½ inches below the top of the tank. This coincided with approximately the 88 gallon level and from this point on down, the gauge would decrease from the full or 95 gallon mark while the float would be decreasing from the 88 gallon position, resulting in a reading of 7 gallons on the high side.

With incorporation of the June 1965 revision, the float position and gauge indicator coincide at the 88 gallon level. As the fuel level decreases below this point, the float and the indicator go down together and more accurately. In this setup, the gauge tells the pilot that he has 88 gallons with a full tank, even though he actually has 95. So if you strap in and read approximately 88 gallons, don't panic, it *probably* means the mod has been accomplished.

NO NOSE (PIN) IS BAD NEWS

When you deviate from the "Norm" — Look Out! Situation: Night Exercise. Second flight for crew. Time — Darkness. Aircraft — F-101F on a scramble. After completing "Last Chance" inspection, aircrew noted communication problem. Aircraft returned to "Cursory" area. Problem corrected. Taxi back to runway. No "Last Chance" performed this time. After takeoff nose gear would not retract. Cause: IRO gave nose gear pin to ground crew at Cursory. After fix, ground crew did not pull, nor did air crew receive nose gear pin. This story is told so that others may learn. Haste Makes Waste.

TF-102 FIRE HOLE

While in the chocks, after engine start, an electrical fire (or near fire) occurred in the cockpit. IP pulled seat pin after locking the canopy, but the pin streamer was snapped to the canopy rail. The seat pin was jerked from the IP's hand and fell into a four-inch hole on the right console. Smoke immediately began to boil from the hole, and the IP pulled the streamer and jerked the pin out. The pin was already *red hot* and glowing although it had been in the hole a maximum of five seconds. Smoke continued to boil from the hole for about a half minute, then subsided.

The hole is a dangerous hazard and if the pin had lodged or come off the streamer, a severe fire would have occurred.

The hole mentioned in the report is located on the right console of TF-102s, immediately aft of the throttle quadrant and the interphone control box. Maintenance personnel state that an obsolete ADC directive removed the Anti-G Suit Control Knob (Figure 4-18, page 4-34, T.O. 1F-102A-1), but apparently did not direct the covering of the resulting hole. The openings, 2½" x 2½", are in the mask defog and anti-g suit control panels on both sides of the TF-102s and on the left side of F-102s. The only apparent hazard relative to the F model and the left side of the TFs is the inadvertent dropping of small objects through the unprotected opening. On the right side of the TF, however, considerable wiring to an adjacent circuit breaker panel is exposed to contact by objects dropped through the hole, as experienced with the seat safety pin.

Until such time that all these control panel openings are covered, it is strongly recommended that F/TF-102A pilots be made aware of this hazard and cautioned against dropping objects into the openings.

If everything on this earth of ours stood still, there would be little opportunity for an accident to occur. When you think about that for a while, it becomes pretty clear that man-in-motion is man's worst enemy. It's a harsh fact of life. But you would never know it from the way people go thrashing around day after day ignoring lessons learned the hard way by those who are no longer with us. The explanation is somehow connected with those famous last words of questionable wisdom: "It won't happen to me, only the other nut."

You can talk long and loud about the built-in dangers of our modern age and how to avoid them. It seems to go in one ear and out the other. People pick up and go their merry way as if convinced of their own immortality. How do you get through to them that Superman exists only in the comic books? In many cases it is impossible, as proven by the enormous number of fatal accidents which occur on a yearly basis. Motorists continue to roar down the highway, bumper to bumper, doing 60 plus mph and never once realize that they are in a situation more dangerous than a combat zone. Members of our youthful generation denounce war on moral grounds and yet are frequent contributors to the slaughter on the highways. One can't help but detect a wisp of hypocrisy in the air. That's why the safety business is sometimes a frustrating and thankless profession. You try to sell the world's most valuable product, life, and door after door is slammed in your face. Finally, you ask yourself: "Is it all worth it?" The answer must be "yes" because you know that for every failure there are countless successes. Also, there are encouraging signs that it's getting better slowly but surely.

The Air Force has a special interest in safety. As all the textbooks say, the unit mission comes first. If this were not the case, why an Air Force? Successful mission accomplishment is the sum total of the efforts of skilled and dedicated people. Across the board, they must be skilled to operate the sophisticated aerospace equipment at their disposal or to perform in demanding support functions. They must be dedicated to meet the challenge of frequent personal sacrifice when the situation calls for it. In any

event, replacement of man or machine is a very costly proposition. It may not seem cricket to reduce everything to a dollar and cents value, but what other choice is there? Unlimited resources are not possible. The amount of national security we get depends on what can be purchased. Nobody works for free, nor does hardware come from donations. If an airman is killed in an auto accident or an airplane crashes in the woods, there goes a piece of national security. Maybe it can't be replaced. In this sense, everyone and everything represents a certain percentage of indispensability to the overall effort.

When Safety is examined through a glass of reason and not emotion, it loses its nuisance value and becomes a useful system for maintaining unit effectiveness. The purpose of Safety very simply is to preserve the integrity of unit personnel and hardware. It holds true even in a combat situation. Probably more so. Any loss which could have been avoided reduces the ability to bring pressure to bear where it really counts. Nothing complicated about that, although it can stir up a commotion when you get down to specifics. Everyone has his own opinion on how far you should go to obtain a safety objective in war or peace. At what point does Safety start biting into operational requirements? To what extent should pilots be allowed to press "paper attacks"? Where does realistic training end and Safety abuses begin? There are no pat answers to these questions. Safety kits don't come with crystal balls. Each situation calls for examination of skill levels, attitudes, and environment. A unit with low skill level can't be expected to compete on an equal basis with a unit chock full of experienced talent without jeopardizing the safety angle. A unit located in a severe weather area is subject to more hazards than one in a sunshine state. And so on. Keeping in mind the overriding importance of the mission and the necessity to keep intact the people and equipment required to perform it, the approach to Safety must be mature and cautious.

How does Safety go about its business of preserving mission resources? To a greater or lesser degree (depending on organizational level), education, motivation, a little arm-twisting here and there, and what might be called "prediction" are some of the methods used to achieve the desired results.

The education process is the way of giving everyone the benefit of experience gained. The time and effort spent in uncovering accident pitfalls are wasted if the information gathers dust in a file somewhere or is withheld for artificial reasons. Safety programs break down unless every individual is made aware of the potential hazards he faces. The measure of success here lies in the ability to reach the ten percent "who never get the word."

Motivation centers around the appeal to common sense. Presenting the facts isn't always enough to convince people to do the right thing. They have to care, first, in order to act, second. Forgetfulness or maybe just plain bullheadedness are obstacles which have to be overcome by motivation programs. It's one of the most difficult problems in selling Safety. Occasionally the situation calls for some gentle arm-twisting, in the form of a guard at the gate checking seat belts, or a blood and thunder session in the briefing room. Unfortunately, there will still be those demanding the right to maim or destroy themselves. But the perseverance, sometimes referred to as interference, is the key for unlocking many closed doors. What other alternative is there?

Unused files are a waste of time!

Impending accidents from previously unknown causes are almost impossible to prevent. By themselves they do not present major difficulties because they occur infrequently. Of primary concern are the accidents which will occur from known cause factors and which should be prevented, if they are recognized and the appropriate action is taken. Mistakes of the past, unchecked, are largely responsible for unacceptable accident rates. Prediction simply involves looking over statistics or trends, adding two and two, and concluding that if certain procedures, practices, or failures continue, they will lead to an accident. This is a valuable tool in any prevention program and is closely related to the education process for obvious reasons. The scare factor in this area is the accident which occurs from undetermined causes. It leaves the future uncertain, and there is no telling how many more will occur before the cause is uncovered and corrective action can be applied. This is the reason that accurate information must be obtained during investigation. The purpose is defeated if the information is used in any other way.

There are numerous techniques used to achieve Safety objectives. Too often they are misunderstood. The individual who complains about his outfit being too "chicken" might change his mind if he suddenly found himself in the commander's position. Chances are he has never seriously considered the consequences of following another course of action. The picture changes substantially when you accept full responsibility for the mission, nose-count the resources available to perform it, evaluate unit skill level, determine maximum possible output, then formulate policy. There isn't much room for taking calculated risks. Some are fortunate in this respect, others are not so lucky.

Sometimes Safety is viewed as a convenient baseball bat

In order to make sound judgments, the commander needs all the reliable help and cooperation he can get. This is where the Safety Officer plays a vital role. If he does his job properly, he can get a feel for whether his unit is functioning smoothly or is headed for trouble. By identifying potential problem areas and alerting the commander, he directly contributes to the effectiveness of his organization whatever the level. There is no limit which can be placed on the value of a good Safety Officer.

Sometimes Safety is viewed as a convenient baseball bat to beat people around the head and shoulders when they step out of line. That's not what it's all about, even though on some occasions valid reasons for thinking so may exist. Situations can get out of hand. They reach a critical point and lead to drastic solutions. It's not a desirable route to take, but it may be unavoidable. In many cases, the cause for what appear to be excessively restrictive safety measures can be traced back to an event or series of events which could no longer be tolerated if the mission was to prevail. On the other hand, unreasonable standards do more harm than good, and, as mentioned previously, careful examination of criteria is required to determine where reality ends and excesses begin.

Until the day that everything on earth stands still or until accidents are eliminated from the realm of possibility, there will always be a need for Safety and the people who serve its cause. If you believe in national security and the importance of the mission in preserving it, Safety deserves your support. ★

ADVANCE OF TORNADIC TURBULENCE

by
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Some recent observations and studies indicate that vortices, or "tubes," of tornadic or near-tornadic intensity may be encountered in and under innocent-looking lines of clouds extending from thunderstorms. Visible tornado (or waterspout) funnels may not be present to alert the unwary pilot, but it appears that these vortices may exist up to 20 nautical miles from the associated thunderstorm. The areas where the "tubes" exist often are free of either precipitation or lightning, and the ambient turbulence in their vicinity is only light to moderate. Invisible voritces below the cloud bases may sometimes be evidenced by dust-whirls at the surface (or "sworls" on a water surface).

Deductions from some accidents in the vicinity of thunderstorms indicate that these "tubes" may extend to great heights within the flanking cloud lines (at least to about 18,000 feet MSL — and theoretically as high as 35,000 feet near the thunderstorm). Neither the "tubes" nor the embedding clouds appear to be reliably detectable on airborne radar, although the cloud line may be picked up by ground radar when viewed within about 30 miles if there is no intervening heavy precipitation. The cloud line may be detected on airborne radars below 8,000 feet MSL and within 20 nautical miles. Typically the echo shows a sharp first iso-echo contour with a relatively "dry" interior. It is likely that these cloud lines give rise to the longer appendage echoes sometimes seen with tornadoes.

One important aspect of this hazard is the great distance from the associated thunderstorm at which these "tubes" may exist. Ten miles is an average value for audibility of thunder, so that a thunderstorm might not be reported at the coincident ground station. Since there are no completely reliable local indications of the existence of the vortices, avoidance must be based upon a knowledge of the presence of the thunderstorms with which these cloud lines and "tubes" are frequently associated, and flight procedures to avoid the cloud lines.

The meteorological conditions under which the hazard exists are similar to those for the tornado. Thunderstorms in tornado forecast areas should be suspected. It also appears that these "tubes" are much more frequent than observed and reported tornadoes, so that these thunderstorms, other than those well-known to be of an "air-mass" nature, also should be suspect. A good first rule for absolute safety from this hazard is *to avoid all suspected thunderstorms by at least 20 nautical miles an any line of bearing and at any altitude.*

Thunderstorms in squall lines over smoother terrain are likely candidates, especially when there is appreciable wind-speed change greater than about 30 knots with altitude to 20,000 feet. A preferred orientation of the cloud line is into the storm-related wind. To estimate this, take the storm-motion vector (as from a radar observation) and *subtract* the mean wind vector in the lower 20,000 feet. The resultant vector will point in the direction from the thunderstorm in which these cloud lines with related "tubes" frequently tend to form. Avoid flying in or under clouds, especially lines of clouds.

e quadrant about this vector. Under IFR conditions, "build-in" an avoidance of 20 nautical miles up to 5,000 feet above the surface, 15 miles at 15,000, and about 7 miles at 25,000 feet.

Caution is especially advised on landing and takeoff, descent and climbout, under or through these lines of clouds. Because of a possible convergence of the "tubes" upward in the cloud line, the hazard tends to increase with altitude in the clouds.

Effects upon aircraft encountering these "tubes" may range from a hard "bump" of several gs upon a direct encounter with a weaker "tube," through an unusual "thump" in grazing incidence with the circulation of the "tube," and vigorous upsets in other grazing encounters, to catastrophic airframe failure in central encounters with fully developed "tubes." *No aircraft has ever been built that can be expected to take the loads possible in a tornado, and survive.* These fully developed "tubes," even with no tornado funnel to the surface below, are of such a nature and intensity as to preclude passing through unscathed.

Preliminary estimates of probability encounter with these "tubes" *in random flight* (no avoidance skill) below 35,000 feet in the United States east of the Rocky Mountains indicate that an air transport might encounter a "tube" once every 3,000 hours (approximately). The probability of this encounter being of a major or catastrophic nature has been estimated at about one chance in eight. Thus, if no avoidance is practiced, a major or catastrophic incident may be expected in 24,000 hours of indicated operation. Skill in avoidance can increase this "waiting time" by a factor of 10 or more. *Note, however, that close avoidance of a heavy thunderstorm who to the south or southwest may produce a negative avoidance skill.* The old rule of "out of echo, out of trouble" is definitely *out* for these phenomena. (See chart.)

Some further suggestions for flight safety with respect to these hazards are:

1. Under visual flight rules, do not fly *below* lines of clouds extending from an intense thunderstorm and often on a common base with the thunderstorm. If flight is absolutely necessary, circumnavigate or overfly with adequate clearance. Remember how far from the thunderstorm the hazard may exist and how innocent the related airspace may appear.

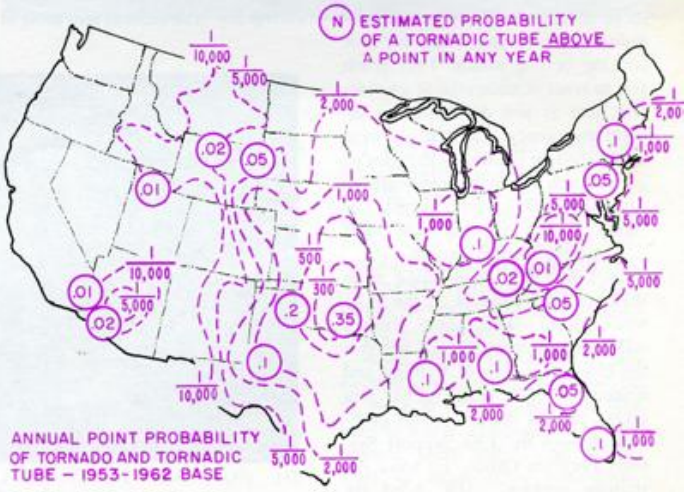
2. If inadvertently caught under one of these lines, watch for dust whirls (or water sworls on a water surface) and avoid overflying these. Get out from under fast.

3. Use a local ground weather-surveillance radar to best advantage in preflight briefing. The type of thunderstorm which often produces these "tubes" appears to have a typical echo (extensive anvil return, a scallop, sometimes an appendage coincident with a cloud line). A similar look at your airborne set before takeoff and below 8,000 feet can be helpful. Use gain settings higher than those for best delineation of thunderstorm echoes to bring up the weaker cloud echoes.

4. If no information is available for estimating the storm-relative wind vector, the most frequent orientation of the flanking cloud lines from the associated thunderstorm is from southeast through southwest to northwest.

5. Under instrument flight rules, note carefully that the orientation of the related cloud lines may not coincide with the orientation of the thunderstorm line itself. Use the basis of estimate given to find the probable cloud line orientation. In using ground-radar vectors, be sure the set used either has the capability of detecting these cloud lines or is backed up by such a set.

6. Close avoidance on the opposite flank of the thunderstorm is not suggested. It must be remembered that there are other hazards, e.g., large hail, which must be avoided.★



Get Out - Get Down - and Get Back

by MAJOR CHARLES A. LEHMAN / *ADC Life Support Branch ● ADOTT-D Hqtrs ADC*

"There's no doubt in my mind—the training I got at the Life Support School saved my life!"

This comment is typical of the many testimonials which our ADC Life Support Schools receive from survivors of the "Hairy Ones." One after another, crewmembers who've "made it" credit the schools with saving their lives.

But why should these schools get so many roses tossed their way when the Air Force has taught survival for years? Well, first of all they're NOT survival schools. They teach procedures to save your hide, not root cooking or bug eating. They teach you to react instinctively, in an ejection, just as you do during an in-flight emergency. The schools were established on the theory that you've got to learn by doing, and learn so well that you won't forget, or "clank," when the chips are down . . . and the handles are up.

In 1964, ADC was losing more than one out of five of all the jocks who ejected. The newly formed ADC Life Support Branch felt that the cause was lack of training and inadequate equipment. AFLC was taking care of the equipment problem through the Life Support Systems Program Office. To solve the training problem, ADC tried the concept of procedural training. The Air Force had used procedural training for years to produce pilots, but no one had tried teaching the entire ejection sequence this way. Schools were formed at Tyndall and Perrin to put the concept into action.

Both schools teach the same course. Each subject in this course was included there because poor performance in that item had killed or hurt someone. It wasn't basic survival that was killing people, but the procedures they used during the first critical moments after a serious emergency. The schools aim most of their material at those few moments, and exist only for you — to give you a better chance to stay in this flying game even if one aircraft lets you down completely.

When your turn for life support school comes up, here's what you can expect.

First, you'll receive a complete briefing on all the items of personal equipment that you use in your aircraft. The instructors will include everything from police whistles to "poopy suits," and show you all you need to know to fit, wear and acti-

PLF, Parachute Landing Falls, require proper body position through expert instruction . . . .

. . . plus lots of practice!

Bye!

ate each item. This first step is included because you've got to understand the equipment thoroughly before you can learn the procedures.

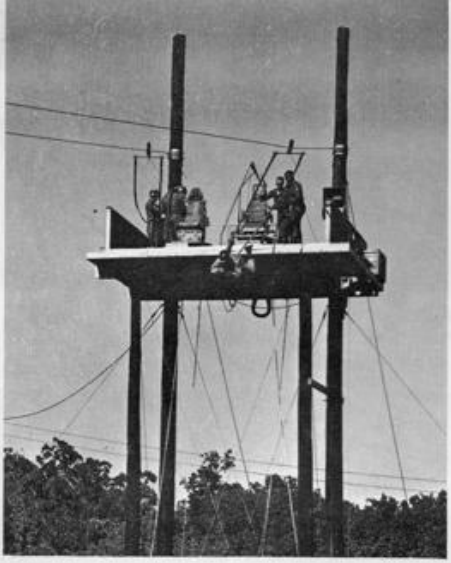
Once you know the "ins" and "outs" of the equipment, you're ready to learn the "outs" of the airplane. You'll learn ground and flight egress procedures. Getting out of a burning aircraft on the ground when you start with 75 pounds of equipment strapped on you is tricky at best. If you foul up the procedures, it could be your very last goof. When you learn to do it right you'll be amazed at how fast you can get out. How about 7 seconds from the back seat of a T-bird? This has been done, and getting out that quickly can sure save the bacon.

Leaving a crippled air machine in flight presents a different problem. The first step in an ejection sequence is that big decision to leave the cozy cockpit womb and venture into the unknown. Delaying this decision can make your wife a widow! Unfortunately, just telling you not to delay probably won't prevent it. You've got to be so confident in your equipment and your procedures that fear of the unknown won't tempt you to wait too long. Your instructors will tell you to make the decision quickly and then proceed to show you how to get out—get down—and get back.

You'll start with pre-ejection procedures. The things you do before you pull those yellow handles give you that first big step toward home plate. Even if you perform perfectly after the ejection, but split your skull on a rock because of something you forgot to do before the ejection, you're still just as dead. Lost helmets kill people, and usually lost helmets are caused by improper procedures. If you don't lower your visor you can get hurt. Poor ejection position often causes compression fractures and they don't feel too good either. The answer is to practice the pre-ejection steps until you perform them automatically.

A RECENT GRADUATE LEFT A "DEUCE" OVER THE NORTH COUNTRY AWHILE BACK AND SMACKED HIS HEAD ON ROCKY GROUND IN A HIGH WIND LANDING, BUT HE WASN'T HURT. HE HAD COMPLETED ALL HIS PRE-EJECTION STEPS AND HIS SECURED HELMET TOOK THE BLOW. ANOTHER WAS ENVELOPED IN A BALL OF FLAME AT THE INSTANT OF EJECTION. HE GOT SOME BURNS, BUT NONE ON HIS FACE, BECAUSE HE REMEMBERED TO GET THAT VISOR DOWN BEFORE HE LEFT. ONE NON-GRADUATE PUNCHED OUT 5 YEARS AGO AND STILL HAS A SORE BACK BECAUSE HE DIDN'T GET INTO A PROPER PRE-EJECTION POSITION.

When you've mastered the pre-ejection procedures you'll move on to the post-ejection sequence. The schools use a combination of ring trainers, jump towers and dummy seats to teach these procedures. After detailed briefings, you'll get



Many a stout heart has quivered here! . . . There's just something about that hard ground some 35 feet below the "Tower of Perrin."

Ooph! . . . First jolt at the end of the risers.

Good body position, feet together, prepare for the landing. . . .

Not bad! Now you can go back, get hoisted up on the rescue sling, and try it again.

Yes you DO have to go!

Launch! Launch! Launch!

a chance to practice all the steps under realistic conditions. You'll strap into an ejection seat mounted on a 35-foot tower. At the command "EJECT — EJECT" you'll go through your pre-ejection procedures and pull the handles. You then jerk open your lap belt (simulating a failure) and kick free of the seat . . . right off the edge of the tower! Your parachute risers are attached to an overhead cable so you free fall for a few feet in the proper position for canopy opening and you're stopped short by the cable. Now safely under a simulated canopy you check the chute, raise your visor, remove your mask and activate the survival kit. Then you inflate your life preservers and perform the four line cut to convert the parachute to a steerable type.

All this time you've been traveling down the slanting cable toward the surface, so you've got to get ready for landing. For your actual practice in parachute landing falls, you'll jump off low platforms and get dropped from the swing landing trainer. You'll repeat the landings until you understand how to impact mother earth without busting your butt.

In the past, a lot of fatalities were generated by water landings. Many jocks were drowned when they got tangled in parachute lines or dragged through the brine when they failed to get rid of the wind-filled canopy. It was obvious that realistic water entry training was a must. Fortunately, a new device came on the scene about the time we needed it. The now famous parasail was adopted by ADC to teach students how to get rid of the canopy at the instant of splash down, and to get away from the deadly tentacles of shroud lines in the water. The students are towed into the air behind a powerful boat and release themselves, on signal, to float down under the canopy.

The parasail not only provides outstanding water training, but it gives you a big dose of confidence. Once you've entered the water under that big red and white canopy, you can never have the same fear of parachuting that you may have had before. Of course, this goes back to

Up - Up

And Away!

the very first step of all. If the fear of the unknown is removed, there is less danger of delaying that decision to eject until it's too late.

IN MARCH, TWO OF OUR 101 JOCKS MADE A TIMELY DECISION AND PUNCHED OUT A SICK VOODOO OVER THE PACIFIC. AS THEY CAME OUT BELOW THE OVERCAST THEY NOTICED THAT 15-19 FOOT WAVES AWAITED THEM. THESE TROOPS DID EVERYTHING RIGHT AND GOT INTO THEIR RAFTS WITH A MINIMUM OF TROUBLE. THEIR SIGNALS BROUGHT THE RESCUE PEOPLE AND THE PILOT WAS RESCUED ABOUT 2 HOURS LATER, WHILE THE RIO HAD TO WAIT 9½ HOURS TO BE LOCATED AND PULLED ABOARD A COAST GUARD CUTTER. IN SPITE OF THE COLD WATER, A BLACK NIGHT, AND HUGE WAVES THESE TROOPS SAID THEY WEREN'T WORRIED AT ALL AFTER THEY LEFT THE AIRCRAFT. AS THEY PUT IT, "THE WHOLE THING WAS JUST LIKE WE DID IT DOWN AT LIFE SUPPORT SCHOOL." FIVE YEARS AGO OUR CHANCES OF RECOVERING THESE TWO ALIVE IN CONDITIONS LIKE THAT WOULD HAVE BEEN ZILCH.

Just to top it all, the parasail is a fine procedures trainer too. Such simple steps as inflating life preservers and deploying survival kits take on a new light when they're performed under a canopy 400 feet above the water. With each parasail ride (normally each man gets three) you go through the procedures faster and more confidently. By the last ride you'll zip through the steps one after the other with no pauses, and wind up with time to experiment with steering the canopy. The parasail steers much like the standard Air Force parachute modified with the four line cut. Remember, a parasail release at about 400 feet simulates a pretty low altitude ejection—the kind that used to hurt a lot of people.

You're now on a heading for South Texas!

A face full of grass is better'n a head full of rocks!

ABOUT A MONTH AGO, AN INTREPID DAGGER DRIVER FLAMED OUT ON FINAL AND LEFT HIS BIRD AT ABOUT 300 FEET. HE WENT THROUGH THE POST-EJECTION PROCEDURES HE HAD LEARNED AT THE SCHOOL, INCLUDING DEPLOYING THE SURVIVAL KIT AND RELEASING THE CANOPY AT TOUCH DOWN. THAT'S TREMENDOUS PERFORMANCE IN A FEW PRETTY EXCITING SECONDS. THIS TROOP LANDED ON A CONCRETE SLAB AND WALKED AWAY UNHURT. HOW'D YOU LIKE TO TRY THAT LANDING WITH A 40 POUND FIBERGLASS KIT STILL STRAPPED TO YOUR AFT SECTION?

The course also includes parachute drags on land and water just in case you don't, or can't, get rid of that canopy at the instant of touch down. Once again you're shown the correct procedure, then you practice until you can do it right. Bouncing along the ground behind a billow

canopy in the 35 knot gale of a wind machine isn't much fun, but it will sure convince you of one thing. Get rid of that chute at touch down! It will also make you confident that you *can* free yourself from a runaway parachute if you have to. The water drag is no sweat once you get the hang of it, but in the past we've lost a lot of good people who didn't know how to cope with one in an actual emergency.

Both schools have completely eliminated "swimming pool survival" which was so commonly taught in the past. You won't learn sea survival, either, but you will get realistic water training in the actions you must perform to live through those first few minutes or hours after an over water ejection. You'll learn how to board a raft quickly and safely, how to ride it and how to aid in your own rescue. Regardless of how often you've been through the swimming pool routine, it's a lot different in the nose burning salt water of the Gulf or in frigid Lake Texoma. It's pretty close to the real thing.

From water or on land, from Lake Superior or the jungles of Viet Nam, you'll get home a lot quicker if you can help the rescue people find you. The school will show you all the common methods of signalling and some not so common. What's more important, you can try them yourself. Rescue records are full of cases where crewmembers delayed their own pickup because they weren't familiar enough with signalling or weren't motivated enough to work at it. Your efforts at the school will be rewarded by a live helicopter pickup.

The schools have been going now for almost four years, so if they're any good our ejection statistics should show it. They do! The ADC ejection fatality rate is down from 22% in 1964 to less than 3% for the last two years. That's quite a drop. It's even more impressive when you study the figures and see that most of those fatalities are the impossible ejections—on the deck—high speed dive—just prior to impact, etc. We've lost only one life support school graduate who may have used improper procedures, and even his death may have been caused by equipment failure. The USAF ejection fatality rate has averaged about 14.5% (not including SEA) for the last four years.

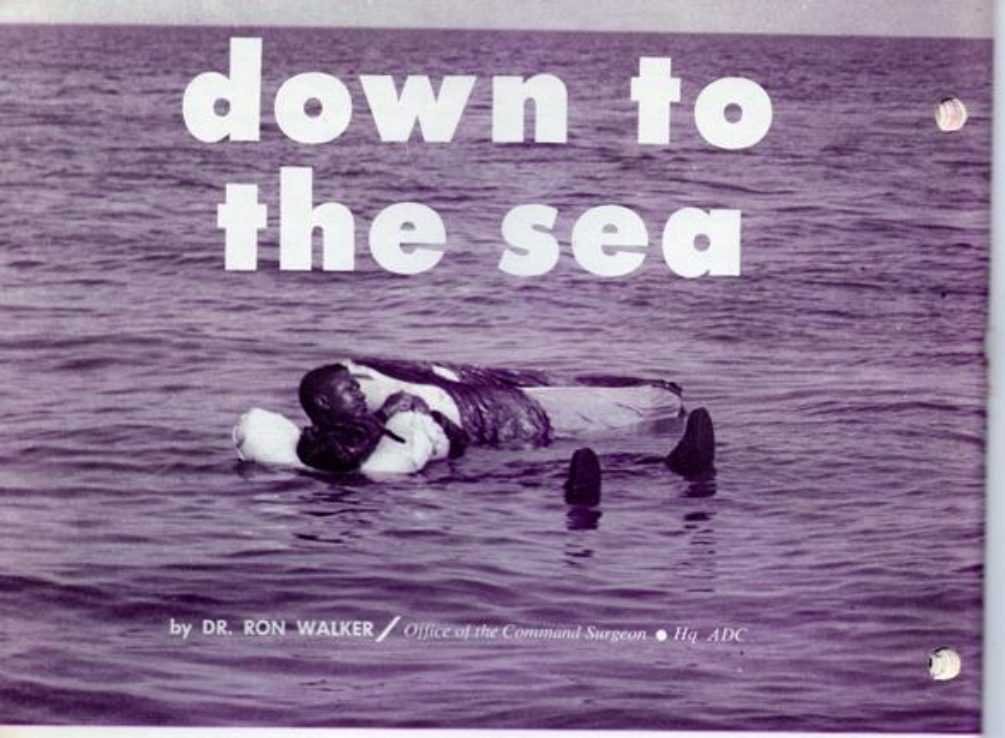
Our program has now been expanded to include a very similar course for Air National Guard crews, and one for Airborne Early Warning crews. The schools are so successful that their fame is spreading. They are currently training a SAC Wing and the NASA astronauts.

When your trusty steed lets you down the one big thing you can do to assure your own rescue is to get down with all your physical and mental powers intact. And that's what the life support schools are all about. If you know what to do and if you've had the chance to practice, again and again, you *will* do it right . . . even when you're scared. You'll do it and you'll be waiting with a great big NO SWEAT grin on your face when the rescue chopper arrives. ★

You can't swim?

No, you may not be excused from class!

down to the sea



by DR. RON WALKER / *Office of the Command Surgeon ● Hq ADC*

ADC now has a global capability and in some areas we spend more time over water than over land. With over 70% of the earth's surface made up of oceans and seas, and since you fly over the earth's surface, it's only reasonable to assume that you're going to spend a great deal of your time over water. (It's in the book!) Just how much of the earth is covered by water is also graphically illustrated by the fact that you could throw all the land area of the world into the Pacific Ocean and still have an ocean the size of South America left over!

"But leave them alone and they" (they being you ADC pilots) "will come home. . . ." we hope. (I could finish that plagiarized statement ". . . wagging their tails. . . ." but I guess that wouldn't be appropriate here.) To continue, we hope you will come home with your aircraft still strapped on; however, if it isn't, what then? What happens if you have to part company with the ole hoss? Chances are you're going to come down in water and chances are that water is going to be mighty cold! So what then? You've parted company with your aircraft, you're floating down towards that big deep tub, you've deployed your survival gear and raft, and you're about ready to join the Navy, whether you wanted to or not. What do you remember about cold water survival? What was that your "FFS" (Friendly Flight Surgeon) said at the last safety meeting? Four main hazards to your life exist after a parachute landing into cold or even temperate water:

1. Sudden death in very cold water due to "immersion shock"
2. Hypothermia or subnormal body temperature
3. Seasickness
4. Drowning

Well, you're an old member of the Polar Bear Club, so no sweat on the number 1 hazard. The sudden shock of cold water never bothered you. So you managed to survive the parachute landing into a cold sea (water temperature 45 degrees or less). Now if you can just get into your raft, for your continued survival is entirely dependent upon your ability to do this. No matter what anti-exposure suit you wear in a cold sea the suit only delays t

evitable a short time. If you're not in your raft, you cannot be seen, cannot signal, cannot attend to your injuries, and the ocean will soon cool your body to 91.4 degrees F. At this temperature, you lose consciousness in your underarm life preserver, your head falls forward and you drown.

But so you make it into the raft, get it all bailed out, now what? Twiddle your thumbs? What else was that the FS said? Having entered your raft, the main hazard facing you is your whole body cooling or hypothermia. Normal body temperature, measured rectally, is 99.6 degrees F. When the body temperature falls to 88 degrees F, functional impairment ensues, which is symptomatically expressed as generalized weakness, a lack of muscular coordination and a clouding of consciousness. Death usually due to cardiac arrest occurs when the ital temperature falls to 78.6 degees F.

You lose your body heat in two ways. One, by direct heat transfer from your buttocks and thighs through the raft floor and into the ocean, and two, by convection cooling of your body into the air. Your body attempts to replace or control this heat loss in two methods: 1. the blood flow to the skin is diverted to the organs deeper in the body, thus decreasing the heat loss through the skin, and, 2. as cooling continues, shivering begins which produces heat through the action of the muscles. The general purpose of any anti-exposure suit is to slow the heat transfer once in the raft. Chart 1 illustrates quite well why you're so glad you wore that "poopy suit" (CWU 10/P) after all. In 45 degree water, you have just increased your survival time from 3 hours to over 5 hours. A word to the wise should be sufficient and nothing e need be said about the necessity of wearing the "poopy suit" while flying over water, comfortable or uncomfortable.

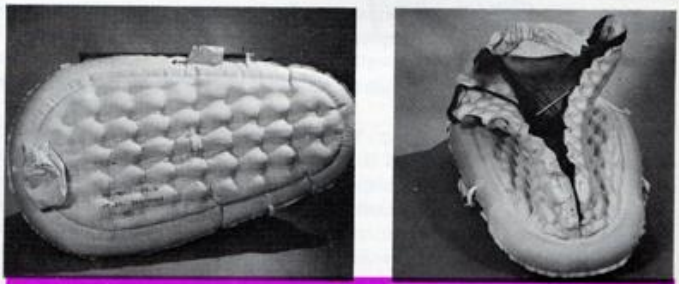
COMPARATIVE SURVIVAL TIMES

TEMP	Flt Suit only SAFE	Flt Suit only Marginal	Flt Suit only Lethal	CWU 10/P Lethal
40°F	30 Min	1 Hr	2 Hr	3 Hr 30 Min
45	45 Min	1 Hr 30 Min	3 Hr	5 Hr 10 Min
50	1 Hr	2 Hr 15 Min	4 Hr 15 Min	7 Hr 40 Min
55	1 Hr 30 Min	3 Hr 30 Min	6 Hr	10 Hr
60	2 Hr	5 Hr	8 Hr +	10 Hr +

Now that the Physiology is all thought through, twiddle your thumbs now? Should you passively wait for rescue or should you swim toward that island you passed over 100 miles back? Whether you're a fat man or thin man, if you're in the cold sea and unable to stabilize your body temperature at a level where you can still function (above 88 degrees F), physical exertion *always* accelerates the *fall* in body temperature. Thus, don't kill yourself faster by attempting to swim toward that island. If you're lucky and parachute into a warm sea (60 degrees F. or higher), the limiting factor tends to be exhaustion due to fatigue rather than hypothermia.

If the unusual happens and you bail out over land, *don't* forget to *take it off!* The poopy suit has no use in cold land survival and actually becomes detrimental to survival if you continue to wear it on land. The cover is waterproof and will not "breathe". So, as you perspire, the perspiration collects and very quickly becomes as cool as the outside temperatures. If the outside temperature is below freezing, the perspiration freezes and so will you. If the temperature is above freezing, your body overheats which leads to rapid fatigue and exhaustion. So, *take it off* if you bail out over land!

So, if you're flying over water, wear your poopy suit. The consideration of comfort is far outweighed by the question of your life or death, and you will come home. . . . ★



BOTTOM AND TOP VIEW OF NEW INSULATED RAFT

OPERATIONAL READINESS INSPECTION TEAM

HQ, ADC

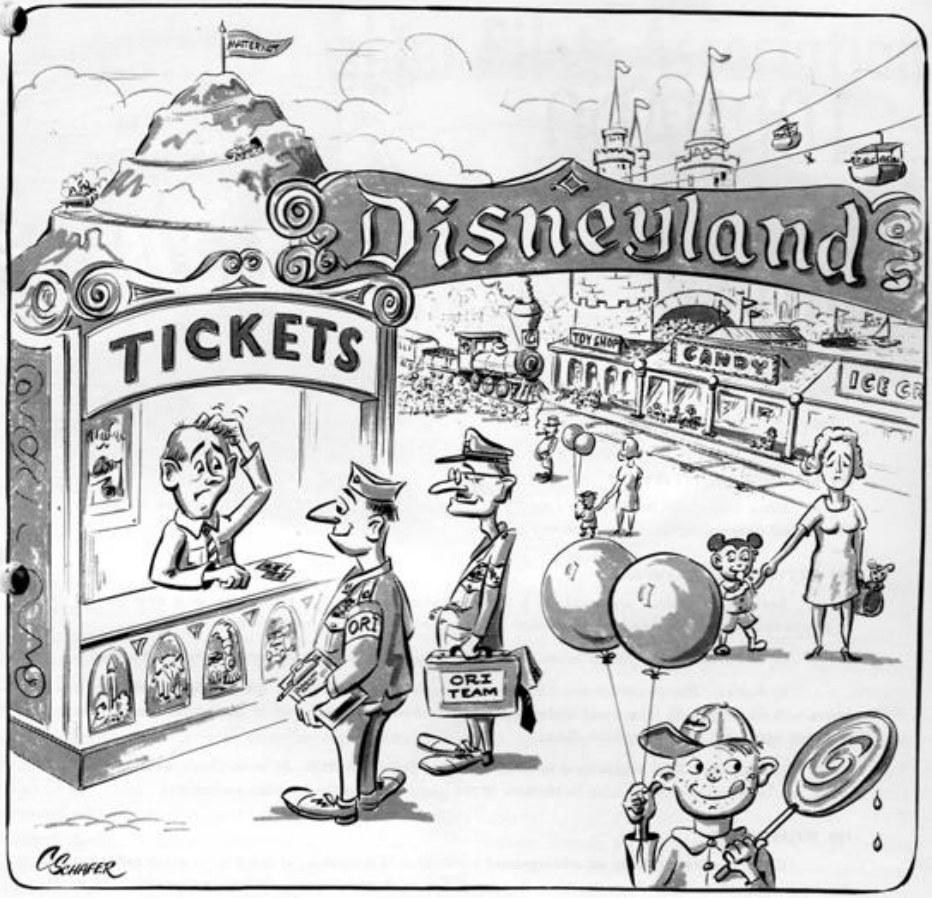
ALERT FORCE CAPABILITY TEST —WHAT IT REQUIRES FROM THE CONTROL UNIT

Probably the best and maybe only no-notice test remaining in ADC is the Alert Force Capability Test (AFCT). Basically, this is a test of the alert aircraft of a fighter-interceptor squadron conducted under ADC Ops Plan 3-67, dated 15 April 1967. Until recently, all the ground environment unit had to do was get the aircraft in a position to fire without regard to standard tactics. There was really no passing or failing percentage for a Ground Environment (GE) unit and almost always the intercepts were conducted by a SAGE Direction Center (DC). This was at times a haphazard operation with little or no preplanning. Tactics were selected that would give interceptors the longest time on target and in the case of so-called low level intercepts (most were medium altitude), the target routes presented no challenge at all.

Let's elaborate on the tactics. We insist on tactics prescribed in ADC Supplement 1 to AFM 3-16. In plain English, if weapons people understand and adhere to standard tactics, you will be credited with a successfully positioned intercept. If you try to bend the rules to give your buddies at the fighter-interceptor squadron a break, you may be charged with a positioning error regardless of the result. These rules and guidelines are clearly established and really require no discussion on the part of the control or fighter-interceptor units. Of course, there will always be extenuating circumstances and the only thing to do if this arises is to request a ruling from the ORI Team member.

Now we come to what agency is responsible for providing control for the intercepts and the criteria. As we stated earlier, the SAGE DCs have provided most or all of the control. Under present policy all units that have a control capability, SAGE, Back Up Intercept Control (BUIC), and manual units, are liable for control. The unit will be selected by the ORI Team based on location, availability of personnel and equipment status. The selected unit will be required to furnish enough personnel to provide control for the exercise and generally, will be selected from the operations crew on duty. In the case of SAGE, it would be expected that the Senior Director on duty would provide the control team from his permanently assigned crew. At BUIC units where a 24-hour control operation is not in effect, the control team would be selected by the operations officer.

Now that we have selected the control site, what are your requirements? You will be subject to a written examination in the supervisory area, Positive Launch Control, and weapons. Scores that must be attained [illegible]e



"you say you're giving us an AFCT ?— What the h___ is that ??!!"

in Ops Plan 3-67. One high and one low intercept per interceptor must be conducted and a minimum of 85% positioning success rate must be obtained. Failure to achieve an 85% will result in a limiting factor and unsatisfactory rating for the GE unit.

The faker routes will be at the discretion of the controlling units. We do expect preplanned routes that meet the requirements for a high and a low. Remember on the low they will be at 3,000 or less with approved evasive action. Expect this and plan for it. Brief your height and surveillance people, make it a real team effort and AFCTs can be a pleasure for Ground Environment units, whoever you are.

TOM WILLE, Colonel, USAF
Team Captain, ADC ORI Team

TORNADO SAFETY RULES

IN OPEN COUNTRY

Move away from the tornado's path at a right angle. If there is no time to escape, lie flat in the nearest depression, such as a ditch or ravine.

IN CITIES OR TOWNS

Seek inside shelter, preferably in a tornado cellar, underground excavation, or a steel-framed or reinforced concrete building of substantial construction. Stay away from windows!

In office buildings: Stand in an interior hallway on a lower floor, preferably the basement.

In homes: The corner of the basement toward the tornado offers the greatest safety. In a house with no basement, take cover under heavy furniture in the center part of the house. Keep some windows open, but stay away from them!

In factories: After receiving a tornado warning, post a lookout. In accordance with advance plans, workers should move quickly to sections of the plant offering the greatest protection.

IN SCHOOLS

Go to a storm cellar or an underground excavation if available. If there is no storm cellar but the building is of reinforced construction, stay inside, away from windows. Whenever possible, go to an interior hallway on the lowest floor. Avoid auditoriums and gymnasiums with large, poorly supported roofs. If the building is not of reinforced construction, go quickly to a nearby reinforced building, or to a ravine or open ditch and lie flat.

KEEP LISTENING

Your radio and television stations will broadcast the latest tornado advisory information. Call the Weather Bureau *only to report a tornado.*

ESSA

American Fighter Pilots Association

'68 ANNUAL MEETING

The American Fighter Pilots Association, formerly known as the "Night Fighters Association," held its annual meeting in conjunction with the AFA convention. New members were being recruited at a feverish pitch as the objectives of the organization were publicized and more clearly defined. A general membership business session took place on April 3rd, and President Walker M. "Bud" Mahurin outlined a plan for increased activity on the part of AFPA with a view toward giving members something of value in return for their confidence and support. The idea was well received and encouraged. A unanimous vote to keep present AFPA leadership in office was made since everyone agreed that a good start in the right direction shouldn't be interrupted by making changes. However, additional members were elected to office so as to reflect the interests of a variety of commands and other branches of the service.

The first Annual Awards Banquet was a great success. The banquet hall was filled to capacity and the program was exceptionally good. During the awards ceremony, Major General Carroll C. McColpin, Commander, Fourth Air Force, presented the General Frederic H. Smith, Jr. Trophy to Colonel Wayne E. Rhynard, Commander, 26th Air Division. The General Winston P. Wilson Trophy was presented by General Wilson, Chief of the National Guard Bureau, to Lieutenant Colonel Lloyd A. Howard, Commander, 141st Fighter Group, ANG. Lieutenant General Arthur C. Agan, Commander, Aerospace Defense Command, presented the Hughes Achievement Award to Colonel William W. Maitland, Commander, 317th Fighter Interceptor Squadron. A new award, the General Gabriel P. Disoway Trophy, was presented by General Disoway to a representative of the 3rd Tactical Fighter Wing, Bien Hoa, RVN. General Disoway then capped a rewarding evening with some interesting remarks on the definition of a Fighter Pilot.

V POINTS

This section of the magazine has been designed for you. Be you a headquarters type at any level, a commander, safety officer, pilot - interceptor, transport, light aircraft - radar intercept officer, mechanic, a civilian in industry, weatherman, doctor, designer, or Indian Chief. This is your corner.

We solicit your ideas, items, notes, photographs, sketches, and pictures. The writing should be less than a paragraph - preferably a sentence or two.

We would sincerely appreciate your inputs mailed directly to: The Editor, INTERCEPTOR, Box 46, Ent AFB, Colorado 80912.

V Hq USAF has approved ADCR 66-23 which authorizes organizational markings on selected ADC aircraft. However, they have placed the following stipulations on the marking of such aircraft:

- Markings contained in ADCR 66-23 will not be applied to camouflaged aircraft. If markings are presently installed, they will be promptly removed.
- The design depicted in ADCR 66-23 will be revised to permit installation of radio call numbers in accordance with T.O. 1-1-4.
- Approval authority for future distinctive unit markings for aircraft shall not be delegated below major command level.

All ADC units have been advised of the stipulations listed above. They have also been advised not to request any AFLC activities or contract facility to remove, apply, or touch up organizational markings. Markings required by ADCR 66-23 must be applied and maintained from ADC resources. (ADMLP-PP)

V A recent safety tip from the 1st Marine Air Wing cautions aircrew members against wearing jungle combat boots in aircraft. They are admittedly very comfortable and cool . . . until you get into trouble. In the case cited, three aircrew members who were wearing the canvas-sided boots received severe chemical burns on their insteps and ankles because their feet were soaked by 115/145 fuel from a ruptured fuel tank. Where their feet were protected by the leather portion of the boot there was no injury. Other reasons the Marines listed for not wearing the jungle boot when flying: no steel toe protection, a must for ejection seat aircraft; inadequate ankle support when making a parachute landing fall. Looks like a strong case for the leather flying boot. (TAC ATTACK)

V In mid-September 1950, Public Law 778 gave the FAA power to govern civil air traffic in peacetime. (ADC-PS)

An effective yet simple tornado alerting system is currently working well at one midwestern Air Force base and could possibly be adopted at some ADC bases where tornadoes are likely to occur. The system works as follows:

- The weather observer on duty in the weather observation site is authorized and equipped to activate the base siren when an **actual** funnel cloud or tornado is sighted visually and the base appears threatened. If the observer is unsure of what he sees, he must confirm by hotline the presence of threatening funnel clouds or tornadoes with control tower and weather station personnel before activating the siren.
- The base tornado siren button located in the observation site is protected from accidental activation in two ways. First, the button is protected by a hinged plexiglas cover and, second, a separate switch in the line must be turned on before the button will activate the siren.
- As the siren is sounded, the duty forecaster also calls the local radio station, which broadcasts information on the funnel cloud or tornado sighting. Base personnel have previously been advised to tune to this station whenever tornadoes threaten. Additionally, base operations notifies the Security Police, who announce the situation via mobile PA system.
- The peacetime emergency signal is used whenever a funnel cloud or tornado threatens (the base). This signal should be publicized monthly in the Daily Bulletin, and instructional cards sent to all quarters and organizations on base. (4WW)

T.O. 4A-1-501, 1 March 1968, directs removal of static ground straps and cables from all series of aircraft. Requirements for static arrestors will be deleted from handbooks. (WGMME-Q)

A recent ejection has again dramatically demonstrated the fact that if all the five mandatory ADC survival items are carried in one pocket, their weight coupled with the "G" forces associated with opening shock can cause the pocket to rip open and allow the items to be lost. Survival vests are being considered as a possible answer to this problem. But until the vests are a reality, we strongly suggest that you carry your gear (as much as you can) in your upper flying suit and flying jacket pockets firmly fastened closed. Think how disappointing it would be to carry your personal survival items for the one big moment in your career and not have them to use. (ADCSA)

The familiar round plastic match container for survival wooden matches can be an explosive hazard unless a precaution is taken. The inside of the cover is rough and abrasive for striking purposes and if the matches are placed in the container according to the T.O. with half heads up and half heads down, they could explode when the cover is closed down on them. To remedy, recommend cutting ⅛ to ¼ inch off each matchstick and then placing a cotton wad on top of the matches before closing the cover. (18OOT-PE)

May 15, 1941. The British flew their first jet, a Gloster experimental aircraft. (ADC-PS)

Certain published missed approach procedures require the aircraft to maintain specified minimum rates of climb per nautical mile. That's right, per nautical mile. (See Oxnard AFB, California, Norton AFB, California, etc.) To make it easy for pilot it is hoped that rates of climb per minute associated with specific speeds will be included in future editions of the "Let down" books. (ADCSA)

DOWN and out

F-101F UNDETERMINED

The pilot and RIO were briefed for a Front/Stern/Re-attack mission. They left the operations building, preflighted the aircraft, and checked in with the combat alert center. After engine start, the tower was called and taxi instructions given. Some minor delays took place but takeoff was finally made. Hand-off procedures were normal and routine intercepts were conducted as briefed.

Subsequently, the aircraft was returned to the traffic control center and a descent to 15,000 feet was directed. RAPCON took control at that altitude with the aircraft approximately over the AF10 Recovery Fix. RAPCON cleared the pilot for penetration and gave the altimeter setting. Both instructions were acknowledged by the pilot. Shortly afterwards, RAPCON asked if the pilot intended to make a full stop landing. He replied in the affirmative. During the next 51 seconds, the aircraft is presumed to have impacted with the water. It disappeared from the RAPCON scope and the pilot did not reply to a communications check. Another aircraft was diverted to the area. Pieces of aircraft wreckage were spotted and the impact area confirmed. There were no survivors in evidence.

During the investigation and analysis, all phases of flight were examined in an attempt to establish any unusual pattern of behavior or mechanical trouble prior to impact. Transcripts of voice communications were reviewed and no abnormal indication was recorded from the pilot. The reconstruction of the flight showed a completely normal mission with normal responses from both aircrew members. The flight path was retraced during the recovery phase and, although a slight overshoot of the penetration radial was evident, it was not considered far enough off the desired track to cause any concern on the part of the controller. Until radar contact was lost, nothing unusual was reported or noted. It was determined that if the pilot was in the process of making a standard penetration, he would have been at 2,300 feet at the time of last communications contact, approaching the level-off altitude. Continuing the profile without level-off would predict an impact point about identical to the actual one.

The inconsistency of the position of any switch or control with what is known of the aircraft configuration and aircrew actions causes extreme doubt as to the reliability of the position of any of these switches subsequent to impact. It was possible to verify the actual position prior to impact of the flaps, gear, and speed brakes. Findings of the structural engineer showed that the aircraft struck the water slightly nose low, wings near level, speed brakes extended, landing gear and flaps up. The value of 292 knots frozen on the true airspeed indicator is considered a reliable indicator of impact airspeed since the instrument reading freezes at its last value when power is removed. In view of these findings, it appears that the aircraft was in a typical jet penetration configuration and attitude when it struck the water. No reliable engine power indications could be found. Overall, there was considerable evidence to support the conclusion that no attempt to level off or recover from a descending attitude was made.

Investigation of the ejection system revealed that both seat safety pins were removed, arm rests on both seats were down, both seat catapults were unfired, and the boost initiators in the canopy were unfired. The canopy was unlocked from the fuselage and torn loose at the hinges, probably caused by force of the impact. Both lap belt/seat man separator initiators were activated as the seats were torn loose. There was absolutely no evidence to indicate an attempted ejection by either crewmember.

Wreckage was examined and tested with no significant malfunctions found either in flight control or trim systems. In the final analysis, investigation could not develop any situation or malfunction occurring subsequent to the last voice transmission which would not result in either an emergency communication from the aircrew, evidence of some attempt at ejection, or evidence of aircraft attitude or configuration change to avoid collision with the water. The last voice transmission occurred approximately 32 seconds prior to impact and was in a perfectly normal voice.

Because of the timing and the lack of evidence of materiel or maintenance failure, it was concluded

most probably the air crew, either through a breakdown of instrument cross-check techniques or spatial disorientation, overlooked altimeter readings during standard penetration to the extent that the aircraft descended through level-off and minimum altitudes undetected and struck the water while still in penetration attitude and configuration.

The primary cause of the accident was undetermined. But if, in fact, the aircrew did penetrate through the level-off altitude and unknowingly allow the aircraft to strike the water, two possibly relevant factors for this were discussed. The first was spatial disorientation associated with the weather conditions prevalent at the time of the accident. Relatively good visibility and meteorological conditions were encountered after penetrating an 8,000 foot overcast and could have resulted in unconscious transition to VFR. Gradually decreasing forward and slant range visibility, the smooth surface of the water, lack of a horizon as the result of little or no color contrast between water and sky, and haze gradually turning to fog on the surface could easily have given the aircrew a false sense of flight condition and relatively position. If the transition to VFR had already been made, at least to the extent that a precise instrument cross-check was no longer being accomplished, the environmental condition as the aircraft descended was such that the aircrew could easily not have become aware of the proximity to the water until it was too late to react.

The second possible contributing factor which was discussed was aircrew fatigue. Two aspects were considered. First, this was the third flight of the day for the illfated crew. Two previous flights were conducted in anti-exposure suits.

After a great deal of questioning as to whether two sorties in the anti-exposure suit could bring on a dangerous degree of fatigue, it was concluded that aircrew capabilities would definitely be decreased. It was further concluded that while medically possible to restore the body with a rest and recuperation period, aircrew fatigue would still exist for a third sortie.

Secondly, it was possible that a more subtle form of fatigue was present and which under the right combination of circumstances could have contributed to the accident. This is a form of mental weariness stemming from excessively long work weeks, excessive alert duty, higher than necessary flying hour programs, and all of these over a long period of time. It is a condition dependent on aircrew manning and simply boils down to trying to do the same job with fewer people.

It's easy to understand why the investigation board seriously took into consideration the possibility of spatial disorientation or aircrew fatigue. Both crewmembers were highly qualified. The pilot's supervisors indicated that his airmanship was well above the average of his contemporaries, and that he was extremely competent. The RIO was very experienced with a lot of flying time in the F-101. Adding up the professional qualifications of the crew, it seems inconceivable that both could fall victim to the same fatal mistake at the same time. And yet, the accident occurred with available evidence pointing in that direction. Was it crew fatigue, disorientation, or even an erroneous altimeter? At best, we can only guess and probably be wrong, at that. But if any lesson can be drawn from this accident, it will be in bringing back to mind the fact that many pilots have put themselves in real trouble by attempting to fly half VFR and half on instruments during deceptive, marginal weather conditions. The school solution is easy. Resist the temptation to look out the window and keep the eyes glued to the instruments. If one or more gauges fail, what else is there to say?

safety officers' FIELD REPORTS

T-33A, STUCK THROTTLE. Flight was normal until approximately 30 minutes after takeoff when attempts were made to reduce the power to idle. The throttle would not retard below the 63% rpm setting. Emergency was declared and landing accomplished with engine shutdown accomplished by using the main fuel shut-offf valve switch. Investigation revealed that the throttle linkage was binding on foreign objects located aft of the rear cockpit seat near the lower left aft corner. Removed from that area were two washers, one 3/16" nut, one small ball bearing, one rivet, and one sheared screw head. The area is an enclosed area and these small items must have accumulated over a period of months and eventually lodged in the throttle linkage area. The aircraft was thoroughly inspected and cockpits were vacuumed. Aircraft has flown to date without recurring discrepancy.

HYDRAULIC LEAK, T-33A. Just prior to an enroute descent upon return from a cross-country flight, hydraulic fluid was noticed to be flowing quite freely into the front cockpit and coming from the left side. The landing gear selector valve was found to be leaking with the gear in the up position, and was replaced.

F-106A, FLIGHT CONTROL. Flight was normal until about eight miles on final for ILS. At that point, with gear down, speed brakes out, and airspeed 200 knots indicated, aircraft rolled to left. Dampers were turned off and aircraft recovered without problem and at that time aircraft rolled to left again. Jet wash was suspected and approach continued. At about 30-50 feet altitude just prior to landing aircraft rolled sharply left again. Aircraft flown at 15,000 and two simulated approaches made with wingman to check airspeed. No other problems occurred and aircraft landed without further incident. Investigation revealed a malfunctioning left and right HEP valve. Also Shelly Intelligence Unit was removed and replaced. Aircraft flown on FCF without discrepancy.

F-101B, FIRE WARNING. Aircraft was 47,000 and had been in full afterburner operation for four minutes when the right engine overheat light began to flash. The pilot immediately moved the throttle out of AB and noticed the EGT dropping through 700 degrees. Maximum temperature is unknown. The overheat light did not go out, so the throttle was retarded to idle, and then the light went out. The crew of another aircraft made a visual check with nothing abnormal apparent. The aircraft returned to base and landed with the right throttle in idle. Several AB cylinders were found to be sticking and it is felt that the most probable cause was the eyelids did not fully open, allowing a gradual temperature increase until an eventual overheat condition existed.

BINDING THROTTLE, T-33A. After approximately 30 minutes of flight, the pilot attempted to advance the throttle which stuck and could not be advanced above the 90% rpm position. Throttle movement was normal thru the idle to 90% range. Aircraft was returned to home base and successful SFO pattern and landing accomplished. Upon investigation, the sleeve on the rear throttle was found loose and had slipped down, preventing the throttle from being advanced above the 90% rpm position. The sleeve was secured in its proper position and engine response was normal throughout the full throttle range.

F-102A ATTITUDE INDICATOR. Pilot was performing Emergency AC Bus electrical check after engine start. It was found that the attitude indicator was 180 degrees out of phase (indicated level inverted flight). This aircraft had been written up the previous day for having an inoperative Emergency AC Generator and a new one had been installed. Investigation revealed the new emergency AC generator wired improperly at overhaul. Generator had reversed rotation causing attitude indicator to be 180 degrees out of phase. Corrective action was to remove the Emergency AC Generator.

UCK THROTTLES, F-106A. After fifty minutes of flight, pilot suddenly couldn't retard throttle below 94%. After two practice approaches, an uneventful landing was made by shutting off fuel switches seven seconds prior to touchdown. Inspection disclosed a bolt had fallen into throttle quadrant and jammed there restricting throttle movement beyond that point. Bolt was removed and an engineering study requested from SAAMA to install same type of dust cover as in the F-105D.

• After approximately one hour of flight, while performing a go-around from an SFO, the pilot of another F-106A had to hammer the throttle with the palm of his hand to increase the power setting. A landing was performed without incident. On inspection, with the throttle quadrant removed, considerable FOD was found on the cockpit floor behind the left hand console curtain. The friction lock on the throttle was scored. Suspected cause was that a grain of sand got on the brake drum, temporarily jamming the throttle brake drum. Entire throttle quadrant was replaced.

T-33A UNSAFE GEAR. After takeoff nose gear indicated unsafe up and down. A check over mobile indicated gear OK in both up and down position. After aircraft burned down fuel and performed one touch go to test it, an uneventful landing accomplished. Cause: Nose up-lock switch out of adjustment caused linkage to bend in opposite position.

LOW HYDRAULIC PRESSURE, F-102A. When the landing gear was raised after takeoff, unsafe gear indications were received (red bar and handle lights, horn blowing). Recycling had no effect; however, the gear would indicate down and safe when the handle was down. On the second recycle attempt, the gear came up and warnings ceased, so the mission was continued. When climbing through approximately 21,000 feet, the pilot noticed that the aircraft was not responding normally to control stick movements. A check of the secondary hydraulic system pressure showed 800 to 1,000 PSI (primary was normal), and the hydraulic fail light began blinking. An emergency was declared and the aircraft returned to the base. The gear was extended with the emergency system and a safe precautionary landing was accomplished. Post-flight inspection revealed a loose "E" nut connection on a flex hose of the secondary hydraulic pump. After the hose was connected properly, the hydraulic system bled and serviced, the secondary hydraulic pump was changed, and the system operationally checked OK. The landing gear was recycled approximately 25 times without malfunction.

F-102A, ENGINE VIBRATIONS. Engine vibrations were noted after takeoff while in afterburner. Vibrations continued during climbout at military power. Between 20-24,000 feet vibrations increased. Emergency was declared, and aircraft landed without further incident. Investigation revealed the CSD drive shaft had several broken rivets in the damper, caused by improper installation.

F-106A, GEAR BOX. When throttle was retarded to make descent from 39,000 feet, the MA-1 power, AC generator, and DC generator all dumped off and would not reset. Uneventful landing was made as soon as possible. Found engine mounted gear box sheared.

F-106A, CANOPY. Immediately after takeoff canopy unlock warning light came on. Canopy hooks checked OK and canopy handle checked forward. Light remained on but landed as soon as possible. Found left hand canopy limit switch out of adjustment.

F-101B, FUEL MALFUNCTION. External fuel position was selected during the climb. Level-off was made at 25M and the power was reduced to approximately 3,000 pounds fuel flow. Neither the drop tank nor the wing tank would transfer fuel fast enough to refill the fuselage tanks. The level of approximately 10,800 pounds internal was maintained during fuel transferring. The Number 2 dual level float switch was found to be defective and was replaced.

F-101B FIRE WARNING. Left engine aft overheat light came on during recovery flight after approximately 1 + 30 flight time. The light would not go out, the engine was shut down and a successful single engine landing was made. After the aircraft was turned off the runway and shut down, the overheat light remained on. It remained illuminated for 30 minutes. The engine was removed and a check of the fire warning loop revealed a cannon plug had shorted out at the bulkhead connection.

F-101B ATTITUDE INDICATOR. Both cockpit attitude indicators failed after takeoff. The displacement gyroscope, roll and pitch, had failed and was replaced.

F-101B UTILITY FAILURE. On GCA final approach the utility hydraulic pressure went to zero. The hydraulic fluid cooler had failed allowing the depletion of utility fluid. The hydraulic filters showed metal contamination and both utility pumps were changed.

safety officers'

F-101B HYDRAULIC PROBLEMS. Twenty minutes after takeoff the Primary Hydraulic Light on pilot's Telelight Panel came on and the pressure dropped to 500 psi. The pressure came back to normal and the light went out. The pressure dropped and came back to normal three times. An emergency was declared and an uneventful landing was made. After landing, the Primary Hydraulic Reservoir was checked and the filler cap was found to be off. The primary system was reserviced and the right engine was run-up to check the system. No additional leaks were noted and the aircraft departed for home. Ten minutes after takeoff the primary hydraulic light appeared and the pressure dropped to zero where it remained for the duration of the flight. An emergency was declared and a landing made without incident. Investigation revealed that the surge dampener in the No. 1 Primary Hydraulic Pump was leaking and that the hydraulic fluid in the system was depleted. The No. 1 Primary Hydraulic Pump was removed and replaced and also the No. 2 Primary Hydraulic Pump was removed and replaced for preventive maintenance because the pump ran for a relatively long period of time with no fluid in the system. The filters were changed and the system purged. It is felt that this incident could have been averted had both engines been run-up before the aircraft was released from first landing base.

F-101B NOSE OVER. After approximately eight minutes of flight at FL310 and 300 KIAS, the aircraft nosed over violently. The pusher, MCSL, and AFCS were disengaged and aircraft control was regained. The pusher was turned on and the aircraft nosed over. The pusher was switched off and MCSL engaged. The aircraft again nosed over and MCSL was disengaged. AFCS was engaged and again the aircraft nosed over. AFCS was disengaged and an uneventful recovery was completed. Investigation revealed: (1) The MCSL malfunction was due to broken wires on the CADC vane at the flex point where the door is hinged. (2) Pusher: the variable resistor on the pusher angle of attack transmitter was open. The broken wires were repaired and the pusher angle of attack transmitter was removed and replaced.

F-101B, MM-3 MALFUNCTION. After takeoff on cross-country flight, the MM-3 attitude indicator was 20 degrees off in bank and 7 degres off in pitch. No "off" flag. Pilot joined on another F-101 remained VFR and landed without difficulty. Cause was internal failure of the MC-1 rate switching gyro. This caused the gyro to stay in the fast erect mode.

F-101B GENERATORS OUT. After approximately ten minutes of level flight at 35,000 feet, both generators went off the line and would not reset. All unnecessary electrical equipment was turned off to conserve the battery, and after two radio transmission the radio was also turned off as the destination airport was still approximately thirty minutes flying time away. Join up with the aircraft just ahead was accomplished without difficulty and the descent for landing proceeded satisfactorily. The landing gear was lowered, the flaps and speed brakes extended, and the aircraft landed without incident. Both generators and both generator control panels were found to be burned out and were replaced.

B-57A ENGINE MALFUNCTION. The aircraft had been airborne for 1 + 50 when an enroute descent fr FL370 to 15,000 feet was commenced. The desc was made at 300 KIAS and at level-off the engines would not respond to throttle movement. Several attempts were made to advance engine RPM but the No. 1 engine remained at 76% and the No. 2 at 78%. An immediate emergency was declared and the aircraft diverted to the nearest suitable airfield. At this time the pilot selected emergency fuel for the No. 1, and then for the No. 2 engines. Both engines immediately responded to throttle movement. After landing the pilot selected the normal fuel control and both engines again responded to throttle movement. Fuel samples were taken from all fuel tanks, fuel sumps, and fuel controls, but no contamination was found and the water content was negligible. On subsequent run-ups, the engines responded normally and no other discrepancies were noted. The exact cause of the engine hang-up cannot be determined. It is suspected that during descent, minute particles of ice formed in the fuel control while the throttle were retarded. The amount of ice that formed was not sufficient to completely block the fuel flow but was sufficient to restrict fuel flow. When the pilot selected emergency fuel he bypassed the fuel control and obtained an unrestricted fuel flow. The ground temperature at landing base was above freezing which eliminated all traces o in the fuel control.

THE WAY THE BALL Bounces

ACCIDENT RATE

1 JAN THRU 30 APRIL 1968

	ADC	ANG
Thru April 1968	3.4	7.3

MAJOR — ALL AIRCRAFT

ON TOP OF THE HEAP

MO	ADC	MO	ADC	MO	ANG
55	62 FIS	46	87 FIS	76	132 Ftr Gp
51	414 Ftr Gp	45	444 FIS	63	162 Ftr Gp
48	48 FIS	37	18 FIS	61	112 Ftr Gp
46	4600 AB Wg	36	408 Ftr Gp 4677 DSES	51	141 Ftr Gp

ACCIDENT FREE

BOX SCORE

ACCIDENTS FOR Apr / CUM TOTAL	1st AF	4th AF	10th AF	14th AF	4600	ANG
CONV						
T-33		1 / 1				
F-100						
F-101	1	1				
F TF-102	2					2 / 3
F-104						
F-106						
B-57						
F-89						
EC-121						

MINOR ACCIDENTS THIS PERIOD — 0
MINOR ACCIDENTS CUMULATIVE — 2

CUMULATIVE RATE

1 JAN THRU 30 APRIL 1968

	ADC	ANG
JET	4.8	7.9
CONVENTIONAL	0.0	0.0

BY AIRCRAFT		
T-33	3	0
F-89		0
F-100	0	
F-101	8	
F TF-102	19	11
F-104	0	
F-106	0	
B-57	0	
EC-121	0	

RATE = MAJOR ACCIDENTS PER 100,000 FLYING HOURS

*Change in criteria.

we point with PRIDE

Major Jack F. Walker
5 Ftr Intcp Sq
Minot AFB, ND

LOW ALTITUDE FLAMEOUT, F-106

Major Walker was flying an F-106A on a low altitude intercept training mission. When the fire signal appeared on his scope, he visually checked the T-bird target and started a level breakaway, 3,000 feet above the ground. He then engaged the auto assist mode and looked down to jot some figures on his mission card. As he wrote, the engine flamed out. The RPM quickly unwound and the EGT dropped, but there was no change in the noise level to signal the emergency. The IR closed cycle cooler and the raised seeker head continued to fill the cockpit with the same, uninterrupted, resonant roar.

When Major Walker looked up, the airspeed was 250 knots, RPM 40%, and the EGT was 100 degrees. He flipped the emergency fuel switch on and jammed his thumb on the airstart ignition button. The engine gave an immediate and encouraging rumble and the RPM started to slowly increase. The aircraft began losing altitude quickly and Major Walker carefully measured engine acceleration against the increasing sink rate. He eased the throttle forward, but the RPM continued to creep up with agonizing slowness. He trimmed the stick back and locked it against his knees, grabbed an ejection seat handle with his right hand and continued to inch the throttle forward with his left. As the power increased to an effective range, he leveled the aircraft less than one hundred feet above the ground, and gradually regained airspeed. The flameout was caused by a malfunctioning fuel control.

Major Walker, by demonstrating superior airmanship coupled with uncommonly good judgment, has made himself richly deserving of the ADC "We Point with Pride" award.

AFTER BURNING

Address your letters to The Editor, INTERCEPTOR, Hq ADC (ADCSA-E) Ent AFB CO 80912
To be published, your letters must be signed,
but names will be withheld upon request.

SIF AND THE NAVY

INTERCEPTOR has been a popular aviation safety publication with me for several years now. There are at this time two requests and an observation to present.

Some years back, INTERCEPTOR advertised a series of pamphlets that concerned the aerodynamics of landing an aircraft. Are these still available, and if so, would INTERCEPTOR forward copies to this safety officer, or furnish an address where the pamphlets may be ordered from?

TSgt Mashburn's article in the February 1968 issue was an excellent review of SIF from a pilot's viewpoint; however, there was one possible omission. Naval Air Systems Command Avionics Change 170 provides a -3, Code-77 squawk automatically when mergency position of the IFF is selected. For FAA radar purposes, this precludes that one extra pilot step of setting "77" manually on the SIF control box. This feature is especially valuable to pilots of single seat aircraft, but was not mentioned in the subject article. It raises a curious question as to whether the Air Force is using this type SIF equipment modification or not. Many Naval aircraft now have it installed.

It would be appreciated if eight copies of the magazine would be furnished this command each month. Presently two copies are received by mail and are spread thin among some fifteen pilots who hold various billets in MWSG-17.

Major P. T. Llewellyn, USMC
Aviation Safety Officer
MWSG-17, 1st MAW, FMF Pacific
FPO San Francisco 96602

***Our mission is SAFETY and we are happy to furnish ADCPIs and increase the number of copies for this purpose. Thank you for your interest and observation.**

FROM TAC

I have completed a review of our distribution for INTERCEPTOR. We are fully utilizing the five copies received.

Many of the problems brought out in your e tional approach to accident prevention a particularly valuable to our mission. I receive many favorable comments concerning INTERCEPTOR and enjoy reading your fine magazine. Please increase our distribution to ten copies and feel free to toss in any extras you have when your distribution is complete.

Major Everett M. Sutton
23 Tac Ftr Wg (TAC) (OS)
McConnell AFB KS 67221

***Thank you.**

"I AM A TIRED AMERICAN"

I was extremely pleased with the appearance of the "I Am a Tired American" statement on the back cover of the March 1968 issue of INTERCEPTOR. If memory serves me right, I first read that statement in a reprint from either Time or Newsweek Magazine in the last quarter of the 1965 calendar year, during a tour of duty in Turkey.

Due to the fact that there is a limited distribution of INTERCEPTOR in the squadron, I would appreciate it greatly if you could furnish me with at least 75 reprints of the statement for redistribution to all personnel in the squadron munitions branch. If the statement is copyrighted, I would like permission to submit a copy of it to my hometown newspaper (The LaCrosse Tribune, LaCrosse, Wisconsin) for reproduction in their editorial section.

I, too, am a tired American.

1 Lt Neil L. Duresky
OIC Weapons Release
49 Ftr Intcp Sq (MME-DA)
Griffiss AFB NY 13442

***Due to the tremendous response to our March back cover, we have selected this letter to represent our numerous inquiries regarding reprints and the origin of this outstanding declaration. When the statement came to our attention, we checked with news media in this region and they stated that it is in public domain. We have heard various stories as to the origin, but have been unable to verify them. As far as we are concerned, permission is granted to reprint. We, too, are tired Americans.**

"THE HEART OF THE MATTER"

May we have your permission to reprint that excellent article entitled "The Heart of the Matter" which appeared in your November 1967 issue. I like its straightforward approach.

You will be pleased to know that your fine magazine continues to enjoy high popularity among our ADC aircrew; whenever flight safety publications are discussed the ADC quickly come up with "You're not going to touch our INTERCEPTOR distribution!"—keep up the good work.

Capt J. T. Richards
Editor, Flight Comment
Canadian Forces Headquarters
Ottawa 4, Ont, Canada

***Permission is hereby granted to reprint the article. Thank you for your fine comments.**

FROM VILLAFRANCA

I have read your publication "INTERCEPTOR." I should like to know the way to receive it regularly, if possible. I am also interested in any other publication regarding flight safety, published by your agency.

Sure of your kindness, I am waiting for your answer.

Captain Francesco Mazzei
Safety Officer, 132nd Sq
3rd Aerabrigata
Villafranca, Italia

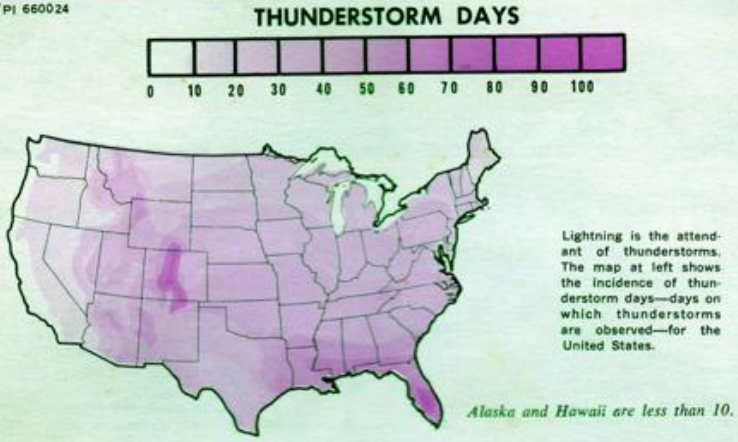
***Thank you for your letter. We have placed your unit on our distribution list, and have additionally included a set of our Programmed Instruction texts that you may find useful in your unit safety program.**

If you would inform the Safety Officer at Istrana that we have these available, he may also desire them for his unit.

It is our pleasure to serve the cause of flying safety with all of our flying units and sincerely hope that we may contribute toward a successful safety program in yours.

the Cold Hard Facts

ESSA/PI 660024



Lightning is the attendant of thunderstorms. The map at left shows the incidence of thunderstorm days—days on which thunderstorms are observed—for the United States.

Alaska and Hawaii are less than 10.

These safety rules will help you save your life when lightning threatens.

1. Stay indoors, and don't venture outside, unless absolutely necessary.
2. Stay away from open doors or windows, fireplaces, radiators, stoves, metal pipes, sinks, and plug-in electrical equipment like radios, television sets, lamps, and refrigerators.
3. Do not use plug-in electrical equipment like hair dryers, electric tooth brushes, or electric razors during an electrical storm.
4. Do not use the telephone—lightning may strike telephone lines outside.

If lightning catches you out of doors:

1. DON'T work on fences, telephone or power lines, pipelines, or structural steel fabrication.
2. DON'T use metal objects like fishing rods and golf clubs.
3. DON'T handle flammable materials in open containers.
4. Stop tractor work, especially when the tractor is pulling metal equipment, and dismount. Tractors in open fields are often struck by lightning.
5. Get out of the water and off small boats.
6. Stay in your automobile if you are traveling. Automobiles offer excellent lightning protection.
7. Seek shelter in buildings. If no buildings are available, your best protection is a cave, ditch, canyon, or under head-high clumps of trees in open forest glades.
8. When there is no shelter avoid the highest object in the area. If only isolated trees are nearby, your best protection is to crouch in the open, keeping as far away from isolated trees as the trees are high.
9. Avoid hill tops, open spaces, wire fences, metal clothes lines, exposed sheds, and any electrically conductive elevated objects.
10. When you feel the electrical charge—if your hair stands on end or your skin tingles—lightning may be about to strike you. Drop to the ground immediately.

LIGHTNING SAFETY RULES