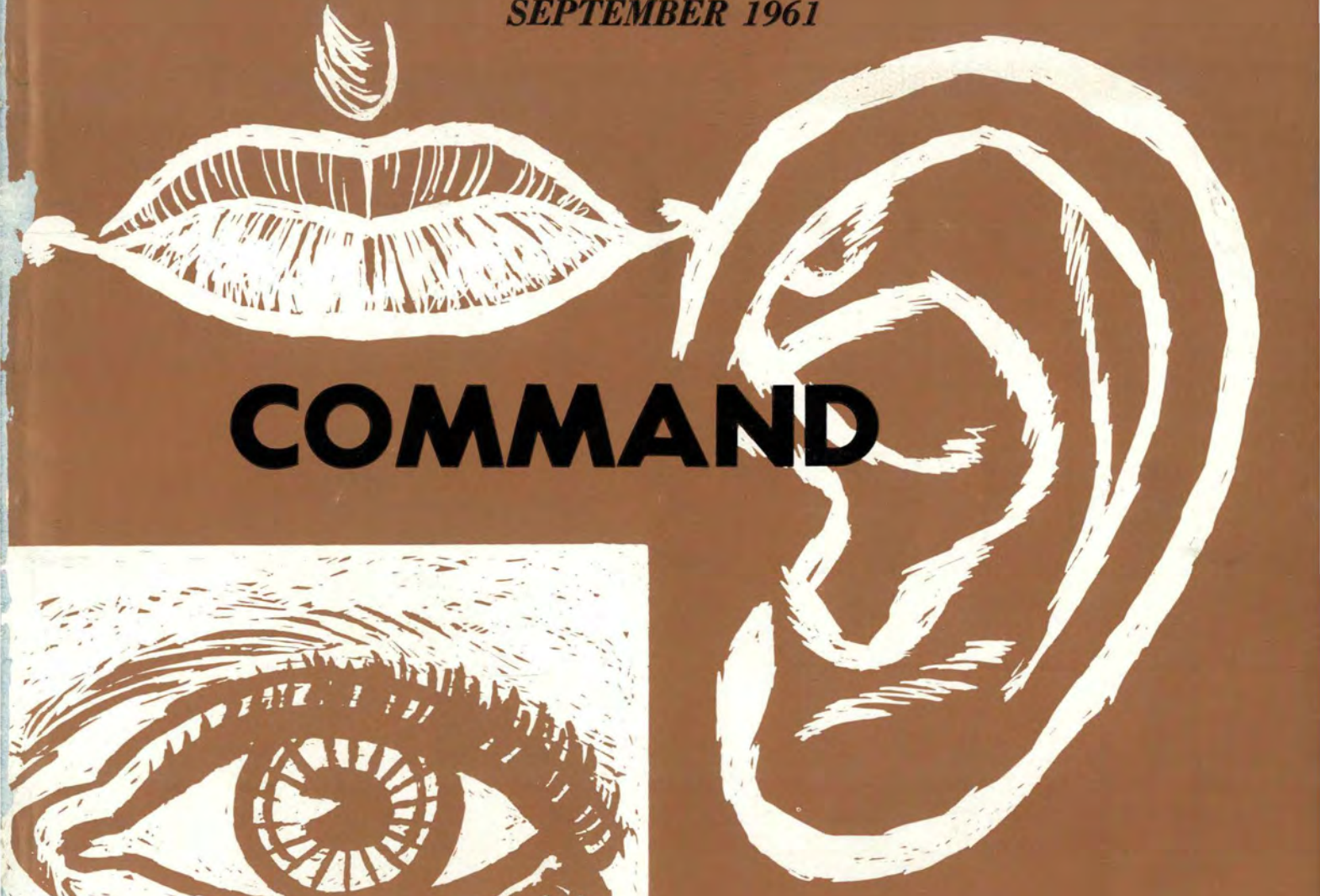
AEROSPACE

SAFETY

UNITED STATES AIR FORCE

SEPTEMBER 1961



COMMAND

...and SUPERVISION

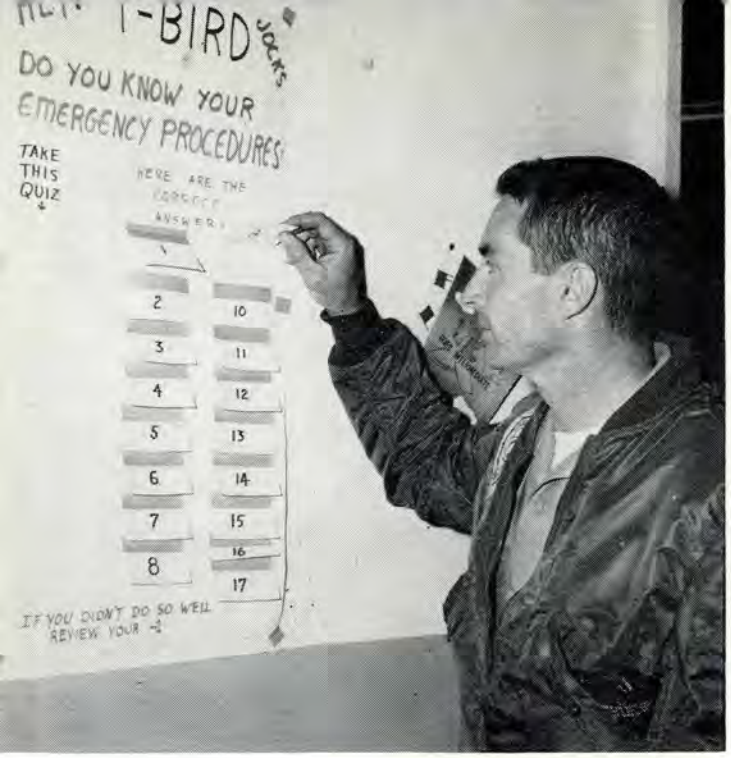
Got there just like my flight plan predicted, 1200 pounds of fuel left, and right on ETA.

The only flight planning he does is to call the ticket office when he goes by commercial airline.

POINTS OF VIEW

Clean up what, I don't see anything wrong.

The Old Man came down to meet a VIP and when he saw . . .



T-BIRD QUIZ

Capt. Leo J. Lee, jet instructor at Norton AFB, tries his hand at the T-Bird quiz which appeared in the April issue of AEROSPACE SAFETY. Captain Lee clipped the questions and answers out of the magazine and mounted them on heavy paper with a bit of paste and masking tape. Answers are under panels on right side of the board, opposite the questions. The board is mounted on the wall in Area 2 Base Operations where pilots can hardly miss it. We have another quiz for you on page 22. This one is on Clear Air Turbulence. Roge' and out. ★

IN THIS ISSUE

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Feature Editor
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VOLUME SEVENTEEN NUMBER NINE — USAF RECURRING PUBLICATION 62-1

The Thundering

The relative quiet of the control tower was disturbed by a cool voice.

"Nellis tower, this is Cobra Cat Leader, I have an ATM failure and I'm declaring an emergency."

"Roger, Cobra Cat Lead, landing at Nellis is Runway 02 left, call base leg with gear, crash equipment will be standing by."

Immediately after this transmission the tower operator picked up the phone and activated the crash line to the rescue section and the flight surgeon's office. Within a matter of seconds the chopper was warming up. As they prepared to take off in the helicopter, one of the pilots turned to the other and asked what the emergency was.

"It's an F-105 with an ATM failure."

"Oh boy, that's bad, we'd better get airborne right away." After a moment's hesitation, he asked again: "Say, what is an ATM failure?"

The other pilot answered, "Beats me, but I guess it's something bad."

(ATM: Air Turbine Motor used to drive the alternating current generator and the utility system hydraulic pump.)

And so a new a aircraft made its appearance at Nellis.

With the advent of the F-105 at Nellis, the problems associated with the initial breaking in of this aircraft were well thought out prior to the actual arrival of our first "Thunderchief." The example cited above actually happened but the education of all base personnel associated with the '105 has proved fruitful and comprehensive, and the statement "beats me" is no longer heard.

What were the problem areas that we would have to research before we started a full scale operation? We had heard initially about the noise level of the aircraft and the problems associated with working around it. Extra ear muffs and ear plugs were ordered for all ground personnel. The flight surgeon's office procured a decibel reader and plans were underway for testing the aircraft and engine noises as soon as the F-105 made its first appearance on the airdrome.

Personal Equipment was asked to look into the feasibility of modifying our flying helmets through a retrofit program so as to get the most sound suppression attainable with present equipment. This was not the only problem that we thought of at this time. Seymour Johnson AFB had been flying the F-105B model and we called upon their knowledge and experience when we set up certain portions of own F-105D program.

The advantages of the aircraft itself were considered as points to watch for in a preventive flying safety program. The airspeeds that were programmed for use in all the phases were not just airspeeds; they were the *limiting airspeeds* of the aircraft itself. This was one time when we were going to use the aircraft as it was designed to be used. Our program was built around the utilization of all aspects of our radar weapons system. In addition, each pilot going through the course was to get a complete indoctrination in the use of the new vertical instrumentation.

Some of the problems associated with the capabilities of the Thunderchief that were considered prior to the commencement of the program are as follows:

- On high airspeed, low altitude runs, the pilot's reaction time to an unsafe condition was analyzed and safety precautions were built into the course.
- Would the new instruments prove to be difficult to understand? Are we giving our pilots enough instrument training, and do we have enough standby instruments in case of failure of some "black boxes?"
- Inadvertent booming and its effect on the civilian community.
- The ground noise problem.
- With so much radar work incorporated in the program, how could we make the missions effective and still keep our head in the cockpit, look at the scope, and not worry about airspace separation?
- Using high indicated airspeeds with stores aboard increases the danger of overstressing the aircraft or the stores.
- The fire hazard created by using cartridge starts for all ground starts and the hazard created by siphoning fuel overboard on the ground.
- New hand signals had to be developed to cope with things like the bomb bay doors and the Ram Air Turbine (RAT), for pilot-to-crew chief coordination.

Each area was treated individually and a solution was incorporated for each suggested problem area. New routes were devised along with sonic boom areas to lessen the chance of inadvertent booming.

We require a chase pilot for all missions that utilize radar, both high and low level, and have incorporated instrument training at the completion of all radar flights so that instrument proficiency is high at the completion of the course. We have available a standby airspeed indicator and a standby altimeter in case of failure of our vertical instruments. Also, we have initiated requests for a standby attitude gyro to be installed,

THUNDERCHIEF

and this modification will be in all our aircraft shortly. Limitations on the aircraft carrying stores have been stressed and even though these restrictions are high we use them as a guide to go by during maximum performance maneuvers. Ground handling of the F-105D was facilitated by a rapid and thorough checkout of our crew chiefs both in taxiing and engine runup and in the use of ground handling equipment.

We have an excellent Mobile Training Detachment here at Nellis with the best mockups ever devised, and all our crew chiefs and pilots are required to attend the course. It has paid tremendous dividends all the way around. Our hand signals have been standardized and when the bomb bay or the RAT is actuated, we are not in fear of closing anyone in them. A fire truck has been stationed in the F-105 area and the specific purpose of its crew is to be alert for any fire hazards in the starting area. We felt that after getting all of this accomplished, we were ready to accept our first '105s.

Our initial concern with certain suggested problem areas has paid off handsomely. We had one fire on starting and the rapidity of the fire department in putting it out was demonstrated by no damage whatsoever to the aircraft. We are able to get our program off to a fine start.

Other problems did arise and we found no difficulty in solving and alleviating all of them. The aircraft was designed with safety in mind, so it has proved to be one of the most reliable airplanes that has ever hit the Air Force. It is so easy to fly and has such nice handling characteristics that all the pilots checking out in it soon found themselves in love with the brute. This fact also facilitated the check-out program as the airplane is an easy transition from other aircraft. The short field landing and takeoff capability, along with the cartridge starter and the excellent turn-around time, gave us a tremendous training potential. The crew chiefs and specialists found the '105 easy to maintain, and just the fact that we get about 60 landings per set of tires made our ex-F-100 crew chiefs happy to have made the move.

After the training course was underway we did experience some new and distinct problems. It's difficult to try to outwit the aircraft on what you'll have trouble with. These areas came to light:

- On gun firing, using long bursts, exhaust gases from the "Gatling Gun" were vented into the engine intake causing chugging and minor compressor stalls.
- Fuel would siphon out of the overflow drain in large quantities anytime the aircraft would decelerate, in flight and on the ground.
- Stick bind was experienced in two cases in flight due to a failure of a thermal blanket on the control actuators, and ice formed in the control system. (In both cases full control was regained at a lower and warmer altitude.)
- Foreign object damage is still a problem, despite the intakes being very high off the ground.
- Sink rates without power on landing are high and power-on approaches are mandatory.
- Retarding the throttle at high mach numbers (above 1.3) causes compressor stalls. (Ed. Note. The throttle must be maintained in the full forward position above Mach 1.3 in order that the engine airflow schedule may match the variable air inlet [VA1] system to avoid engine and duct instability.)
- Inability of some pilots to correctly analyze discrepancies for write- up on the Form 781, concerning the fire control system.

All of the previous problems have been alleviated or are in the process of being alleviated by modification. We have received excellent support throughout the Air Force on facilitating changes into the aircraft. We have a team of specialists housed in a hangar directly next to the F-105 flight line and it is mandatory for all pilots to see the "diagnostic team" after every flight in which the fire control system has been used. The pilots take the Form 781 with them and go through a debriefing with the "team." The team members (our own specialists and some factory engineers from the companies concerned) help the pilots make their write-ups. They also aid in helping the pilots to assess their own techniques and procedures. This team has proved to be of high value in tracing troubles correctly and in helping to spread the word.

Republic Aviation has been outstanding in its help and cooperation in setting up the program. During our flying safety meetings each week, usually we are privileged to hear some representative of the Company give a talk on the various aspects of the aircraft and its systems. A question-and-answer period follows, and much information and insight are gained from these sessions. The Company also publishes a "Pilot's Poop Sheet" which has any information the Company pilots may come up with that is different or out of the ordinary. By using this information and our own gleaned from the course, we have been able to indoctrinate new F-105 pilots with the correct methods and procedures right from the beginning.

I have borrowed liberally from AEROSPACE SAFETY on the use of gimmicks to get flying safety across to pilots. We have a slot machine (we're in Las Vegas, of course) that comes up with emergency procedures instead of lemons, and it doesn't cost a cent. Periodic testing of the pilots and a number of displays round out most of the effort to get the point across. We have found that aside from Rex Riley's secretaries, most pilots do not want pretty pictures about flying safety, but would rather have the facts easily accessible. Just what they can and can't do with the aircraft is posted conspicuously; this, plus a constant drumming-in of procedures, seems to bring good results.

The flying safety program in the squadron is necessarily a dynamic one and a great deal of the credit should go to Lt. Col. James E. Bean, our Squadron Commander, for his insight in the initial setting up of the program, utilizing his previous experience with the '105-D at Eglin when the program was in the diaper stage. Capt. Bob Jondahl, our maintenance type, is largely responsible for the "gung ho" attitude of our crew chiefs and our superb maintenance. Most of all we are dealing with experienced, fine pilots who are definitely motivated and eager to try the F-105 on for size.

The F-105D is a challenge, both in the respect that it is a complete weapon system in itself, and is a new aircraft to fly. It has proved itself here and I'm sure that if necessary it'll prove itself in combat. ★

Capt. Saul Waxman, 4526th Combat Crew Training Sq (Tac Ftr), Nellis AFB, Nev.

Left, Lt. Brown demonstrates underarm life preserver and back chute at safety meeting. Right, operation of seat kit is explained by MSgt Reid to TSgt Montgomery.

GET PERSONAL

The sergeant in charge of the Personal Equipment Section carefully opened the box that had just arrived. The label stated it contained oxygen masks, and additional ones were needed. When he pulled the first mask from the container he noticed that instead of the familiar plug-in type with rubber washer and valve, this mask had a connector with three lugs.

After examining several more of the masks he repacked the lot and shipped the box back to the depot, muttering under his breath at the stupidity of the person responsible for sending him masks he could not use.

The masks he had received had the new three prong connector designed to be used with the now familiar CRU/P8 unit. But the sergeant had not received any CRU/P8s and knew nothing about a new connector. A week later the new connector units arrived.

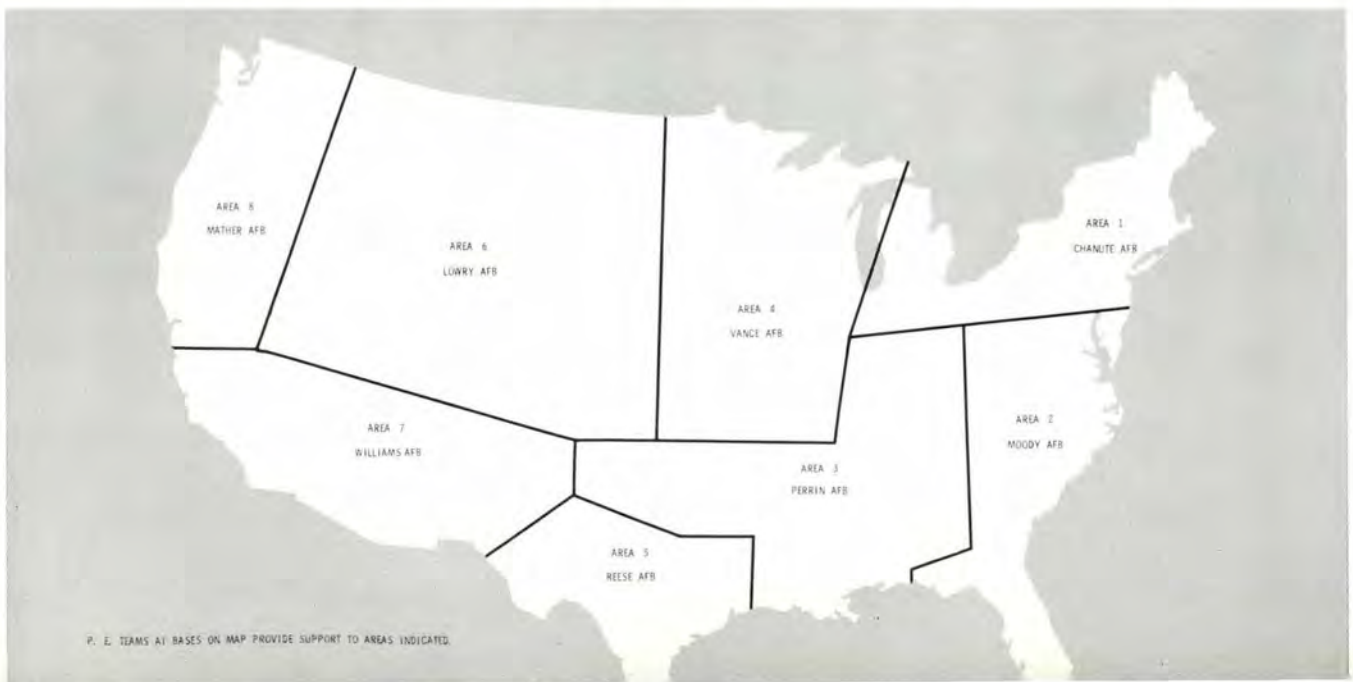
The mistake was not the sergeant's fault, but resulted from the equipment's reaching the field before the word. To prevent such incidents as this is one of the functions of the new Personal Equipment Mobile Training Teams.

The rapid development of varied items of personal equipment led Air Force headquarters last year to establish the Personal Equipment Mobile Training Team concept on a one-year trial basis. Nine teams were formed within existing manpower resources of the Physiological Training units of the Air Training Command. There are now eight teams consisting of one officer and one technician at Perrin, Webb and Reese AFBs, Texas; Craig AFB, Ala; Chanute AFB, Ill; Vance AFB, Okla; Lowry AFB, Colo., and Mather AFB, Calif.

Team members attended the Personal Equipment Officers' Course at Chanute AFB and the Partial and Full Pressure Suit Maintenance Courses at Brooks AFB, Tex. Briefings and technical assistance were furnished by Aeronautical Systems Division (formerly WADD), Wright-Patterson AFB, Ohio. The teams were also represented at the Personal Equipment Advisory Group Meetings, to obtain additional information on the state of development and expected procurement dates in order to coordinate with all commands on the specialized training they desired.

A pretty good idea of how the teams operate can be gained from noting the functions assigned to them. These are:

- To indoctrinate field personal equipment techni-



cians on new and advanced items of personal equipment being brought into the Air Force inventory.

- To establish a degree of standardization and indoctrination in the use, care and maintenance of personal equipment.
- To promote closer liaison among using organizations for the sharing of experience.
- To correct on-the-spot discrepancies.
- To brief, on request, aircrew or other personnel on the use of personal equipment.

Although training is the only mission of the teams, we had to overcome a general feeling that we were inspectors. We feel now that this has been accomplished and that the personal relationships established between team members and personal equipment specialists in the field will result in some real improvements in the use and maintenance of the equipment.

The teams now have a year of experience and have been given the green light for fiscal year 1962. The first year, however, had its problems but they have been or are being solved. For example, at Perrin AFB we had an initial budget of $1000 for travel for the year, 19 bases to visit, and no available aircraft. We solved the problem by using the Aero Club's Mooney Mark 20, which came in mighty handy but was less than ideal for long trips.

A typical team visit begins with notification of a proposed visit to a base through its command headquarters. After the visit date has been confirmed by both the base and command headquarters, we make a study of the mission of the base and the type of aircraft it uses. From this study the personal equipment of primary value to the base can be determined. We usually have a few new items which we show the base PE specialists. We instruct them in the use, care and inspection of these items.

We showed the new MBU-5/P oxygen mask to the jet units we visited, demonstrated the breakdown and installation of the new valve and discussed the fitting of the mask, along with the Sierra Retention device and its positioning on the helmet. Possible problems were discussed and solutions recommended. Such previews, we have found, have greatly helped base PE specialists to make effective use of the new equipment when they receive it.

After a team arrives at a base the first task is to brief the commander on the purpose of the visit. This is repeated with the PE people, with emphasis on the fact that the team is there to train and *not* to inspect. Training is usually conducted in a discussion manner with team members explaining the equipment and the PE personnel asking questions. This results in a relaxed atmosphere with both sides learning. Also, we pick up ideas that can be offered to other bases. Every attempt is made to give due credit to the originator.

An example of what a team can pick up and share

CRU-8/P Connector Assembly

A pilot lost consciousness while riding in the rear cockpit of a T-33 aircraft. The cause was attributed to the reinforcement ring which prevents a visual check of the connection between the CRU-8/P oxygen mask to the regulator connector assembly and the three-prong bayonet. The reinforcement ring was installed in accordance with T. O. 15X5-4-1-511.

Similar incidents have been experienced with connectors not having the reinforcement ring installed. Therefore, it is imperative that users of this equipment take special precautions to insure that a proper connection is made, regardless of whether the reinforcement ring is or is not installed. This is easier on connectors not having the reinforcement ring, since a visual inspection will suffice. The following method will insure a proper connection when the reinforcement ring is installed.

- Push three-prong bayonet into connector for approximately ¼ inch.
- Turn bayonet clockwise for approximately ¼ inch.
- Release bayonet.

There should be a noticeable movement of bayonet outward from the connector assembly. NOTE: In the event excessive force is required to insert bayonet into connector, units should be returned to the Personal Equipment Shop and replaced with units that are properly mated.

Col. C. A. LeClair, Tinker AFB, Okla.

1/Lt Charles L. Brown, Personal Equipment Officer, Perrin AFB, Texas

concerns local purchase items. These include such things as waterproof matches, fishing kits, soap, and tissues. Some bases have had trouble in finding local purchase sources in their areas and we have been able to supply them with addresses. We also assist the PE sections with their OJT programs and emphasize the importance of proper technical order files. Tech Order changes are discussed and clarified. Questions that we cannot answer are referred to the PE School at Chanute AFB and the Aeronautical Systems Division (ASD), and as answers become available they are forwarded to all teams and bases as general information items.

MSgt Hugh D. Reid Jr, briefs Perrin AFB personal equipment technicians (above) on the MBU-5/P oxygen mask. Below, Lt. Brown and Capt. George C. Braue explain survival signal light to helicopter pilots.

The teams are also available for presentations to flying personnel and, if possible, will visit a base whenever their services are needed.

The reports made by the teams are widely disseminated. Copies go to the base visited and its command headquarters, to the other teams, and to the Air Training Command Physiological Training Coordinator, who is in charge of all teams. Other recipients are the PE School at Chanute, ASD, the School of Aviation Medicine at Brooks AFB, and to the numbered Air Force Headquarters.

So, we have plenty of paperwork. In fact, our Perrin AFB team has been described as "a walking, talking newsletter on personal equipment."

The reports are relatively brief and cover just those items we discuss with base personnel. Some excerpts from one report will suffice to illustrate: The team briefed the unit on new items about to be received in the field of interest to B-52, KC-97 and KC-135 crewmembers. The following equipment and its known problem areas were discussed: HGU-7/P helmet, MB-3 helmet changes, MC-1 sleeping bag and container, D-10 Bill Jack helmet (now the HGU-9/P), survival recognition light, CPU-26/P pilots miniature computer, pilots knee board (new), and use of the MC-1 survival knife and pocket.

Problem areas were pointed out and fixes were shown. The new MBU-5/P mask was introduced—this item had not yet arrived at the base. The possible problem of mounting Sierra retention devices in Hardman retention holes was pointed out. The Hardman retention holds a two-point suspension, whereas the Sierra device has a single point. Field experience has shown that this has resulted in improper fit of the mask.

The unit showed us a pocket survival kit they were issuing to T-33 pilots. The kit used the accessory packet from the MA-2 life preserver and contained a wrist compass, match box, pocket knife, first aid kit, whistle and mirror. The unit also had a locally purchased small fishing kit for which many bases had been looking. The purchase source has been transmitted to them.

As knowledge of the teams' activities spreads and commands and bases become more familiar with the services we can provide, it is expected that we will be called upon more often. One of the goals of each team is to create a working relationship with the bases in its area whereby Personal Equipment Units will call upon them when they need help.

There will undoubtedly be changes in the way the teams operate. This is to be expected. Flexibility is a necessity for the teams, because, as aircraft and requirements of the Air Force change, so must the demand for proficiency and knowledge of the equipment by the men who use and maintain it. The business of the Personal Equipment Mobile Teams is to keep up to date and proficient and thereby help aircrews and PE specialists stay up to date on what's new. ★

Project SCAN, the pilot-reporting program for obtaining data on mid-air near-collisions, has been in operation for nearly two months now. Have you had any close ones to report?

Probably by now most pilots have heard about SCAN. In case you haven't, the program began on July 1 and will last for six months. It is being conducted by the Flight Safety Foundation under a contract with the FAA. After five months of operation an interim report will be made to FAA, with a final report to be delivered within 60 days after the end of the program. The findings will be used by FAA in its campaign to improve air safety.

Any pilot who experiences a near-collision is requested to fill in a stamped and self-addressed Project SCAN form and mail it to the FSF. When the report is received at the Project SCAN office, the information it contains will be analyzed, coded and the data converted to stastitics to be forwarded to the FAA. In the meantime the original report will have been destroyed so there will be no chance for a pilot to incriminate himself.

Where the analyzed information suggests the need for changes of any kind—changes in procedures, traffic patterns, even aircraft cockpit or instrument design—specific recommendations will be formulated and submitted to the FAA for action. Actually, this is where Project SCAN differs from prior incident-reporting programs. Other such programs have dealt solely with statistics, with the "how manys" instead of the "how comes." Project SCAN deals with the "how comes" or the "whys" as well as the "how manys."

The educational aspects, the conclusions and recommendations arrived at through detailed analysis of the data taken from the Near-Collision reporting forms, is the all-important part of Project SCAN as far as pilots are concerned.

Project SCAN Near-Collision reporting forms, postpaid and self-addressed, have been made available to pilots, military and civil, throughout the United States and Puerto Rico. In addition to copies that already have been mailed to all licensed pilots, supplies of reporting-forms are available from flight safety officers at Navy, Army and Air Force bases throughout the U. S. and Puerto Rico, at Operations offices of the military services, at U. S. Coast Guard air bases of operations, at civil airline operations and/or dispatchers offices, at airport managers offices, airport weather facilities, and all control centers.

The fact should be stressed that no signature is required on any submitted Project SCAN near-collision reporting form. Thus pilot anonymity assures the confidential tone of the reporting program. Even if, for one reason or another, a pilot were to sign his incident report, this information is destroyed. Nothing of a personally identifying nature is retained in the analysis or coding of the reports. IBM machines won't talk—except in numbers—and nothing more than statistics and the resultant recommendations are submitted to the FAA.

Pilots have been aware of the problem of mid-air collisions almost since the day there were more than two aircraft in the sky. More recently, however, as the speeds of aircraft increased and the airways have become as busy as the nation's highways on a holiday weekend, the need to do something about the problem has become more apparent.

In 1954 both the Air Transport Association and the military ran their own independent surveys of near-collision incidents involving their own aircraft. From 1956 until 1959 the Civil Aeronautics Board conducted a similar survey, instigated largely at the request of commercial airline pilots. One main result of these prior studies was to prove conclusively that there was indeed a problem.

In 1959 when the CAB terminated its program of collecting near-collision reports, the Federal Aviation Agency took over the survey. Unfortunately, however, when the pilots realized the FAA had a legal obligation to take disciplinary action against a reporting pilot if and when a violation was apparent, the submission of voluntary reports from pilots dropped off to a trickle.

Over a 12-year period (from 1948 to 1959), the U. S. scheduled airlines were involved in 20 mid-air collisions, seven involving fatalities to airline passengers, seven to the occupants of the other aircraft, and six resulting in no fatalities. By estimate, there were 25 million airline flights in those 12 years, thus averaging out to one collision per 1,250,000 flights. In general aviation (private flying) there has been an average of 15 mid-air collisions per year. During the past few years military aircraft have been sharing the air at all levels with civil aircraft. Even so, there were only eight mid-air accidents in 1959 and just one in 1960. There were no fatalites nor destroyed aircraft during 1960.

Considering the amount of flying, the record is good. BUT . . . the midair collision is potentially so catastrophic that even one is one too many.

A near-collision is a potential mid-air collision: by definition, "A condition of flight in which the safety of an aircraft is assumed to have been jeopardized by the proximity of another aircraft."

This is the "why" of Project SCAN. It is an all-encompassing effort to find ways and means of eliminating the problem of mid-air collision, of making flight safer.

Project SCAN offers all pilots an opportunity to participate in this program. It requests the cooperation and support of pilots, military and civil, so that it may accomplish its purpose—to find solutions to the problem of flight hazards. BE SURE YOU SUBMIT YOUR PROJECT SCAN REPORT! ★

Missing the Missus

Mrs. Janie Swanson, USAF Wife, Anchorage, Alaska

Every man has problems, annoyances and worries. In most cases all three can be spelled w-o-m-a-n. She may be notoriously unreasonable—and even a little hardheaded. Worst of all is to be married to one.

To illustrate, let's take an early morning peek into the private lives of Captain Gregory Gulbransen and Lieutenant Milton Merriweather. We'll start at the Gulbransen home.

"What's with all this wifely efficiency?" asked Captain Gulbransen, as Hilda snatched his cup and saucer before he finished swallowing his coffee.

"Big day today," she replied briskly. "Got your briefcase?"

"Yep. May be a little late," he added, leaning over the steaming sink to kiss her goodbye.

She turned abruptly. "What do you mean, you may be late? The Colonel and his wife are coming for dinner tonight. Did you forget?"

"Well," Gregory explained, "Milt and I are flying over to Mountain View."

"I'm sorry I snapped at you then—that's only a couple of hours each way, isn't it?" answered Hilda, apologetically.

"Yes," he agreed, "but you never can . . . "

Hilda flicked on the vacuum cleaner and said, confidently, "I'll see you about five o'clock, honey."

Across the street, Lt. Milton Merriweather put his breakfast dishes in the sink, then slipped quietly into the bedroom.

"Are you awake?" he whispered.

Alice Merriweather opened one eye and said something that came out "ummmphh."

"Do you feel any better?" he asked.

"Oh . . . yeh . . . I'm fine." She rolled over and pulled up the blankets.

Captain Gulbransen sat in his car at the curb, racing the engine impatiently. He honked the horn for the third time. Lt. Merriweather called out "just a minute" and turned to get his raincoat. A light drizzle had just begun to dampen the sidewalks.

If Gregory Gulbransen and Milton Merriweather were junior executives off for a day of conferences and cost analyses, the morning pressures might spoil their day. Greg, worrying about impressing the boss, might bark at his secretary for trifling errors and skip lunch to be sure that he got home by 5 o'clock. He might get a headache or forget his briefcase. Milton might call home at 10 o'clock and find his wife's illness worse and take the afternoon off to drive her to a doctor.

But Gregory and Milton are not junior executives. They are fighter pilots and are going to spend their day at the controls of a complex flying machine. In murky weather they can't simply shake out their raincoats and turn on more lights in the office. Despite well-meaning exhortations to the contrary, they can't always leave their problems on the ground. But they had better recognize a bad day when it slaps 'em in the face, or they won't be around for the good ones.

Recognizing one of those days, however, is not the time to begin coping with it. You don't preflight your aircraft 20 minutes *after* takeoff when you suddenly discover your tanks are siphoning fuel. By the same reasoning, please don't try to explain the whys and wherefores of inevitable delays to a woman while she's in the midst of party preparations, or to one who is nursing three preschoolers through a bout of chickenpox.

Preplanning is the key to successful missions. Isn't that the reason for the Form 21a? There really ought

The whole problem is not just that pilots are in such an all fired rush to get home but that wives who don't understand are in such a snit if their men are late.

to be a Form 21hf (home front). One wild, reckless evening just let Matt Dillon or Paladin fight their battles alone, while you brief the female copilot in your life.

Despite the fact she is unreasonable and unfathomable, you must have been attracted to her to marry her in the first place. You know that she would like for you to be home in time for dinner every night—well, several days a week anyway. But have you ever really *explained* why this is sometimes impossible? Do you give the old girl credit for a modicum of good sense and the ability to understand a reasonable explanation?

When asked why so few men take the time to explain, Captain Aloysius Anonymous offered a rather startling explanation—and admission: "Perhaps it is because we often use the pressures of duty as an easy excuse, when we know inside that the business was not really that important."

Perhaps you do. So what? It works two ways. Surely you've suspected that your exhausted wife didn't really have such a rough day when your blue shirts aren't ironed, but the bookmark in her novel has progressed to the three-quarters mark.

So the woman in your life is no mechanical genius. You don't have to teach her how to repair an internal combustion engine to explain that there are several dozen kinds of spark plugs and you have to have the one that *fits*. It shouldn't be difficult to find a picture of an aircraft damaged by hail, when you explain why you can't spend three or four hours dodging thunderstorms when you have five hours fuel aboard—and no place clear to land when that's gone.

A few pilots tend to glamorize and romanticize their narrow escapes. Try listening to one at the next party you attend. (There is probably some psychological explanation, but that is another department.) The impression many women get from listening to "war stories" is that these guys love trouble. They may have a dim understanding of the trouble, or none at all, so it just plain scares them.

Certainly a man doesn't set out to frighten his wife intentionally—let us hope. If he has done so by omission, it is easily corrected. Fear and uncertainty are so closely related as to be virtually synonymous. One of the most common uncertainties a wife faces is, "where is he?" He hasn't phoned so she assumes he will be home at 5:30, as usual. At 6 o'clock she is annoyed. At 6:30 little unnamed doubts nibble at her nerves. By 7:30 she is plainly and frankly worried, but not wanting to be tagged a worry-wart, she sits on her hands and tries not to stare at the telephone. The Lord of the Manor breezes in at 8:30. He "got talking with some of the boys and lost track of the time."

For three hours this girl has been frantic, imagining "he was in an accident; he's sick; he got robbed and is bleeding in an alley somewhere." Three hours she has wasted worrying about this big lunkhead, and he was sitting at the club downing cool ones. Don't laugh! What horrible visions did you conjure up the last time *she* was a couple of hours late getting home from her ceramics class?

It's not too late to start a campaign for understanding (if it were, there would be no one reading this). Next time Lt. Milton Merriweather finds himself stuck out with a broken airplane, 45 cents and no razor, his problem would not be complicated by worrying about "what Alice will think."

Perhaps, despite Captain Gulbransen's campaign of education and enlightenment, Hilda cannot (or will not) ever quite understand. That, admittedly, puts a heavier load on the Captain. When he is tempted to push on through ("we can make it by midnight if we skip dinner"), he will have to discount the importance of Hilda's wrath. If he doesn't make it for dinner with the Colonel, the Colonel, at least, will understand. If his Great-Aunt Fanny is the expected guest, she almost surely won't. But Aunt Fanny's legacy can't be spent by a dead man anyway. Birthdays and anniversaries can be celebrated just as festively a day or a week later. Captain Gulbransen may have to put an appropriation in his budget for long distance phone calls to appease Hilda. But most women, even the least reasonable of the lot, will come around if *you* will lay it on the line. They certainly can't be censured for lack of understanding when no one has taken the little time necessary to educate them. ★

There were six members of the military base at chow who were discussing the pros and cons of St. Patrick's Day and just whether or not snakes were an item of consideration. Those who had some Irish ancestry weren't too sure either. It was the 16th of March and, the day's work behind, the urge to find out what went on in places dedicated to the celebration of St. Patrick's Day was pretty strong.

The six had a lot in common, such as rank, AFSC, job assignments, etc. The one thing they didn't have was an older member in their group who could vote or buy beer. So, by unanimous vote, they selected one whose rank was not enough higher to bother anyone and who could, and would, buy a six-pack for purposes of washing down dinner.

The NCO Club has beer, but what fun is there sitting around a place where everyone talks business, or about women with none of them around. So, it was decided to take off for a town not too far distant. The roads were okay and there were four cars to select from. One had recently been overhauled and needed a "few miles" to break it in. This was one selection. The other was a sedan, real new to the group and everyone wanted to "try it."

A change to civvies didn't take long, and with bits of green color here and there included in their dress, the seven took off to see what happened when St. Patrick's Day was celebrated in this area. It wasn't too cold, but at 60 miles-an-hour it was necessary to keep the windows closed.

The first stop was at a small tavern that catered to the military, run by a genial ex-G.I. In this state, it is legal to sell beer and hard liquor in the same establishment; however, the tavern owner was pretty careful to serve only beer to minors. He was particular to stay in the good graces of the military as they were good customers and very little trouble ever occurred there. Even credit could be secured until pay day. This night, though, credit was not an issue as pay day was on the 15th.

There was a spot on down the road about 50 miles where dancing was in order and a special deal was going on to celebrate for the Irish. After a couple of beers, our seven proceeded south to the reported spot. Boy! there was activity there. Lots of people, lots of beer, and lots of dancing.

All seven were in a large booth, and a friend from the local town came in with a couple of girls. This called for some extra maneuvers, so two booths were used. During this time, one of the local boys with a bottle of whiskey showed up with no place to sit. The fellows invited him to sit down, and, in turn, he offered a drink with their beer. Seasoned drinkers, able to pace themselves, might be able to hack a few "boilermakers" but youngsters have little business with this sort of thing.

So, the inevitable happened. One of the boys turned white and had to escape to cooler air and a place to lie down. The others, it didn't seem to affect. In fact, after the bottle was emptied, the older representative was selected to buy a couple of fifths so they could have a real party. A collection was taken, bottles purchased, and the party was on. Forgotten was St. Patrick's Day, the time, the job, the distance back to the barracks; in fact, everything but a few songs, dancing and stories about how each one fixed someone else's wagon at one time or another. The sick one returned, and his looks called for a few choice remarks on boys vs. men. However, his buddy didn't feel too good either, so the two who had started out together in the "overhaul" job began the long ride back.

The rest? The other five? Remarks like "Go ahead, we'll catch you"—"That overhaul job can't move fast"—were heard, and the remainder of the whiskey, chased boilermaker style with beer, was consumed.

The whiskey was gone, but so was the evening. The eating places were closed, and there was duty tomorrow. Besides, the girls had gone home, and with the other two gone, something had been taken from the party; some of the tinsel was gone. Someone said, "I wonder if we can catch them before they reach home." "No problem," was the reply, "let's go." The doors seemed narrower than when they came in, and it was cold outside. "Get this thing in gear"—"Light the fuse"—"Take Off" were some of the prophetic remarks. The car moved out into a seemingly narrow road for the trip back.

In five minutes, all but the driver and the rider in front were asleep or stoned. The driver was only stoned. Let's see if we can catch them, and down the road they moved. No note of the speed was made—the road was straight, with only a few rolling hills, nothing steep. The pines flowed by on the side of the road making a quiet, deep scene of green fence-like material with a blacktop ribbon running through. A look to the right and what do you know—everyone but the driver was asleep. On and on, the heater worked swell and the engine was really smooth, even revved at top speed. The heater worked so well that finally the driver began to relax. Soon he too was asleep, or unconscious perhaps, with eyes wide open. The car started a slow, very slow, movement to the right.

When an accident occurs, an orderly, or disorderly, procession of events can be traced to the culmination of same. In this case, the drift of the vehicle to the right side of the road was timed to the second for a head-on collision with a large, bridge-type, culvert abutment made of concrete.

Only the driver, who awakened or became aware of the drift, was conscious of what happened, and that

Ray D. McNeilly, Ground Safety Div., Hq Air Defense Command, Ent AFB, Colo.

lasted for only a split second. The frame of the vehicle stopped, but the car body containing precious bodies flew over 150 feet to a roadside where oblivion forever struck the five who wanted to see what happened when people celebrate St. Patricks' Day.

The other two? They were lucky. The sick one was driving a few hundred feet ahead and could have been struck from behind. His buddy, the owner of the overhaul job, was asleep. When the fast-moving lights behind just disappeared, he turned the car around and drove back to see why they had stopped. He found out; and in this manner the world found out what happened and how unforgiving careless actions and disregard for teachings at home and school can be. Liquor can be the "root of evil" and will rear its ugly head when common sense, the deterrent, is drowned with alcohol.

The five who died? A few brief years previous they lived in the loving sanctuary of homes. The parents, relatives and friends will grieve and some will not forget. The enigma of a story such as this is what can be accomplished to prevent the ones that follow, day after day as sure as the sun rises. It has become an insidious thing—almost a way of life, or, more properly said, a way of death. The public apathy, from a safety man's point of view, is little short of criminal. ★

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SHOULD I REPORT IT?

Robert H. Shaw, Air Safety Investigator, DFS

A strange thing happened on your flight today. Should you send an Operational Hazard Report? Is it worth the effort? Will it help anyone?

Let me assure you that the Operational Hazard Report not only tells the story, but indicates what direct action must be taken to eliminate an accident potential. If anything is before-the-fact in accident prevention, this is it! Best of all it provides that ever-necessary spark to "get with it."

Perhaps your strange occurrence won't completely shake up the Air Force, but all the same it may be important. Consider what may be learned from the following would-be-major-accident: After five hours of flight in a KC-135 aircraft a penetration and approach for landing was started. When the landing gear control was activated to the DOWN position the nose gear remained in the UP and LOCKED position. The gear was recycled several times with the same result, and then the emergency extension system was tried. The nose gear was still up.

Following several more unsuccessful attempts to extend the nose gear the left hand hydraulic system was depressurized, with the pump left running, in an attempt to bleed off pressure so that the nose gear could be unlocked. This proved unsuccessful and the aircraft was descended to 5000 feet to melt any possible icing. The normal and emergency extension systems were again tried. Still no results.

As a last resort the pilot placed positive and negative G forces on the aircraft in an attempt to extend the nose gear. When this failed the aircraft was climbed to 20,000 feet where 20,000 pounds of fuel were transferred from a B-47 aircraft by two reverse refuelings.

After a discussion with supervisors at the home base it was decided that the runway would be foamed and the aircraft would be landed with the nose gear retracted. A foam strip 32 feet wide and 9000 feet long was placed on the runway. The aircraft now weighed 111,000 pounds.

The final approach was flown at 131 knots, and a smooth touchdown was made at 105 to 107 knots. The nose of the aircraft was lowered at 7800 feet from the approach end of the runway, and the aircraft came to rest 8850 feet down the runway. The damage to the aircraft was minor, consisting of bent nose gear doors and worn gear door fairing.

Investigation revealed that a wheel well light lockwasher, .268 inches in diameter and .034 inches thick, jammed between the nose gear drag brace upper and lower links when the gear was retracted on takeoff, preventing nose gear extension. The lockwasher was part of the nose wheel well light which had received maintenance just prior to takeoff.

The report of this occurrence resulted in a nose wheel well foreign object inspection on all KC-135 aircraft at the base concerned and several gear retraction tests. Recommendations were dispatched for a fleet-wide nose wheel well foreign object inspection and for a procedure to remove the complete wheel well light fixture from the wheel well during maintenance of the fixture. A most practical recommendation, favorably received, was that the depot facility design a flexible accordion type sleeve to fit over the knuckle of the upper and lower drag brace links to prevent entry of foreign objects.

This is just one of hundreds of reports dispatched throughout the year. What did we learn? We found out that a simple thing like a change in a wheel well light bulb, coupled with sloppy maintenance and a lack of inspection follow-up, almost produced an accident. We found that this occurrence concerns not just one aircraft, but a whole fleet of aircraft. We found that immediate constructive action can be taken to eliminate accident potential.

If nothing else, we learned something of the merits of the use of runway foam, and I'm sure I'll never pass up a nose wheel well inspection on preflight in the future. ★

"Remember how great ———"

There are some, more older than bolder, who have "retired" while still on active duty. They have virtually ceased to contribute to progress, having reached their peak sometime back—even as far as WW II in some cases—and now contribute but nostalgic memories to the aviation fraternity. You've seen them, hangar flying at squadron affairs, recalling the "good old days," recounting hair-raising personal exploits that have been embellished with countless tellings.

It's sad, in a way. But progress in aviation has been so rapid that often yesterday's record achievements have become today's history. Some are old enough to remember the first powered flight at Kitty Hawk in 1903, yet young enough to have been on hand for the first space flight. Progress has been so rapid that many, still active airmen, have been left in comparative "dark ages."

Sometimes attention can be obtained through flattery. This time we will try the opposite approach. We want to keep you with us 'cause, as usual, there's a safety aspect planned for later on.

Remember how great it used to be to swoop and soar like an unfettered bird—in an open cockpit biplane, crouched down to protect your face from the frigid, 90 mph wind? Or, recall the great satisfaction of pulling a length of telephone wire from the undercarriage after an exhilarating buzz job? How about the "taste" of flying obtained from hot oil thrown by a leaking Lycoming? Nothing like it! Then there was the never-to-be forgotten thrill of feeling your way down through the soup when you couldn't find a sucker hole, like the one our intrepid O-25C boy is about to plunge through, in the photo above.

Yeah man, remember how great!

To go back a bit farther, we quote some "Remember How Great" era accidents from this wonderful time. We suspect some can top most of the currently Happy Hour tales.

• "A B.E. 2 stalled and crashed during an artillery exercise. The pilot had been struck on the head by the semaphore of his observer who was signalling to the gunners.

• "Another pilot in a B.E. 2 failed to get airborne. By error of judgment he was attempting to fly at midday instead of during the recommended best lift periods, i.e., just after dawn and just before sunset.

• "A Longhorn pilot lost control and crashed in a bog. An error of skill on the part of the pilot by not being able to control a machine with a wide speed band of 10 mph between top speed and stalling speed.

• "Whilst low flying in a Shorthorn, the pilot crashed into the top deck of a horse drawn bus.

• "A B.E. 2 pilot was seen to be attempting a banked turn at a constant height before he crashed. A grave error by an experienced aviator.

• "Pigeons destroyed a Camel and two Longhorns after midair strikes.

• "The top wing of a Camel fell off due to fatigue failure of the flying wires. A successful emergency landing was carried out."

Here's one that points up the adventuresome nature of the flying game before the days of proven emergency procedures:

"The pilot of this flying machine attempted to maintain his altitude in a turn at 2500 feet. This resulted in the aeroplane's entering an unprecedented maneuver, entailing a 'considerable loss of height about a twisting moment.' Even with full power applied and the control column fully back, the pilot was unable to regain control. However, upon climbing from the cockpit onto the lower main-plane, the pilot managed to correct the machine's attitude and by skillful manipulation of the flying wires, successfully side-slipped into a nearby meadow."

One more, for any readers who might want to go even farther back:

• "Captain ..... of the Hussars, a balloon observer, unfortunately allowed the spike of his full-dress helmet to impinge against the envelope of his balloon. There was a violent explosion and the balloon carried out a series of fantastic and uncontrollable maneuvers, whilst rapidly emptying itself of gas. The pilot was thrown clear and escaped injury as he was lucky enough to land on his head.

"Remarks: . . . action has been taken. The pilot was flying in full dress uniform because he was officer of the day. In consequence it has been recommended that pilots will not fly during the period of duty officers. Captain ..... has requested an exchange posting to the Patrouille d' Alpes, a well-known mule unit of the Basques."

Yeah man, remember how great!

But, from a safety standpoint, consider how much more beneficial it would be for the "older than bolder" types to recount how recent self-study had permitted them to increase knowledge applicable tomorrow. One might explain specific asymmetrical power considerations in the C-135. One might have just studied revised FAA procedures and be able to explain exactly how the changes affect the squadron. Another might have availed himself of the opportunity to research the integrated flight system, then practice in the link.

If someone should come up with such a tale (and we realize this is a rather large IF), by all means get on his frequency! One story with information on what you can put to use next day or next week is of much greater value than a whole eveningful of "interesting things to do in a biplane."

This is the type of thinking we are obligated to do if we are to come anywhere near staying a-pace with the rapidly moving field of aviation—SAFELY!

Certainly this is an obligation of safety publications. Probably a piece on exploits in a P-40 would be read by all ex-P-40 pilots, but very improbably would such a piece assist one iota on tomorrow's flights in F-105s or on forthcoming missile squadron assignments. Articles on safety, if they are to have any accident-prevention value, must concern themselves with information that can help airmen in the future—not on what could have helped in the past.

Another thing. There are enough accidents, both in quantity and variety, to prove that aerospace progress is not without a lot of expensive and painful toe stubbing. For the first time in nearly two decades the aircraft accident rate is up. Fatal accidents are up 31 per cent over last year, (as of June 30). Collectively and individually we have to work toward a safer tomorrow. Any ideas? We can help you spread the word to over half a million Air Force readers.

But, save your "rocking chair reflections" for the post-retirement, rocking chair days and the grandkids. Effecting spin recovery by climbing onto the lower mainplane may have worked once, but reading a current article on the problem by an engineering test pilot provides you with a lot more usable information, should you ever spin out of a level turn in the future.

The more of us who so subscribe, the more of us who are likely to be around to *"Remember How Great."*

TJS ★

Weren't these the days though? This bakery busting Nieuport pilot undoubtedly was honored for being able to walk away so he can fly in the afternoon. They didn't need barriers then, that's for sure.

CROSS COUNTRY NOTES

The Air Force has heard many comments, pro and con, from the local citizenry about its fighter type aircraft that sometimes thunder through the sound barrier. No doubt the verbal expressions pertaining to this noise from the skies have been varied, but I'll bet you haven't heard this one before. It's a request from a nice lady in the Cape Cod area. She asks:

"Would the U. S. Air Force hold one sonic boom per week, at a pre-announced time?"

Her reason for this special request is that she has attended a comprehensive community relations project on the hows, whys and wherefores of sonic booms and passed the information on to her vacationing guests. Now they want to experience the real thing.

"Sonic booms make the stay of vacationers at Cape Cod even more interesting," the lady remarked.

The subject of landing tactical fighter aircraft from two-ship formation approaches came in for much talk recently after studying a formation landing accident on which Hq USAF asked for opinions based on similar accidents. Following are some points worth considering in establishing policy.

From safety considerations only, it is better to land jet fighter aircraft from individual approaches rather than in formation. When operational considerations dictate two-ship weather penetrations, accident history indicates that the most hazardous procedure is for the wingman to drop back for individual landing on instrument final approach. This is because high sink rates of current jet fighters and effects of jet wash become critical factors under this procedure.

Accidents have also occurred under night and low ceiling or visibility conditions when lead instructs his wingman to land, and lead initiates a go-around for individual landing. Sudden transition from formation has caused pilots to become confused or disoriented and thereby misjudge approach. Several factors influence the procedure to use for jet fighter weather recoveries, including runway length and width, weather, fuel state, and approach facility saturation. Although formation landing is not without risk, it is sometimes desirable for operational as well as safety considerations. Therefore, formation landing training would more likely assure proper execution under emergency and/or weather conditions.

Ever had a canopy warning light come on during flight? Or have you ever wondered what would happen if your airplane's canopy decided to stop protecting you at .96 Mach or supersonic? We heard about such an event that took place at Edwards AFB recently, got in touch with the pilot and asked him to write down his experiences. Here in his own words is Major Edwin L. Rogers' story about losing a T-38 canopy as he was decelerating to 1.1 Mach.

"I had taken off on a routine transition mission climbing at .92 to 40,000 feet. Upon reaching altitude, I put the aircraft through normal acrobatic maneuvers and then proceeded to the high speed corridor for a routine speed run. I thoroughly checked engine and flight instruments, oxygen and pressurization systems, and noted everything to be within operational limits.

"Being satisfied with the aircraft performance, I proceeded to get radar clearance and entered the high speed corridor at 38,000 feet accelerating to 1.2 Mach. Again I checked the cockpit at supersonic speed and noted normal operations. Upon completing the speed run, I made a standard 5G descending turn to the left decelerating to Mach 1.1. Upon completion of approximately 90 degrees of turn I experienced a terrific explosion, at about 32,000 feet. My oxygen mask seemed to tear loose from my face and then snap back into place with considerable force. My head was pushed back against the crash pad, and I was dazed momentarily. The cockpit filled with vapor blanking out the instrument panel and at this time I thought one or both of my engines had exploded. I noted a pitchup of the aircraft and a momentary loss of control. I immediately retarded power and dropped the dive boards and went to emergency oxygen. The initial blast of oxygen under pressure seemed to help considerably and things began to take shape rapidly. I had slowed the aircraft to subsonic speed, and control appeared to be no problem by this time. By now I had an opportunity to analyze the situation and discovered I'd lost the rear canopy, causing decompression. My next concern was for the pilot in the rear cockpit. I could not see him through the rear view mirror but I couldn't have talked to him

FROM REX RILEY •

anyhow over the interphone because of the excessive noise. I assumed then that his seat had fired, blowing him with it. By this time I had descended to approximately 15,000 feet and slowed the aircraft to about 250 knots. I wiggled the controls for a further check to find out if he had ejected. Finally, the controls moved, assuring me that Captain Albert Crews was still in the rear cockpit. By now I could see his helmet coming up in the rear vision mirror and my thought was, 'Thank God, Al's with me.'

"The continued descent and landing were uneventful; the T-38 responded beautifully. At 250 knots, Al and I were able to communicate over the interphone to some extent. Then, on the ground we discussed the effects he experienced when we lost the canopy; basically they were the same as mine."

In a telephone conversation with Major Rogers, he was asked if he had any words of wisdom or lesson to pass to other pilots. His advice was short and to the point: "Hang on, and above all, don't panic. Find out what has happened before you start reaching for the 'next-of-kin' button."

If you're a T-Bird pilot maybe you'll be interested in some pure unadulterated accident facts about the airplane you're flying. For instance, in 1960 the T-33 was involved in 73 major accidents, during which 49 airplanes were destroyed. The year's accident rate was the lowest in history: 5.6 accidents per 100,000 flying hours; only 25 aircrew members were killed—also a new low.

If 1961 goes along the same general lines as 1960, we'll find that 40 per cent of the major accidents were caused by "pilot factor." Just think: If we all flew the airplane according to the book we could almost halve the number of bashed T-Birds. Want some examples of *accidents* that could have been prevented? Read on.

- Collided with ground during night weather: 3
- No abort procedures at refusal point: 2
- Mid-air collision: 5
- Night penetrations: 3
- Practicing SFOs 5

(Note: Forty-five aircraft were landed safely from flameout pattern after full or partial power loss.)

- Landed short: 3
- Did not lower gear: 2
- Porpoise: 3

And on and on.

In addition to the major accidents, we had quite a loss of external stores and it's not just the loss of hardware that concerns us. There was one fatality due to a tiptank jettison and one child was injured by a falling travel pod. It's some kind of a miracle that more were not killed or injured 'cause we lost 24 travel pods; 29 sets of tiptanks (lost by aircraft malfunction or pilot factor); 10 individual tanks (same reason as above), and 22 canopies, (ditto).

This doesn't nearly cover the T-33 accident-incident picture but does present some of the more serious problems. In 1961 we've already duplicated some of the accidents described above. For everybody's sake (including your own), let's try not to repeat them all. One day we're going to wake up and find ourselves fresh out of airplanes.

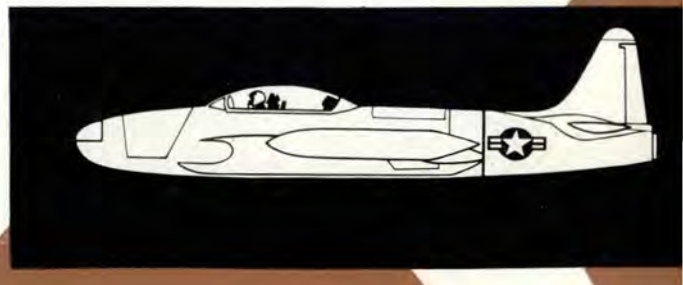
Overheard: " ..... tower, this is ..... 39180 requesting a practice DF steer."

" ..... 39180, this is ..... tower, we are no longer allowed to give practice steers, only actual emergency steers."

(. . . pause . . . then meekly)

"Well, what do you say we try one of those." ★

(U.S. Naval Aviation Safety Center)



Crash location map, above, adorns wall at Western Air Rescue Center, Hamilton AFB. Each pin represents a downed aircraft.

Properly operating survival gear can save your life, especially when water gets choppy. Some good advice: attend base survival course.

YOU CAN BET

Pilots devote at least part of their time to planning what to do in an emergency. When should I get out? When should I ride the bird down? What to do in case of fire or engine failure?

Most of us have answered these questions to ourselves, depending on the type of aircraft we fly and under what conditions. At the same time we're a little vague about what will be done to save our hides if we should find ourselves stranded in some remote area with a busted bird or after a nylon letdown. Well, you might be surprised at the number of people, and the equipment and facilities that will be put to work trying their best to save your life.

The National Search and Rescue Plan provides an organized method of searching for and rescuing downed pilots, lost children, tourists and adventurers. It's long arm includes specialists in air searching, mountain climbing, water rescue, medical assistance and practically any other specialty you can think of. Coordinating the program is the Air Force's Air Rescue Service, which is presently going through the final stages of reorganization to be completed by 1 October.

Under its headquarters at Orlando AFB, Fla., the ARS has three regional centers in the United States:

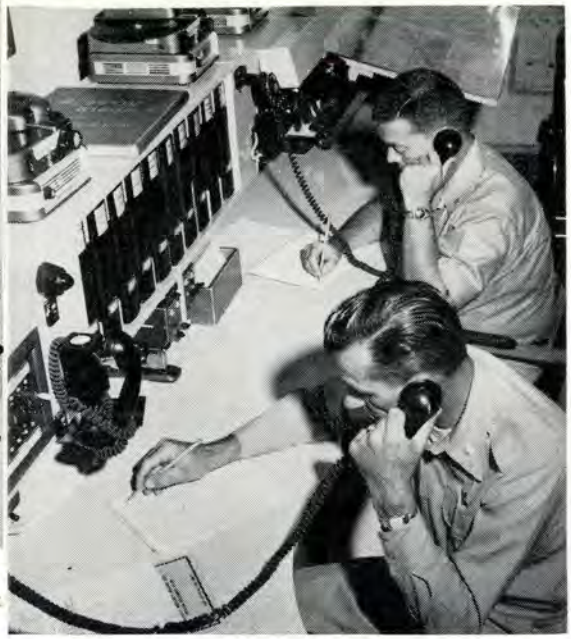
- *Eastern* at Robins AFB, Georgia.
- *Central* at Richards-Gebaur AFB, Mo.
- *Western* at Hamilton AFB, just outside San Francisco.

Each Center has approximately 16 local base rescue detachments, each consisting of two helicopters and 11 personnel, scattered throughout its area. The detachments, under operating control of the base commander, include four pilots and seven airmen. Training, flying safety, standardization and personnel actions are provided by the Centers.

The Centers have an elaborate network of communications facilities including commercial long distance telephone lines, and they use tactical nets such as those of ADC and SAC, telephone-radio patches, MARS (Military Affiliate Radio System), and, through ARTC Centers, a patch-in with the FAA Communications system. When an emergency occurs, the Center becomes a single point of contact for coordinating all the agencies involved in a search or other emergency.

Under the National SAR Plan, there are three regions: Inland or continental USA, Maritime, and Overseas. We'll concentrate on the Inland Region in this article.

The master plan grew out of a study directed by the President in 1954. Basically it is a plan to take advantage of and integrate all agencies involved in search and rescue efforts. Operation of the plan is an Air Force responsibility now under MATS. ARS, commanded by Brig. Gen. Joseph A. Cunningham, is the agency immediately responsible for implementing the plan. Briefly, ARS is a communications and coordination agency whose function is to alert and coordinate search and rescue efforts of all the necessary organiza-



Majors V. L. Wright, front, and R. W. Freshwater man communications at Western Air Rescue Coordination Center during recent rescue.

Major Wright at map showing location of assisting agencies for search and rescue in eight Western States. Swamp buggy and 'copter are handy tools for rescuing people in hard-to-get-to-places.

YOUR LIFE!

tions in an emergency as well as provide much of the direct rescue support. It goes beyond strictly a search and rescue mission in that it also coordinates the efforts of various agencies in any domestic emergency.

A good example of the latter occurred in 1959 during the West Yellowstone earthquakes. Aircraft, ground parties, equipment and medical supplies poured into the quake area. Imagine the chaos that could have occurred without some overall coordinating agency. Simply put, the National SAR plan is people working to help each other. This includes military and civilian; in fact, in the Western Region which averages about one case a day, civilian rescue efforts outnumber military about two to one.

Search and Rescue is a serious business, but occasionally the coordinators' day is lightened by humor. In some cases a delicate hand is necessary. A farmer recently called one of the centers and informed them that his prize cow was stuck in a mudhole. Would ARS dispatch a helicopter to hoist her out? The coordinator could sympathize with the farmer, but had to explain that the nearby air base the farmer referred to had only two helicopters. It would be mighty embarrassing, perhaps disastrous, if both 'copters were needed in an emergency only to have one of them occupied in rescuing the cow.

The Western Region, commanded by Col. Robert A. Stribling, is particularly handy for us to discuss because within it are all of the different types of terrain and weather that might be found any place in the country, ranging from vast deserts to huge piles of rock in the Sierra, Cascade and Rocky Mountains. Weather varies from sub-tropical in Southern California and Arizona to near-polar temperatures and conditions in the northwestern states in winter.

Air Force and civilian aircraft go down in the remote mountains and deserts of Arizona, California, Nevada and Utah, or in the rugged country in the northwest. Hikers get lost and injured in the High Sierras and have to be rescued. Tourists and rockhounds get lost in the desert where a man can dehydrate in a few hours during the summer heat. Children wander away from resorts or campsites. Regardless of the type of emergency, as soon as it is known, search and rescue action can begin.

An example will serve to give you some idea of what you can expect to have going for you in the event you find yourself in real trouble, possibly in a remote area. Suppose that your aircraft goes down many miles from civilization and you find yourself alone, probably not too well equipped, and not exactly sure of just where you are.

After you are overdue one hour, an INREQ (Information Request) is sent out to FAA stations and airports along and adjacent to your route. There is no word. Two hours after your ETA, or at a time when you were calculated to run out of fuel (whichever is sooner) an ALNOT (Alert Notice) goes out from

FAA. This starts a wider communications search and a ramp check of all fields near your course. Still you have not been found, so ARS requests the military base nearest to where you were last reported for a route check. Aircraft fly the route you were supposed to have been following.

When your aircraft landed it slid into the shady side of a hill, or under some trees; you are injured but alive. You are not spotted by the aircraft checking your route. Now, an all-out, wide search is begun. ARS can contact all or any one of a number of agencies to put the search in gear. Frequently this is the Civil Air Patrol; in other states it might be the State Director of Aeronautics, or a sheriff or military base. ARS collects all the known data and briefs the search units, usually through the mission commander, the person selected to direct the actual search. All of the known factors are pieced together and a search area is defined. Planes fan out and begin the hunt. You are fortunate and a couple of hours later a search pilot spots your wreckage and, on a low pass, identifies your plane. He reports to search headquarters, giving your position and any other known or suspected data such as, "it appears that the occupant is injured and needs help immediately."

Depending on the weather, location of the wreckage, time of day and other variables, the actual rescue might be carried out by a military helicopter, a mountain climbing team, a horse posse, or possibly a light aircraft. In this case a helicopter would be most advantageous so ARS, which has kept in constant touch with the search commander, alerts the County Sheriff that you have been found and appear to be injured. They request helicopter assistance from the nearest air base. If you are critically injured the 'copter will probably take you to the nearest place for medical attention. This very likely would be an air base, although some hospitals now have heliports.

ARS now terminates the search. If you had not been found immediately, the search would have continued for several days, at least 10. After that your chances of having survived would have been pretty slim. Sometimes searches are extended, however, when children are involved. They might be uninjured but unable to care for themselves, while all the adults in the party were killed in the crash.

If you were not found and another emergency occurred near where you went down, a secondary mission for the searchers will be looking for your wreckage, even though two or three weeks may have gone by.

ARS is also called upon in other types of cases. A recent one involved a young girl thought to have been abducted by a man who killed her parents. While ARS does not get involved in specifically searching for escaped criminals, it would launch a search for the missing person, in this case the girl who, it was thought, might have escaped and wandered around lost for several days.

Time is a major factor. Often people are missing for days before any kind of an organized search is begun simply because the ARS or local rescue organizations have not been clued in. Recently a girl was hiking with her parents and suddenly was missing. A local search was begun but the child was not found for four days. Finally the searchers found her on a nearly inaccessible ledge, and the Western ARS was asked for help. The Center quickly alerted a local base detachment which soon had a helicopter at the scene with a doctor aboard. Within five hours of the time the girl was spotted, she had been rescued and flown to a hospital.

The helicopter has become an invaluable tool in rescuing people in trouble. It has proved its worth in plucking pilots out of the water, hikers off ledges, and aircrewmen from wreckage sometimes burning. The new H-43B with its turbine engine has a fine high altitude capability previously unavailable. This helicopter will be the mainstay of the local base detachments. (AEROSPACE SAFETY, July 1961.)

Since its inception in 1946, Air Rescue Service has participated in many varied operations. In Korea, 1300 men were rescued, 700 of them from behind enemy lines. Recently ARS has had the assignment of recovering Discoverer satellites in case they miss the intended recovery zone and land in water or on land near the West Coast.

The philosophy by which ARS operates is expressed by the framed motto on the wall of the Coordination Center at Hamilton Air Force Base: *"There is no limit to what can be accomplished if you do not care who receives the credit."* This was expressed in another way by Lt Col C. W. Brown, Deputy Commander of the Western Region. "While we are an Air Force activity, I want to emphasize that successful search and rescue is accomplished by many people in many organizations. This is a joint effort and you've got to give credit to everyone of the activities involved. These include the Air Force, the Army, Navy, Civil Air Patrol, Sheriff's Offices, State Directors of Aeronautics, Highway Patrol, the Forestry Service, Coast Guard, and volunteer groups of all kinds."

The Canadian Search and Rescue organization works closely with ARS, and the Mexican Government permits the U. S. Border Patrol to cross the border for search and rescue activities.

Some good advice for military pilots as well as civilians is given by Major V. L. Wright, Senior Controller at Western Center.

- When an emergency arises, don't fail to try to let someone know where you are.
- Stay with your aircraft or near where you have bailed out.
- Be sure that your personal equipment is in good shape.
- Military pilots should take advantage of base survival training.

The Air Force averages less than an hour in rescuing aircrews who go down. If you are not rescued right away, don't panic. You can bet your life that a lot of people will be risking theirs to save yours. ★

WASTE NOT · *WANT NOT*

Capt. Thomas E. Wilkinson, Jr., 727th AC&W Sq, Det 1, Seymour Johnson AFB, N. Car.

In the March issue of this magazine appeared an excellent presentation of actual touchdown point test results of five various Century Series aircraft flying GCAs. To refresh your minds a bit here is what was brought to light. In round figures, actual touchdown points averaged 2,000 feet beyond the GCA established touchdown point for these five aircraft landing out of a 2½ degree glideslope GCA.

Almost identical circumstances occur on landing from an ILS approach. While GCA facility touchdown points are usually established from 250 to 1000 feet down the runway, AFM 51-37 tells us that ILS Glide Slope Transmitters are usually installed between 750 and 1250 feet down the runway from the approach end.

Here are some runway distances behind your aircraft at touchdown that are possible if approach speed and glideslope are maintained right down to the runway:

GCA touchdown or ILS Glide Slope Transmitter distance from runway threshold.	250 — 1250 feet
Average actual touchdown point beyond above distance.	2000 feet
TOTAL	2250 — 3250 feet

This is a lot of unused runway which a thrifty fighter pilot finds difficult to sacrifice.

How about the VFR approach? Let's take a look at the diagram. Most Century Series pilots fly a VFR pattern final approach path parallel to a 2½ degree GCA or ILS glideslope as depicted here. The flight path is at a lower altitude and the "aim point" usually somewhere in the overrun area. The roundout and deceleration glide to touchdown speed carry the fighter up to the desired touchdown area, which is usually 500 to 1000 feet from the runway threshold, depending on local SOPs.

Now, if we can safely achieve the same thing during an IFR approach the long landing problem is whipped. This means lots of extra runway at the 12 o'clock position when a drag chute fails, runway braking action is poor, brakes malfunction, or any combination of these misfortunes occur.

How can you as a Century pilot go about achieving this? By smoothly dropping from the glideslope to INTERCEPT YOUR NORMAL APPROACH PATH as soon as the runway is in sight. Many of you Century "jocks" have either consciously or subconsciously been doing this to some degree all along. But a clear understanding of the mechanics of this technique and a lot of practice at it will prevent your getting into serious trouble when an approach at or near minimums is required.

When breaking out of a low overcast or when the runway is sighted at "the last minute" in low visibility, the common tendency is to feel high and a strong urge to chop the power to idle is manifest. Some have done just this and stalled the aircraft out well above the terrain, sometimes dropping it in on the overrun and sometimes in "the lower 40," usually tail first. But the right way is to decrease power when the runway is first sighted (2 to 5%), just enough to give you a smooth gradual increase in rate of sink. The stick should NOT be pulled back at this time. Perhaps a slight forward movement will be necessary to expedite the intercept. Remember, the stick directly controls airspeed while throttle is the device you want to use to control the rate of descent. Just prior to intercepting the normal approach path one of two things becomes necessary, depending on airspeed and remaining distance to the desired touchdown area. Either apply stick back pressure to simultaneously level off on the new approach path and begin airspeed deceleration to touchdown speed, or reapply power to effect level off on the new approach path and maintain speed until closer in. In either case final power reduction to idle should be made as for the normal approach. But don't be hasty here. "Milk" it back in 2 or 3 increments.

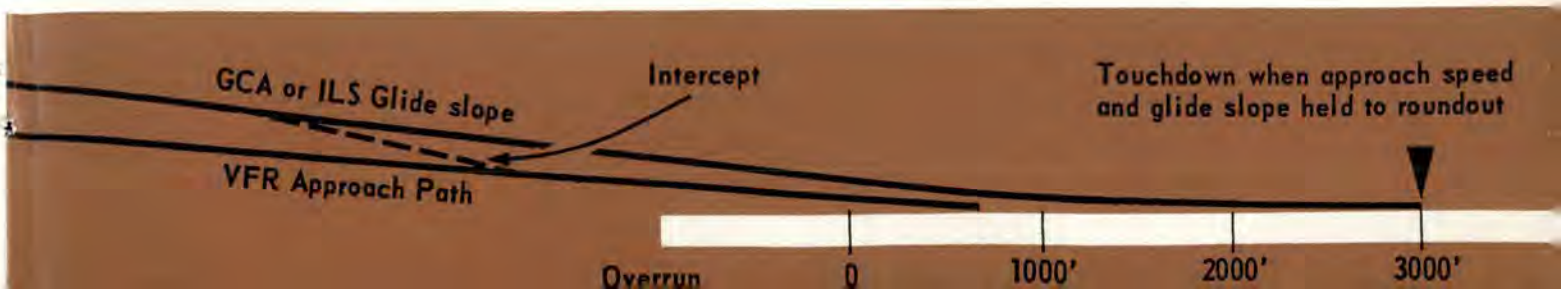
If you try the intercept techniques for the first time in soggy weather or night, you may not fare so well. Continuous practice under VFR day conditions is necessary in order to hack it in actual weather conditions. If your outfit flies weather in formation flights then conduct your practice approaches likewise. I personally get a charge from formation landings. Once a feeling of proficiency begins to appear, you will probably notice you have developed a special technique not yet mentioned in this article. That is, consistently arriving on the new approach path at precisely the point where it is not necessary to reapply power, but begin the coast-down to touchdown speed. Many pilots will call this an "over the fence" point. Of course, it varies in relation to the runway depending on winds, gross weight, configuration, etc. Control of arrival over this variable point is predicated on when you depart the glide slope and rate of intercept. Oftentimes in bad weather you won't visually pick up the runway soon enough to get all the way down on the normal approach path. But a little is better than none.

Since the range of visual pickups will vary in weather, you should vary the point of departure from the glide slope in your VFR practice approaches for proficiency in allover weather conditions.

A good formula to remember in any phase of flying is:

UNDERSTANDING + PRACTICE = PROFICIENCY

Take one of these away and the formula will not be complete. ★



ROUGH RIDE IN A '135

Here's a case for you to think about the next time you line up your aircraft for takeoff, particuarly if the weather's wet and the gusts are unfavorable. Forewarned is forearmed and, at least, it might save you from a few harrassing moments.

Two qualified pilots and a qualified copilot started a night takeoff from a midwestern base in a KC-135. The weather was you-know-what: ceiling ragged, broken at 900 feet, overcast at 1200, visibility four miles. To help matters there was fog, as well as light rain and snow, with a 13 knot crosswind gusting to 23 knots.

Takeoff data was computed for dry thrust, wet runway, using anti-ice for a 239,622-pound aircraft. Acceleration time check was normal and a very small difference in airspeeds noted. Takeoff speed was computed at 149 knots, with rotation speed called by the copilot at 143 knots. Rotation was normal, according to witnesses on the ground—the Supervisor of Flying in the tower and the Director of Safety beside the runway. The aircraft lifted off within a short distance of the computed ground run.

Pilots stated that after rotation severe turbulence was encountered and the instrument panel became extremely difficult to read. Flight was continued using the artificial horizon and holding a 10-degree nose up configuration. The gear was not retracted, as the pilot felt he might touch down again and had 2000 feet of uphill runway remaining. The pilot called for gear up as he passed the end of the runway and over a 65-foot downhill embankment. Rate of climb at this point was zero, pilot's airspeed 160 knots, copilot's airspeed 155 knots. The Supervisor of Flying and Director of Safety agree that the aircraft definitely appeared to settle as it left the end of the runway. The pilot called for flap retraction from 30 to 20 degrees at an airspeed of 160 knots, but was delayed by the copilot who read only 155 knots (160 required). Again, when flap retraction was called for by the pilot at 180 knots, the copilot delayed the action as he read only 172 knots (179 required).

Statements of qualified personnel aboard agree to the 10-degree nose up indication on the artificial horizon, that the takeoff was normal except for the turbulence, and that no settling was noticeable on the takeoff. The aircraft was contacted by the Director of Operations through RAPCON and queried as to any difficulty. The reply was, "Wind shear and severe turbulence at takeoff." Departure was continued and at 20,000 feet the pilot's airspeed rose to over 300 knots with a rate of climb at 1800 feet per minute. A power reduction was called for, but the copilot noted his airspeed to be only 195 knots and he was given control of the aircraft to effect recovery.

The aircraft was leveled at 33,000 feet and cruise configuration set up by the copilot's instruments. The pilot's airspeed at this time was 352 knots and machmeter .95. Later, at 38,000 feet, the pilot's airspeed read 376 knots and the machmeter off scale high. This condition existed until penetration 11 hours later when, between 30,000 and 15,000 feet, the pilot's airspeed broke loose and read almost the same as the copilot's. The instructor pilot made the landing from the right seat. On takeoff the IP was occupying the left seat and the copilot was in the right seat.

Boom damage was found on inspection of the air-

Robert H. Shaw, Air Safety Investigator, DFS

craft after landing, although none of the crewmembers had any knowledge of the boom striking at any time. A pitot static-check was made immediately. No moisture was found in the system; however, on an airspeed comparison check, the copilot's airspeed was found to be from 6-8 knots high in the KC-135 takeoff range. No conclusive marks were found on the runway indicating where the boom may have contacted the concrete.

Examination of the aircraft revealed that the air refuel boom was lightly scraped from the lower inspection door to the tip of the ice shield and below the ruddervator fairing area. Also, there was slight damage to the aircraft tail cone.

A T-29 pilot who landed a few minutes later reported severe turbulence on final approach, plus difficulty holding airspeed and heading on GCA final.

Primary cause of the damage to the KC-135 is unknown. Probable cause is premature rotation caused by malfunction of airspeed indicators of both the pilot and copilot. A contributing cause was pilot's airspeed malfunction believed to have been the result of a combination of gusty crosswind conditions, temperature and dewpoint both 33°, and a light rain. ★

Ed. Note. For your information I am quoting the data titled "Disparity Between Airspeed Indicators" from page 3-23, Sec 111, of the KC-135 Dash One, dated 15 March 1961: "If there is disparity among the installed airspeed indicators, and weather conditions permit, the airplane may be flown to a safe altitude and placed in initial buffet. By referring to figure 6-2 and using gross weight, altitude and the 0 degree bank angle curve, the initial buffet chart speed may be obtained to check against the airspeed indicators to determine which airspeed indicators are accurate. If initial buffet is checked at or below 10,000 feet figure 6-1 may be used instead of figure 6-2. If one or more airspeed indicators are accurate, continue mission using the accurate indicators. When night or IFR conditions prevent making the initial buffet speed check, if during climb, continue climb at MRT and maintain 8 degrees on the attitude indicator for gross weights up to 225,000 pounds, or 6 degrees for higher gross weights. Continue climb to cruise altitude, set cruise EPR for the configuration being flown, and head for the nearest suitable landing field with VFR conditions. The autopilot may be used with the exception that the altitude hold and Mach No. hold function should not be used because these functions may be unreliable due to a malfunctioning pitot static system."

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CONFESSION IS GOOD FOR THE SOUL

Don't be misled by the title of this article. The matter at hand is non-denominational, actually. The thought being presented is for consideration by *all* USAF pilots, particularly those tractable officers who can accept change and admit to themselves their own shortcomings. Here's the pitch. A young officer, especially one struggling for self esteem, recognition and advancement, will not normally volunteer information that would cast a questionable reflection on his own competence. All his words and deeds must be on the credit side of the ledger. We've all gone through this stage. Fortunately, in the case of many pilots (but definitely not all), experience gained through the years brings the realization of how absurd—and dangerous—continuous rationalization and failure to admit mistakes can be.

What is the practical application of all this? The immediate supervisors of our young duty pilots have passed the stage where they would rather die than admit they just did the wrong thing and became lost on a cross-country. They would rather talk it out and tell the other troops why Sector II-A/B won't put them over a line of thunderstorms at 47,000 feet. These supervisors have attained a realization that they have profited much and possibly owe their lives to lessons learned from the mistakes coped with by others. These supervisors know that their young officers must have full freedom of thought exchange between one another in an atmosphere where the possibility of "loss of face" does not exist. Does this situation exist in your outfit?

Bull sessions at the bar used to be the primary area for release of "confession" type stories. The best place for this activity is now the squadron briefing room.

We know that accidents are the result of many cause factors. In a discussion on profiting from the mistakes of others, it is timely to observe that ego and the "it won't happen to me" attitude have played a part in many costly accidents. Have you ever noticed that your flying school classmates killed in air accidents consist of a pretty even spread of those you had cataloged in your mind as above average, average and below average? Any of us can "purchase the farm" under a given set of circumstances. Study and diligent application, however, decrease the odds against us individually and collectively and require that aforementioned "set of circumstances" to be exceedingly stringent.

The pilot who refers to the "stupid jerk who landed wheels up" had best pause to consider and profit from the example before him. Otherwise, the same thing may happen to him when his normal landing thought pattern is interrupted by unforeseen events. He who warns others of the wrath of hell which will be incurred by taxiing into an open ditch had best know where that same ditch is and avoid it. This type of failure has tripped up sharp people many times before.

Yes, confession is good for the soul. It can insure you know a lot more about your flying job. The more you know about your job, the better your unit can accomplish its mission. Flying safety will continue to be furthered. Your professional flying ability will increase—and you'll live a while longer. ★

Lt. Col. Clifford P. Patton, Chief, Defense Branch, Fighter Div

An All-Type CAT Quiz

During recent discussions of problems resulting from clear air turbulence, a review was made of specific articles published in the May issue. The thought then occurred that a general quiz might be helpful to crewmembers operating all types of aircraft. Here's an All Type Cat Quiz contributed by the 3908th Strategic Standardization Group (SAC), Barksdale AFB, and I hope you know all twenty-five answers.

You can find out how well you did on page 27.

1. In mountainous areas, a lenticular (lens shaped) cloud or series of lenticular clouds stacked one above the other is an indicator of possible turbulence associated with .....
   a. thunderstorms
   b. mountain waves
   c. a cold front
   d. none of the above

2. Damaging turbulence due to mountain waves is least likely to occur .....
   a. at a level near the height of the mountain ridges.
   b. at a level about 50% higher than the mountain ridges (MSL)
   c. above the tropopause
   d. none of the above

3. The type of cloud in or near which severe turbulence is most likely to be encountered is .....
   a. a cumulonimbus
   b. stratus
   c. altostratus
   d. cirrus

4. The best tool for avoiding turbulence associated with clouds is radar. To avoid the most severe turbulence .....
   a. fly near sharp or scalloped edges of strong radar echoes
   b. avoid sharp or scalloped edges of strong radar echoes
   c. climb
   d. descend

5. Moderate to severe turbulence is ..... experienced above the tropopause.
   a. never
   b. occasionally
   c. always

6. Turbulence is frequently encountered near the jet stream. Which of the clouds sometimes found near the jet stream are best indicators of a turbulent area?.....
   a. cirrus
   b. cirrostratus
   c. cirrocumulus

7. What are visual indications of impending severe clear air turbulence? .....
   a. there are none
   b. a broad expanse of undercast
   c. persistent contrails
   d. non-persistent contrails

8. Turbulence in the vicinity of the jet stream is difficult to predict precisely because .....
   a. it most often occurs in shallow layers
   b. the jetstream never occurs south of 35° N. latitude
   c. it can only be inferred from radiosonde observations
   d. it never occurs over oceans

9. The following have a bearing on the severity of turbulence encountered: .....
   a. wing loading of aircraft
   b. airspeed
   c. pilot technique
   d. all of the above

10. Turbulence associated with mountain waves is .....
   a. confined to within a few miles of the ridge associated with the waves
   b. least when winds are over 50 knots
   c. often experienced more than 50 miles downwind of the mountain range
   d. always light

11. You have been briefed on the existence of a strong jet stream. As you approach the area while flying in smooth air, you note a layer of cirrocumulus (cirrus clouds of tufted form, several thousand feet deep) ahead at your flight level. Upon entering these clouds, you should expect to encounter: .....
   a. continued smooth flight
   b. turbulence
   c. sustained smooth updrafts
   d. occasional weak downdraft

12. You have been briefed that the tropopause will lie at 36,000 feet msl. While cruising at 35,000 you suddenly encounter clear air turbulence. To divert your aircraft out of the turbulence in the shortest time, you should .....
   a. change altitude approximately 3000 feet
   b. turn 90 degrees right
   c. turn 90 degrees left
   d. proceed on course at the same level

13. During late spring, as you descend to enter a low level route in the Western Plains area you are advised that weather stations along the route are reporting strong, gusty surface winds and visibilities restricted

in dust. Upon reaching your low level cruising altitudes, you should expect to encounter .....
- a. moderate, possibly severe, turbulence
- b. no turbulence—but restricted flight visibilities
- c. frequent smooth updrafts
- d. a rapid increase in free air-temperatures

14. ..... clouds are cauliflower-like in appearance with appreciable vertical development and dome-shaped upper surfaces.
- a. stratiform
- b. cumuliform
- c. high
- d. middle

15. Precipitation from cumuliform clouds is usually of a showery nature. Along with this activity you should normally expect to find .....
- a. some hail and snow
- b. relatively stable air mass
- c. turbulence
- d. sheets or layers of clouds with little vertical buildup

16. Cumulonimbus clouds form only as result of the continuous ..... development of cumulus clouds, and occur in ..... air.
- a. horizontal — stable
- b. vertical — stable
- c. horizontal — unstable
- d. upward — unstable

17. Turbulence tends to .....
- a. increase in intensity as the air becomes more unstable
- b. decrease in intensity as the air becomes more unstable
- c. decrease as airspeed is increased
- d. dissipate in an unstable air mass

18. Turbulence normally associated with the jet stream is classified as .....
- a. thermal
- b. mechanical
- c. frontal
- d. wind shear

19. The most severe cases of frontal turbulence are generally associated with .....
- a. slow moving cold fronts
- b. fast moving cold fronts
- c. slow moving warm fronts
- d. stationary cold fronts

20. The strength and magnitude of mechanical turbulence depends upon .....
- a. the speed of the wind only
- b. the speed of the wind, roughness of terrain or obstruction, and the stability of the air
- c. the proximity to the jet stream
- d. the moisture content of the cumuliform cloud

21. The mountain wave effect is of vital concern to pilots .....
- a. even though it is felt only 500-700 feet above the terrain
- b. because turbulence can be extremely severe and may extend several thousand feet above the general level of the mountain peaks
- c. primarily because of the hail and sleet normally associated with it
- d. because of the strong downdrafts usually encountered on the upwind side of the mountain

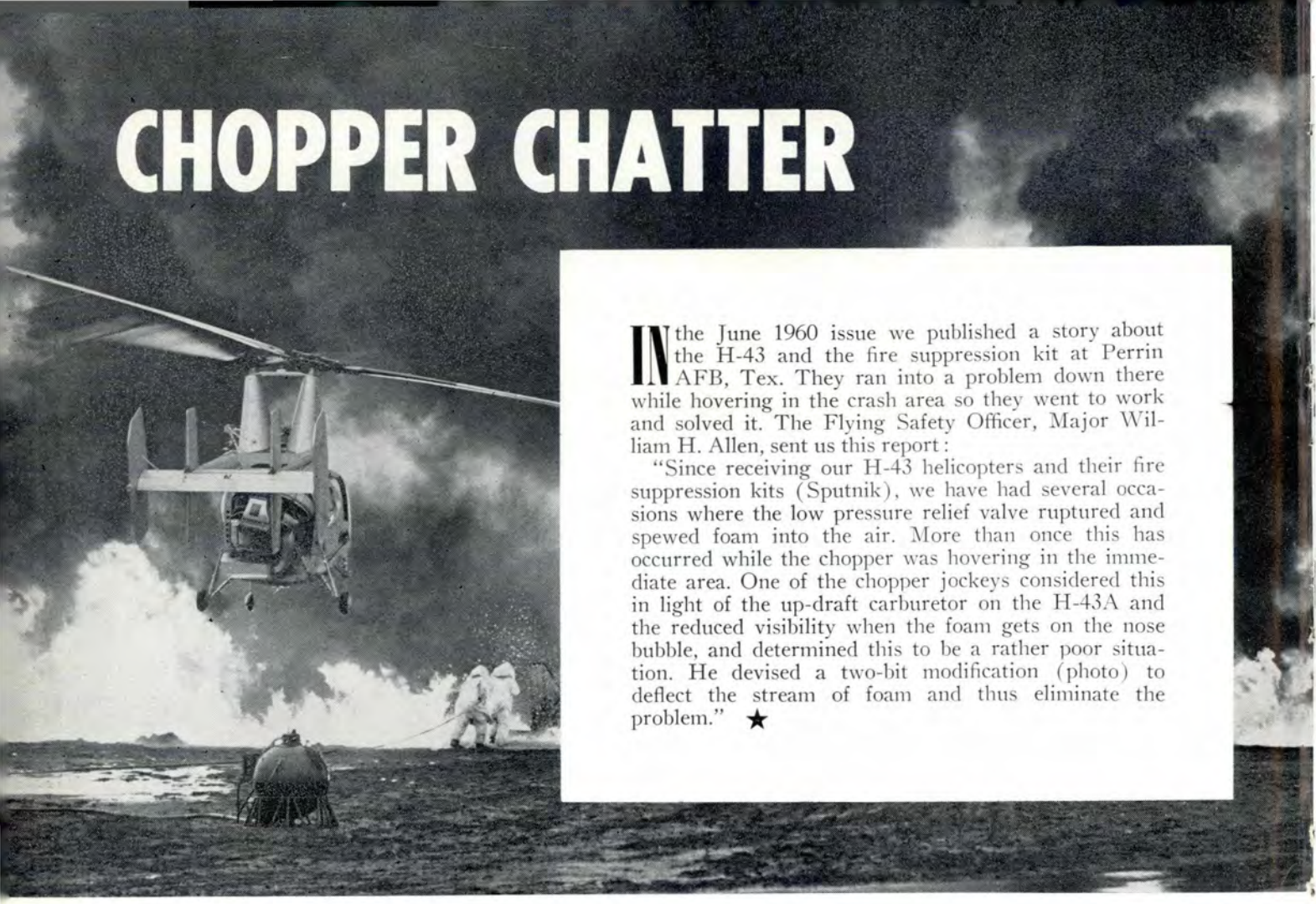
22. Mountain waves can always be anticipated since identifiable clouds are always present if mountain wave effect is sufficiently severe to be of concern. .....
- a. true
- b. false

23. Clear air turbulence associated with the jet stream usually extends .....
- a. vertically many thousands feet and change of heading rather than change of altitude is best procedure for exit
- b. vertically no more than 5000 feet and change of altitude in many cases would be sufficient to exit from turbulent area
- c. both vertically and horizontally to such great distances that no attempt should be made to alter either heading or altitude in an attempt to exit
- d. vertically many thousands of feet, so exit should always be attempted by turning south and descending

24. Mountain waves, if identifiable by cloud formation .....
- a. may be safely penetrated since turbulence associated with this formation is never of sufficient severity to cause structural damage
- b. should be penetrated at a level which is at least 50% higher than the height of the mountain range if it is not feasible to avoid the area
- c. should be penetrated at the bottom of the roll cloud if it is not feasible to avoid the area
- d. never extend more than 500-1000 feet above the mountain peak

25. Unusual weather phenomena encountered in flight should .....
- a. be reported only upon request
- b. be reported immediately without request
- c. be recorded on COMBAR report but it is not necessary to report inflight
- d. be reported immediately to FAA only if major aircraft damage has been done ★

CHOPPER CHATTER



In the June 1960 issue we published a story about the H-43 and the fire suppression kit at Perrin AFB, Tex. They ran into a problem down there while hovering in the crash area so they went to work and solved it. The Flying Safety Officer, Major William H. Allen, sent us this report:

"Since receiving our H-43 helicopters and their fire suppression kits (Sputnik), we have had several occasions where the low pressure relief valve ruptured and spewed foam into the air. More than once this has occurred while the chopper was hovering in the immediate area. One of the chopper jockeys considered this in light of the up-draft carburetor on the H-43A and the reduced visibility when the foam gets on the nose bubble, and determined this to be a rather poor situation. He devised a two-bit modification (photo) to deflect the stream of foam and thus eliminate the problem." ★

Photo below shows deflector welded to low pressure relief valve on fire suppression kit to prevent straight-up spray of foam.

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C-NOTES

TF-102

Those F-102 jocks who fly the TF-102A will probably agree that they land sooner and shorter in the "TF" than they do in the "F." Naturally, when this happens it affects the pilots anywhere from a minor irritation to extreme mortification. The airplane? I'll not mention the major modification to a TF-102A recently involved in a short-landing accident. Remember that it is not just the *weight* of the "TF" that causes this to happen. *Drag* also is a factor.

If you're driving down the final in the "TF" and you chop the power at the same place where you would in an "F," your rate of deceleration is faster. And if you are using the same airspeeds as for the "F" you will touch down shorter.

Suggest you check that "TF" Pilot's Handbook and be sure to note that, in addition to reducing power at a slower rate, your "prior-to-flare" airspeed should be 170 knots minimum, and touchdown 140 knots minimum—NOT 165 and 135, respectively. Ideally, the throttle should hit the IDLE TOP just as the wheels touch the runway.

A good tip: Use the proper "TF" technique. It will keep you in good stead with the boss, with yourself, and it'll even prevent bent birds. ★

Captain M. O. Detlie, Fighter Branch.

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• TIPS FOR T-BIRD DRIVERS

The instructor pilot could not regain control of his T-Bird after entry into an inverted spin—entered inadvertently because the aircraft was stalled while practicing vertical recoveries. The T-33 was left by its lonesome after determination was made that recovery attempts would continue to be futile. As the pilots descended under canopies of nylon, they observed the proud ol' gal circling nearby.

Loss of aircraft control in flight has caused six T-Bird bashes to date in '61. Four of the six happened because pilots pointed the nose of their machines directly into the searing, burning blue and sat immobile until the relative wind changed 180 degrees—nose to tail. One knows that an airplane suspended motionlessly stays so for a very short time and then becomes simply a falling object. For some moments during the initial part of the descent the pilot's role changes also; he becomes a rider and, generally, a frightened one.

An aerodynamicist can authoritatively predict the random twisting and turning of an airplane in an uncontrolled vertical descent. But it is doubtful if such information would be of any worth to a pilot because the initial movement of a T-33 from a vertical stall is quite violent and to the average pilot causes some consternation. A pilot's remembrance following a hammer head is sometimes rather vague: one pilot stated the airplane was tumbling; another said that dirt and maps floated about the cockpit, another was unable to recall what happened.

It is indeed unusual to be a witness to an aircraft's attitude that allows fuel overflow from the sabre drain to seemingly fall upward past the nose of the involved machine. Such was not the intent of the designer or manufacturer. So-o-o-o-, T-Bird jocks, take note: If your machine is pointed skyward and the relative wind is zero, keep a firm upper lip because very shortly you will experience a thrill—positive, negative and zero G forces—with a tad of centrifugal force thrown in that will buffet you at Gatling Gun rapidity! The convulsive writhing of the old girl is a bit more exciting to the virile pilot aboard than the shimmying of "Little Egypt."

One last word: DON'T! ★

Before you fly again, read, then heed! Disregarding symptoms can end your flying career, even your life . . . all because of those

LITTLE BUBBLES OF GAS

"After parking the aircraft I shut off all switches in the aircraft rear cockpit and climbed out. I noticed that Major Mac was still sitting in the front cockpit and had made no effort either to shut down the aircraft switches or to get out. I commented, 'Let's get out of this thing and stretch so we can feel better,' and then proceeded to complete the aircraft form. After completing the form I noticed that Major Mac was still in the aircraft and that the switches were still on since I could hear the fuel pumps and inverters running.

"I still thought that he was just very tired and, jokingly, I said, 'You look like an old man, and you know you aren't as young as you used to be. Come on, get down, I'll race you to base operations.' Then I noticed that he was perspiring very heavily and of course realized that he wasn't well. I climbed up on the ladder and shut off the switches for him and asked him to get out. He was barely able to stand up in the aircraft and clearly was in no condition to get down by himself. I called to the operations officer to help me get him to the Flight Surgeon's office because I now realized that Major Mac was in pretty poor condition."

The above is quoted verbatim from an incident report. It was written by a lieutenant who had been the rear seat pilot on a T-33 navigational proficiency flight.

Unfortunately, in this case, a qualified flight surgeon was not available and the Major did not receive the benefit of examination and treatment by such an individual until sometime later.

Now let's take a look at the symptoms. Following are quotes from the Major's statement.

"Departure was at approximately 1000 hours for a 2 plus 30 flight plan. Time from engine start to wheels up was less than four minutes. The climb to 39,000 feet assigned altitude was unusually rapid. The weather was sunny, undercast but with no turbulence. . . .

"About two hours out I began to feel slight discomfort in both knees and commented to the Lieutenant. In response to his question, I denied a desire to descend, since there was little or no pain. Twice during the flight, the Lieutenant asked for the cabin altitude reading which I gave as 26,000 feet.

"Upon approaching our destination I suggested that we request a lower altitude for, while still not painful, my knees had become a nuisance. Ten minutes out, we were cleared to descend to 37,000 feet. Passing Hiad intersection, we were cleared to 20,000 feet, penetration altitude. Upon reaching 20,000 feet, the knee pains disappeared, but I noticed a very slight blurring of vision. At the time I blamed this on the fact that I'd been flying into the sun for over two hours on an exceptionally bright day. However, this condition disappeared as we approached 20,000 feet. On the penetration I began to experience 'waves of nausea,' although not serious. I made the initial radar approach, touch and go landing, a second normal pattern with another touch and go landing. On the third approach, the tower advised that there was an aborted aircraft on the runway so we abandoned the approach. To save fuel, we climbed to 10,000 feet.

"At this time I asked the Lieutenant to take over so I could unzip my jacket because of the heat. As I did this I began to feel exceptionally nauseated, so much so that I asked the Lieutenant to let me have control again, feeling that if I kept busy I would feel better. I shot the final landing. On the landing roll I asked him to take over, since the heat was causing me to become ill. He taxied in while I removed my mask, helmet, undid my parachute and unzipped my flying suit. After shutdown, I managed to get out of the seat and sit on the ladder. However, I needed help to get down the ladder into the car.

"At no time do I recall that my mental processes were dulled, in that I was able to think clearly and knew everything that was going on around me. However, I was sick at my stomach (without throwing up), perspiring freely and feeling exhausted. My arms were alternately numb and I had acquired a bad headache. In fact, 'I just didn't give a damn,' my physical problems being my principal concern."

If you think the above is one of those one-in-a-million cases, then here's another one. Note the symptoms.

" . . . Cabin altitude, upon reaching 40,000, was 30,000 feet. After 10 minutes at this altitude, the subject reported numbness and tingling of the fingers, pain in his right knee and a severe cough that produced clear sputum. He had to remove his mask several times in order to expectorate. The IP in the front seat noted that the patient appeared to be in moderate distress and was removing his mask and adjusting his helmet quite frequently. A slow descent was started to 27,500 feet. It lasted 25-30 minutes. Cabin altitude, upon reaching 27,500 feet was 20,000 feet. The IP in the front seat turned on the defroster in order to increase the cabin pressure. Patient reported a marked remission of his symptoms during this descent. The remainder of the flight pro-

Lt Col Horace S. Bell, USAF, MC, Chief, Professional Branch, Asst. for Life Sciences.

ceeded at this altitude, total of 2:20 after takeoff.

"Fifteen to 20 minutes after takeoff on the return flight, he complained of nausea and was noted by the IP to be holding his head and appeared to be extremely uncomfortable. He stated that he felt as if he were going into shock. The return flight was made at about 25,000 feet with a cabin altitude of 17,000 feet. During the 1:20 return flight, the patient remained extremely uncomfortable and was coughing and nauseated and continued to feel his impending collapse, At the termination of the flight, he came immediately to the Flight Surgeons' office. Here, his complaints, his general appearance and condition, his blood pressure and his significant skin findings were noted, and the patient was admitted immediately as an emergency case."

Both men were victims of dysbarism—those little bubbles of gas.

In theory, decompression sickness or dysbarism is caused by a lack of atmospheric pressure on the body. Gases which were in solution then have a tendency to bubble out much as a coke reacts when the bottle cap is released. Difficulty lies in the fact that they are released inside the body, mostly in the bloodstream, and cause various troubles, depending on their location.

If they affect the joints, we call them by the name for divers or caisson workers disease, the "bends." Bends are tolerated if the pain is not too severe but should act as a danger signal of more serious possibilities.

When the bubbles lodge in the skin (parasthesia) they can be mighty uncomfortable and an even more important danger signal that other places are undoubtedly affected.

The "chokes" occur when the bubbles lodge in the circulation of the lungs. Chokes are dangerous and incidence of collapse is very high, usually in a very few minutes.

Should these bubbles lodge in the brain or block its circulation system (or the vital spinal column) any range of symptoms can occur, ranging from dizziness, double vision, nausea, fainting, abnormal reasoning powers to some more bizarre. Generalized shock and incapacitation are common. They seldom affect different people the same way except that "Central Nervous System" disturbances almost always end up in collapse. They are to be avoided at all costs.

Several things should be kept in mind to do if you should ever be affected by decompression sickness:

- First, the only cure is recompression, not just part way, but all the way to ground level. **LAND!**
- Second, do not rub or move the affected part, you will only make it worse—in effect, you're "shaking up the coke bottle." Also, just because your elbow or knee hurts does not mean that this is the only place where the bubbles are.

Perhaps you've gotten the idea by now that these things are to be avoided in the first place. You're right!

You may wonder: How can dysbarism be treated by a Flight Surgeon? In the treated cases on record, a combination of neurological and shock symptoms occur. Each sign or symptom must be analyzed and therapy directed accordingly.

The next question is the future of individuals who experience the signs and symptoms of dysbarism. The patient in the second incident has been temporarily suspended from flying—it may be permanent. In the first case the major was grounded indefinitely. The answer is simple and is essentially that of determining the severity of the tissue damage and whether or not this is compatible with return to flying status. It is the policy of the USAF Medical Service to review individually all cases in terms of flying safety, with particular consideration for the health and welfare of the individual, to determine whether it is in the best interests of the individual to return to flying status.

There is every indication that few rated personnel consider symptoms of dysbarism, such as bends, to be a serious problem. If it should happen to you or someone else, it can be fatal, permanently disabling, or only minimal and undetectable damage may occur. In the best interest of your own longevity, here are some recommendations:

- Ask your Flight Surgeon to discuss dysbarism at the next Flying Safety Meeting.
- If you experience any symptoms of dysbarism, descend immediately and land. Report to the hospital and ask to see a Flight Surgeon immediately (preferably, call in prior to landing and have the Doc meet you). Do not attempt to fly again for at least 24 hours, and then only after clearance by a flight surgeon. Many more incidents of dysbarism occur than are reported as evidenced by a total of eight cases reported during the past three years in T-33s. These cases were reported due to the hospitalization of the individuals, as were the incidents discussed in this story. Pride and fear of grounding are undoubtedly deterrent factors in the reporting of physiological incidents, but it could well mean the difference between life and death.
- If there is a malfunction or a question as to the proper cabin pressurization—WRITE IT UP! The T-33 has the reputation of having a poor pressurization system and it is commonly accepted. But—perhaps with improved maintenance this system can function as it was designed. Acceptance and complacency in this area can be deadly. OXYGEN IS NOT THE PREVENTION OR CURE FOR DYSBARISM CAUSED BY LACK OF PRESSURIZATION.
- Another point: *Watch that cabin altitude.* Be sure that you read the indicator accurately. (In the first incident it was subsequently determined on the next flight that cabin altitude was 32,000 when the aircraft was at 39,000 feet. However, due to the bracket that contains the instrument light for the cabin altimeter, the location of the altimeter itself on the lower portion of the instrument panel and the graduation above 25,000 feet being on the top of the instrument, it is difficult to accurately read the instrument without lowering your head and looking directly at it. It was pointed out that it is entirely possible for the pilot to misread the altimeter at 26,000 when it is actually at 32,000 feet.) ★

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CAT QUIZ ANSWERS

1. b	14. b
2. b	15. c
3. a	16. d
4. b	17. a
5. b	18. d
6. c	19. b
7. a	20. b
8. a	21. b
9. d	22. b
10. c	23. b
11. b	24. b
12. a	25. b
13. a	

FALLOUT

LETTERS TO THE EDITOR

Fly Safe Ribbon

In the July issue there appeared a letter from Captain John S. Wright, suggesting that a flying safety ribbon be given pilots for 1000 hours of logged time without an accident, plus a cluster for each additional 1000 hours. Several comments have been received. Space permits these extracts:

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I think it's an outstanding idea and one that all pilots should support. I'd be happy to trade my "longevity" ribbon for one of this type. How about pushing this?

The article by JLT, "The Name of the Game," was indeed a side-splitter. As both a pilot and an air traffic control officer I can vouch for the fact that it is accurate. Personally I gain points in both catergories: win when I fly and lose when I control!

1/Lt Ward J. Baker
1920th AACS Squadron.
Eglin AFB, Fla.

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* * * * A fighter pilot from San Antonio writes: "Ribbons are for fightin'."

• • •

Pilots of the AF-CAP Liaison Office, Hqs Great Lakes Region, think the flying safety ribbon is an excellent idea.

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A reader from Hq Officer Training School, Lackland AFB, writes: * * * I agree with the principle but he has overlooked one or two items. . . . In order to include all the items listed, this ribbon would have to be 18 inches long and 6 inches wide. Of course, now, we would fasten a chain to each end of the ribbon and wear it suspended about the neck.

Seriously, how about including a ribbon to accompany the Flying Safety Award? Any unit which receives or has received this award would also receive individual ribbons for all crewmembers who contributed to the over-all record. This would be a sort of unit citation worn above the right pocket.

1/Lt Raymond A. Danz

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Pilot Error

I agree with Colonel Frederick L. Smith's article about pilot error which is published on page 13 of the May issue of AEROSPACE SAFETY. It's good work.

Lt Col Francis C. Eberhart, USAF
Director of Operations
Hq 1100th AB Wg, Bolling AFB

Being a pilot, I share your opinion about Colonel Larry Smith's article, "The Pilot Did It." It is with genuine regret that I must report the untimely passing of Colonel F. L. (Larry) Smith. A heart attack caused his death last June after an extended flight to Europe. We will miss his good work and the pleasant association.

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Tower Battles

After reading the article "Name of the Game" in the July issue, I'd like to mention some local battles between Aero Club pilots and the base control towers in the area. Generally, it is enlisted personnel involved in the battles rather than flight crewmembers.

The favoritism of club pilots toward the T-34 aircraft is most obvious to anyone even giving the club second glance. The well known bad radio contact on the ground presents a great opportunity to the cagey pilot. Frequent tower instructions call for many delays in taxi and takeoff clearances because of "poor radio contact." Favorite sport now is to call the tower before engine start, and the tower knows all the intentions of the T-34. Once the tower operator agrees to give a light "what else?", he's hooked. The T-34 can now use the "no contact" excuse. Everything is therefore expedited and is much more in favor of the little bird, providing safety is the prime concern when taxiing.

The next trick is to be aware of local base traffic and get in the most advantageous position before the tower has a chance to ask you to "hold for inbound traffic." Be it on the ground or in the air, by asking for immediate takeoff or a straight-in approach, the pilot preys on the tower's "try not to refuse him policy" and usually succeeds in outscoring the tower.

A3C Robert Whitman, USAF
4136th Strat. Wing, SAC
Minot AFB, North Dakota

This is flying safety? Better fix the radio on that T-34.

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Eliminate the Point?

I have a recommendation concerning flying safety. It falls within the field of ground-to-air communications. My suggestion is this: Why not eliminate reference to the word "point" when citing UHF frequencies? For example: "two seven five point one."

It has been my experience and that of several other pilots with whom I've recently talked, that frequently when given a frequency from ATC the digit following the word "point" is confused or not remembered. On a number of occasions I have had another pilot say to me or I have said to another pilot "I got the 323 point but did not get the last digit."

For the communicator I can certainly see why there is a requirement to definitize a frequency exactly. For the pilot flying at high speed and making multiple frequency changes upon instructions from the ground, his only interest is hearing four numbers correctly and grinding them in his UHF. I believe that in ground-to-air communications if all UHF frequencies were given simply as four digits, without citing the decimal point, time would be saved, confusion and repetition would be decreased and flying safety would be improved.

Col. John C. Robertson, USAF
AFROTC AU Maxwell AFB, Ala.

Thanks for writing. We referred your suggestion to the FAA and here is the reply from the Bureau of Air Traffic Management of that agency: "In examining the reasoning behind the use of the word "point" we find that it serves a very useful purpose of frequency band identification. Elimination of the "point" could result in considerable confusion if the aircraft were equipped, for example, with UHF and HF radio equipment. Assignment of frequency 3014 (point deleted) could result in a pilot's attempting contact on 3014 kilocycles whereas 301.4 megacycles was intended or vice versa. Although there are many inherent means by which frequency band assignment can be determined, we feel that as long as a valid requirement exists for use of the "point" as the only method of band identification we must retain it in the normal frequency phraseology. We extend our sincere appreciation for bringing this matter to our attention."

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Runway Obstacles

Much has been written and said about the "black hole" situation that exists when trying to locate the active runway during IFR and conditions of darkness. Tachikawa AFB in Japan is a prime example. A short (5000-foot) runway with obstacles on both ends coupled with the confusion of bright lights from the nearby city of Tachikawa, creates a real problem. Add to this a tired crew completing a low GCA approach under poor visibility conditions with a plane load of dependent wives and children, and the element of panic is introduced.

The recently published AF Manual 51-37, entitled Instrument Flying, Chapter 16 page 9, outlines the use of strobe lights at runway thresholds to assist inbound aircraft in locating active runways while still some distance from the airfield.

Prior to reporting to MATS, I was attached to the GCA unit at Naval Station Adak in the Aleutians. A pair of the above mentioned strobe lights were obtained and installed at the end of the instrument runway. Following installation, the amount of missed approaches began to approach the theoretical zero level. This installation cost approximately $3000, which was a very nominal amount, considering savings in aviation gasoline, the resultant increase in safety of flight operations, and the gallons of pilot sweat unshed during periods of very low visibility.

To sum up the whole reason for this letter, how long must we continue to operate with antiquated field light and approach lighting in this Space Age when good, tried and tested, nominally priced equipment is available?

LCDR C. C. Christiansen, USN
VR-7, Moffett Field, Calif.

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CAT — a nuisance.

Permission is requested to reprint the article, "Gone With The Relative Wind" in the May issue of Aerospace Safety Magazine. The reprint would be distributed to Canadian Meteorological Offices, jet aircraft operators, and Civil Aviation authorities.

We are under the impression that clear air turbulence is widely regarded as a nuisance, but not potentially disastrous. I believe that the article in question has a salutory effect in calling attention to an actual case when clear air turbulence was disastrous.

P. D. McTaggart-Cowan
Director, Meteorological Branch
Dept of Transport, Toronto, Canada

We're happy to oblige, sir!

• • •

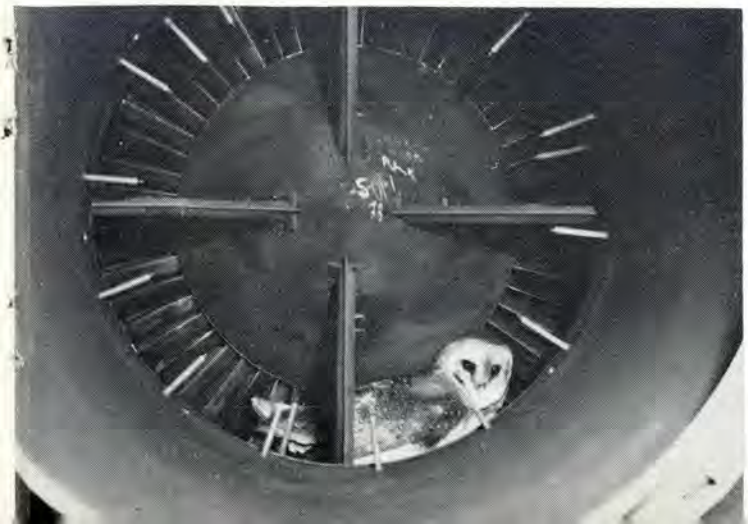
From Australia

We are encouraged by your complimentary remarks concerning the Aviation Safety Digest and are pleased to know that you offer no objections to the reproduction of articles from your magazine. We have been receiving Flying Safety regularly for some considerable time. Currently, of course, we are receiving Aerospace Safety. Your publication offers wide coverage on safety matters and in no small measure has been an inspiration in our efforts to encourage safety through our much more humble publication, Aviation Safety Digest.

Please be assured that future issues of Aviation Safety Digest will be forthcoming either direct or through our Civil Air Attache in Washington.

C. A. J. Lum
For the Director-General of Civil Aviation
Commonwealth of Australia

If that engine starts the owl will wish he'd put out to sea with a pussy cat. This picture from Edwards AFB shows just one kind of foreign object that can cause damage. Moral: Look before you leap!



Duncan & Heinz

As you know, the Duncan & Heinz program is now in its fourth year. We have announced in the June issue of the *Maintenance Review* that our program has been expanded to include selected bases of our sister services as "Honorary Members" in this program.

No doubt some of the throttle jocks in the USAF have received exceptional transient maintenance and service at other than USAF installations, and we would like to be told about it. We feel that our sister services deserve recognition for their contributions to the USAF accident prevention effort. So-o-o, if you-all in your fine publication will let it be known to the fly-boys, we would be very appreciative.

Lancelot Duncan
M. Heinz

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Wind Sock

This type of wind sock is installed on the approach end of all runways at this facility. We want to give due credit to the Navy who left one here when they deactivated this base. We found this sock to be of such great value, it was installed on all runway approaches.

Many factors favor its use, especially at fighter bases. It enables the pilot or flight leader, at a glance, to note the exact direction of wind, thereby allowing him to elect a favorable flight lineup position on the runway to avoid dangerous jetwash on takeoff. The same principle applies to landing.

Another valuable advantage is to those bases located close to water when invariably there are wind shifts due to onshore and offshore breezes. Many times this shift can be observed on the wind sock before it reaches the standard wind recording equipment.

The sock may be manufactured locally, and easily. The post is a stock 4" x 4" x 8'-9' wood type, with a metal ring that fits in a hole drilled in the top. The cloth is of 40" x 40" material tapered to catch the wind, and that's it! We hope that other installations can find it as valuable as we have.

Capt. James E. Varanyak
FSO, 119th Tac Ftr Sq, NJ ANG
BRDC, Atlantic City, N. J.

WELL DONE

CAPTAIN RICHARD B. COLLINS

83rd Fighter Interceptor Squadron
Hamilton Air Force Base, California

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During an Air Defense scramble in an F-104A, Captain Richard B. Collins, 83rd Fighter Interceptor Squadron, Hamilton AFB, encountered a serious emergency when cockpit pressurization failed during climbout and intercept.

He started a descent to a lower altitude, and as he turned toward base, the control stick went to the stowed position (full forward). This is one of a sequence of events that occur during automatic ejection. He immediately released the control stick as it appeared that the seat would eject. After waiting a few seconds and checking that the ejection ring was not fouled, he tried to regain control of the stick. It moved back freely, but there was no elevator control available. Normal stick control can usually be regained by either pushing the stick down vertically while it is in the stowed position or by pulling it directly aft, until it latches into position. This method failed to work in this instance, however.

Since the aircraft was still in a descending turn, elevator trim was checked and found to be working normally. A climb to 20,000 feet was made, using trim and power. Another check of the aircraft was made and hydraulic flight control pressures were normal. After determining that elevator control by use of the control stick would not be available, Capt. Collins lowered the landing gear and land flaps to check control of the aircraft in this configuration using trim and power. Control proved satisfactory at landing approach airspeeds and he elected to land at an alternate base with a 10,000-foot runway.

Internal fuel was reduced to 1500 lbs and a long straight-in approach, with gear down and landing flaps extended, was started. Descent was controlled to about 400 fpm down the approach. After crossing the overrun at about 50 feet altitude, all the available elevator trim was used and the aircraft was still a little too nose-low to make a normal flare for touchdown. This attitude was held to about 5 feet off the runway and then the speed brakes were extended and the resulting pitch change allowed the aircraft to flare sufficiently for a smooth touchdown.

Capt. Collins' accurate analysis and professional ability prevented the loss of an aircraft, and his devotion to duty reflects great credit upon himself and the U. S. Air Force. For his commendable airmanship, we say WELL DONE, Captain Collins. ★

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