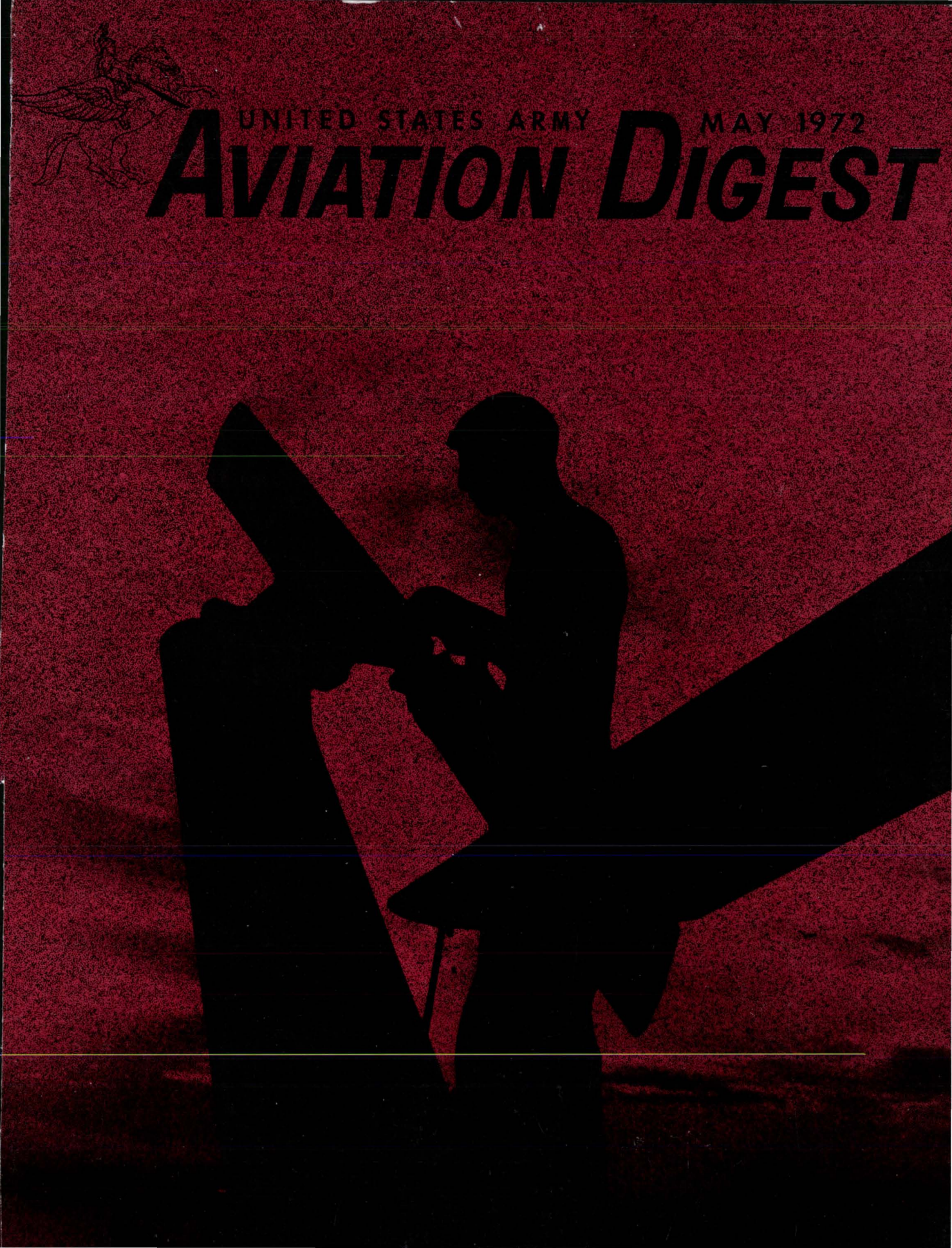
UNITED STATES ARMY

MAY 1972

AVIATION DIGEST



UNITED STATES ARMY AVIATION DIGEST

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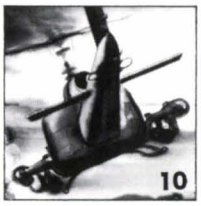
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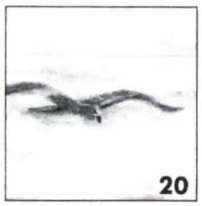
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ABOUT THE COVER

After a long day of flying it's easy to become complacent while pulling a dusk or twilight daily inspection. Use as much caution on your dailys as your pilot uses on a precision approach. Photograph by CWO Michael Lopez

The mission of the U. S. ARMY AVIATION DIGEST is to provide information of an operational or functional nature concerning safety and aircraft accident prevention, training, maintenance, operations, research and development, aviation medicine, and other related data.

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Articles, photos, and items of interest on Army aviation are invited. Direct communication is authorized to: Editor, U. S. Army Aviation Digest, Fort Rucker, Ala. 36360.

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VIEWS FROM READERS

Sir:

Your assistance is requested in publicizing the Noncommissioned Officer Education System (NCOES).

The article addresses both the course and the fact that some attendees are not aware of the highly favorable impact the course will have on their careers as NCO.

Never before has the Army attempted NCO career schooling on so large a scale. NCOES deserves our dedicated information support. We must do our best to help ensure that the course quotas are filled with quality students.

Your assistance informing the noncommissioned officer and his commander of the scope and purposes of NCOES, high-lighting service school courses in your area of interest, would be highly beneficial to the Army.

COL Gerald C. Burch
Information Officer
Continental Army Command
Ft. Monroe, VA 23351

The NCOES article appears on the inside back cover.

Sir:

Sometime between 12 to 18 months ago, you published an article about a unique way of folding large maps that resulted in a paged "pamphlet-like" format—convenient and easy to use in a crowded cockpit.

I was fascinated by the prospect so I performed the operation on one of my sectionals. The result was terrific. I did all my charts the same way.

But I failed to keep the article which described the procedure and I'll be damned if I can figure out how to do it from looking at one of the already folded charts. Can you find and send me a copy of the article? I'd be much obliged.

Mr. Vernon L. Lewis
Promotion Manager
MEDICAL WORLD NEWS
299 Park Avenue
New York, NY 10017

The article concerning the folding of maps was entitled "The Tactical Map And You." It was printed in the October 1970 issue, a copy of which has been mailed to you.

Sir:

AR 95-2 paragraph 1-1c states, flight rules published by the Federal Aviation Administration (FAA) will be complied with while in territory under the jurisdiction of the FAA except as modified herein.

Federal Aviation Regulations (FAR) part 91, page 4-1, paragraph 91-25 requires that a VOR check for IFR be completed every 10 hours and 10 days and the date, place, bearing error and signature of person making check be entered in the aircraft log or other permanent record.

Is this entry required on U. S. Army aircraft forms?

CW3 Hollis B. Scott
291st Aviation Company
Ft. Sill, OK 73503

The DIGEST forwarded CW3 Scott's letter to the U. S. Army Aeronautical Services Office and their reply follows:

Mr. Scott is correct in his statement that the Federal Aviation Administration (FAA) flight rules will be complied with unless modified by AR 95-2. This regulation modifies some of the FARs to accommodate differences in operations between military and civil flight operations. Paragraph 91-25 of the FAR specifically states "civil aircraft," and since the Army does not make an exception in AR 95-2 the requirement does not pertain to Army operators.

USAASO is in the process of rewriting AR 95-2 and requirements for a periodic VOR check are being considered for inclusion. However, the only requirement at this time for a VOR operational check are those required during scheduled maintenance and the normal before flight radio checks included in the pilot's checklist.

LTC David S. Johnson
Chief, Air Traffic Control Division
U. S. Army Aeronautical Services Office
Cameron Station
Alexandria, VA 22314

Sir:

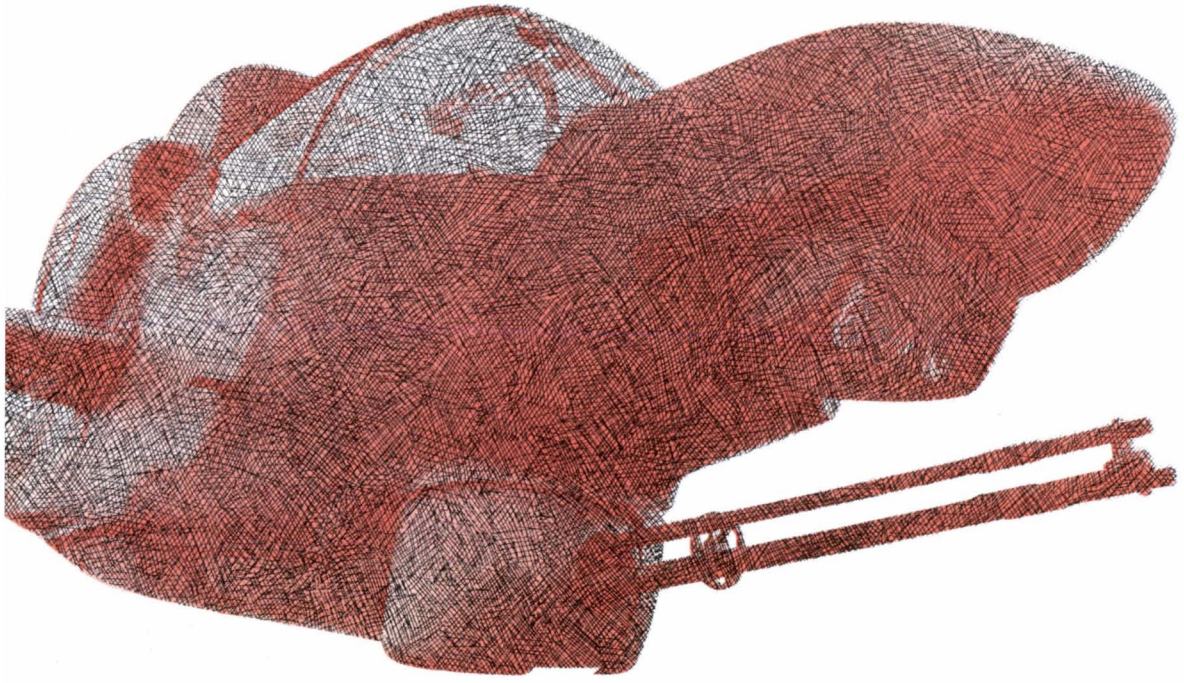
The article in the February issue about life insurance entitled "How Much Is Enough?" was very interesting and thought-provoking. In the rush of our day-to-day living this is an area that is very easy to ignore.

Some use the excuse that they distrust insurance salesman in order to avoid the issue. It is true that there are many shady insurance salesmen just as there are many shady car salesmen. But you don't see many people without a car these days. It is possible to get some very reasonable term insurance through one of the mutual benefit associations without even dealing with a salesman. (Be sure you are dealing with a reputable organization, though. And be sure you have aviation coverage!)

Then there are some who just don't like to face the fact that someday they will die. This is a nice thought but it won't be much comfort to their family in the event the breadwinner unexpectedly departs this life.

The SGLI is probably the best bar-

Continued on page 29



A Strange Kinda Bird

When a soldier pins on his wings he becomes a part of a military fraternity which augments the capabilities of the Army . . . but it can't be done in the cockpit alone

Major Peter J. Barrett

THE ARMY AVIATOR is a strange bird indeed. From one moment to the next his attitude can change from selfless heroism to complete apathy. The gunship pilot who repeatedly flies through extensive enemy fire to help the long range reconnaissance patrol break contact might also refuse to remain beyond a release time to escort ships resupplying the same unit.

Can it be that Army air crews have developed a propensity for selective support? Have they reached a point at which they tell the folks on the ground where, when and if aviation support is needed? I submit that such extra-sensory perception would not be appreciated by the man who has to spend the night in a wet rice paddy.

It should not be forgotten that aviation exists solely to support the man on the ground. The fight is his; it is the foot soldier who closes with the enemy to destroy or capture him. Certainly part of the credit and a good deal of the glory goes to the aviation unit in a well executed successful airmobile operation. However, when aviation attempts to win the war single-handedly it loses the flexibility and versatility inherent in the mission and organization of its units. Furthermore, the same loss is incurred through rigid scheduling, flying hour and maintenance programs.

If aviation is to be responsive to the needs of the ground commander, aviation personnel must be attuned to his needs and aviation units must be structured to support those needs. The latter has been accomplished through tables of organization and equipment (TOE) which provide for relatively self-sufficient aviation units which can easily be attached, placed in direct support or under the operational control of infantry battalions, brigades or divisions.

When an aviation unit is used in a general support role and adheres to strict flying hour programs, which include inflexible report and release times, flying crews somehow do not dedicate themselves to the supported unit as readily. The aviation unit becomes the end instead of the means.

If an aviation unit is permitted to refuse a mission because its release time is violated or because "air cav shouldn't carry cargo" or "assault helicopters shouldn't perform reconnaissance," the true value of Army aviation is at stake.

The intent here is not to detract from the superb accomplishments of so many Army aviation units and air crews. Rather, it is to warn that pettiness can do much to destroy the truly professional image that Army aviation has reflected by its better accomplishments. A discouraging note is that pettiness has been made a matter of policy in some units, such as a CH-47 unit that won't recover downed aircraft at night, or the assault helicopter company that refuses to transport propane gas.

Many of these attitudes stem from a basic fear among aviation commanders to place their resources at the disposal of the ground commander. "He'll overfly our crews!" they cry. "He'll misuse and abuse us!" they scream. "He'll fly us into the ground!" they wail.

Horsefeathers!

Infantry battalion commanders are among the first to realize the value of sound maintenance management, conservation of resources (both personnel and equipment) and planning for efficient utilization of combat support forces.

The aviation commander should be just as close to the unit he supports as the artillery battery commander and the engineer officer. He should habitually coordinate with the supported unit and be a real part of planning for airmobile support of that unit. Furthermore, were the aviation commander in habitual support of the same ground unit he would certainly have more influence over the proper use of his elements than he does in supporting a number of units in different stages of offense or defense and in widely separated locations.

Of primary importance in soliciting dedicated support from aviation personnel is educating them to the problems of the people they support. If an aviator awakens in an airconditioned room after a relaxing evening, dons a fresh set of Nomex, eats a good hot breakfast and then flies off to support a unit which has been in the field all week and was nearly overrun the night before, it is naturally difficult for this lad to sustain an appreciation for the problems of that fellow on the ground. But, if Army aviation is to remain effective, its air crewmen must feel such an appreciation for the ground soldiers' problems.

Safety and standardization have become increasingly important over the years and the performance of any aviation unit is vitally affected by its record in these areas. However, some commanders overemphasize safety and standardization to the point that their units' effectiveness suffers as much as if it had no accident prevention program. The commander with sound, well-balanced, mission-oriented safety and standardization programs will not have to resort to browbeating threats, mass punishment and relief of subordinates to maintain his unit's effectiveness. When aviators are afraid to carry out routine missions because of reprisals which *may* result from a *possible* accident the unit suffers greatly and soon gains a reputation.

On the other hand, overpermissiveness is probably one of the greatest evils in the aviation community. But, there has been much progress treating this ailment—which stems from the old days of aviation when an aviator specialized to the point of making a career out of flying one airplane on one type of mission. Versatility is the answer today. Just as there is no room in aviation for the pilot or crewchief who attaches himself to one airplane and one type mission, there also is no room for the aviator who seeks only to spend his career in a cockpit. The man who seeks responsibility through additional duties and varied assignments is the man who really contributes to the overall effectiveness of Army aviation.

Certainly Army aviation is not dying. But the minor viruses from which it now and then suffers could develop into a plague that cannot be treated. To offset this possibility there should first of all be an increased emphasis on the overall mission of Army aviation in flight training programs. Today's graduates tend to separate in their thinking "flying" and "tactical support." When a soldier puts wings on his chest he does not cease to exist as a soldier. Rather, he becomes a part of the military fraternity which seeks to "augment the capability of the Army to conduct prompt and sustained combat incident to operations on land."

In addition to mission orienting flight training, the prima donnas in the ranks should be identified, reeducated and given something more constructive. Vary their assignments, give them responsibilities beyond the cockpit and establish career development along lines that will benefit both the individual and the Army.

Finally, aviation units should be employed in a direct support role or under the operational control of the supported unit whenever possible. Success or failure on the battlefield is the responsibility of the ground commander. And, it must never be forgotten that his success or failure dictates the success or failure of Army aviation.

Radar's Role In Air Traffic Control

Some common misconceptions aviators have about radar controller responsibility and the capability of radar units are revealed here. When an aircraft does not have a working transponder, it may not provide a radar return depending upon the amount of exposed surface the radar beam has for reflection . . . in VFR conditions even on an IFR flight plan the aviator is obligated to avoid other traffic

Robert A. Beatty Jr., DAC

YOU ARE IN VFR conditions on an IFR flight plan, being vectored off route direct to an approach fix. Then you notice an aircraft off at a distance at approximately your same altitude closing on you. You expect to hear the controller report this traffic to you; however, he is talking with several other aircraft and is apparently not aware of your situation.

You become a bit uneasy and initiate a call inquiring if the controller has the target on his scope. He acknowledges by reporting the traffic. You breathe a sigh of relief, sit back and relax a bit . . . of course keeping an eye on that other aircraft which is continuing to close.

The aircraft is getting fairly close now and you start to tense up a bit anticipating instructions from the controller. Instructions never come and you take it upon yourself to take some evasive action.

The remainder of the approach was uneventful. The air traffic control (ATC) radar vectored you to the runway and when you broke out of the lower cloud layer you were aligned right down the center of the runway.

On your way into operations to close out the flight plan you discuss some of the things that happened on your flight. The weather was fairly decent, the aircraft performed superbly and your mission was accomplished as planned. One point that still distrubs you, however, is the service you received from the radar facility controllers serving this airfield. They did assist you considerably by vectoring you direct from the airway to the approach fix where you didn't have to take the circuitous route via airways and then make a standard instrument approach. But you felt the controller was very neglectful in not providing traffic information and vectoring you clear of traffic.

You and your copilot decide to visit the ATC radar facility after closing out your flight plan, knowing you will always find a hot cup of coffee and a controller eager to discuss the subject of air traffic control and ways he can better serve you.

Your conversation may go something like this:

Pilot: We were flying R13687, a U-21, which landed about 30 minutes ago. You vectored us off route direct to the approach fix and saved us considerable time which we appreciate; however, an aircraft was approaching us at our altitude and you apparently were not aware of it until we brought it to your attention, at which time you reported it. Why was this?

Controller: My first consideration is separation of aircraft as required in the Terminal Air Traffic Control Manual, TM-11-2557-29, (hereafter referred to as TM-29). Primarily this is only between radar identified aircraft. My secondary consideration is the service required in the TM-29 such as vectoring aircraft when there is an operational advantage to the pilot

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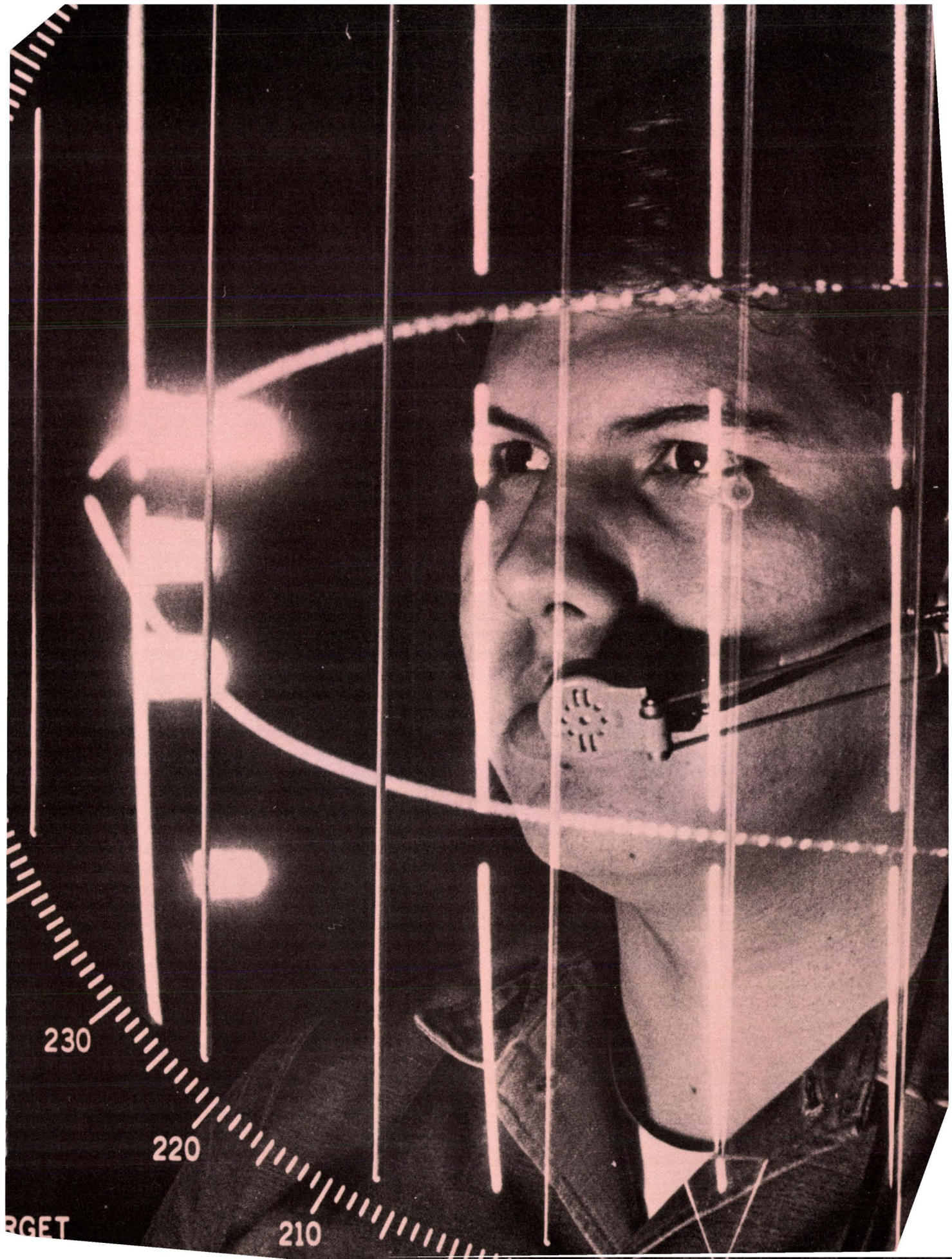
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FIRE!

The author, an assistant analysis officer with the U. S. Army Vietnam Aviation Safety Office, discusses fire hazards around the flight line

CW2 Peter J. Smith

THE DREADED CRY of *fire* rang throughout the revetment area. Everyone within hearing distance froze momentarily. They all looked around and saw the billowing cloud of black smoke coming out of a CONEX (container express) located between two revetments where UH-1 helicopters were parked. Some were quicker to react than others. Everyone had the same thought: Get a fire extinguisher and put it out!

Almost immediately two crewchiefs who had been working nearby were on the scene. They knew where to get fire extinguishers. There was one located at the end of every revetment. Quickly they each grabbed one and raced to the rapidly spreading fire. The first man aimed his fire extinguisher at the base of the flames, pressed the trigger and nothing happened. He dropped it and ran after another one. The second man aimed his extinguisher at the flames, pressed the trigger and was rewarded with the comforting sound of CO2 escaping under pressure . . . but the white frosty cloud was not going on the fire. The extinguisher cone was broken and the CO2 was just escaping in all directions from the fractures. The crewchief dropped it, but before he could leave to try and get another one there was a loud explosion from the CONEX and flames gushed out the open door and engulfed him.

Luckily the control tower operator saw the fire and alerted the crash-rescue truck which arrived on the scene almost immediately.

The firemen quickly enveloped the crewchief in foam, smothering the flames. They then directed their attention to the CONEX and within a short time the fire was out.

The crewchief was rushed to the hospital where he started his painful recovery from second and third degree burns.

What were the contributing factors in this incident?

First, as it turned out the following items had been stored in the CONEX: 5-gallon can of JP-4, solvent, oil, grease, Brasso, some loose ammunition (which luckily hadn't gone off), oily rags, cans of spray paint, various aircraft parts and other items that had been destroyed by fire.

The fire was started by a cigarette which had been laid down for a moment and then forgotten. The cigarette dropped off the bench and into a box of oily rags which ignited. The ensuing explosion was caused by the ignition of the 5-gallon can of JP-4 (which the crewmen used for cleaning their hands, washing tools, etc.).

Everyone knows or should know that you're not supposed to store paint and oil together. Everyone knows or should know that oily rags are supposed to be stored in a closed metal container. Everyone knows or should know that the JP-4 shouldn't have been stored there. And everyone knows or should know that you don't smoke around any one of these items, much less around all of them together. All these items were stored in the CONEX purely as a matter of *convenience*.

As was required, fire extinguishers were located at each revetment in the area. A recent safety check had revealed that the fire extinguishers had been overdue for inspection. The platoon leader certainly didn't want *his* section of

the line to be considered unsafe so he went ahead and signed off the inspections on the fire extinguishers because it was *inconvenient* to take all the extinguishers to the fire house to have them inspected and weighed—and what the heck, they looked okay.

The cone was broken on the fire extinguisher because the extinguisher wasn't mounted up off the ground as required. It was standing at the end of the revetment where it was periodically kicked, knocked over and occasionally blown over by rotorwash. The cones on several fire extinguishers were subsequently found to be broken and/or clogged with dirt. Why? Because it was more *convenient* just to put them at the end of the revetment than it was to go to the trouble of making some kind of bracket on which to hang them.

And how about "old faithful"? How about supervisory error? It jumps right out at you every place you look. You're darn right it was a factor. Periodic inspections by the proper people (the commander safety officer, etc.) would have uncovered these problem areas and prevented this incident. The deficiencies should have been discovered and brought to the immediate attention of the individuals responsible for the problem areas. And then after a short period of time the area should have been re-inspected to ensure correction of the deficiencies.

Enough? Heck no! How about recurring inspections on a periodic basis (at the very least, *weekly*)? How about educating the personnel on the line to the hazards involved? After all, you *must* have their cooperation to operate safely. And it will be a lot easier to obtain their cooperation if they understand the hazards involved and why it is to their benefit to alleviate them.

This particular story is a work of my imagination, but the ingredients are most definitely not. The photographs on this page are definitely *not* staged. They were taken at an airfield "as is."

In the first photograph you see a leaking paint can, a half full can of hydraulic fluid (Why half full? Because someone intended to use it again despite the danger of contamination!), oily rags, grease, oil, uncapped oil lines (contamination again) aircraft parts, etc.

The second photograph also reflects the ingredients for a catastrophe: a leaking 55-gallon drum of solvent, paint, ammunition, oil, grease, oily rags, hydraulic fluid, etc. All that is lacking for big trouble is one little cigarette, although it's not really needed since the danger of spontaneous combustion is always present.

The two instances cited above are far from being isolated. You can find duplications at many airfields and heliports around the world. And the trouble doesn't have to be in a CONEX. It can be a foot locker, closet, storeroom or any other storage area, even the storage compartment in your aircraft.

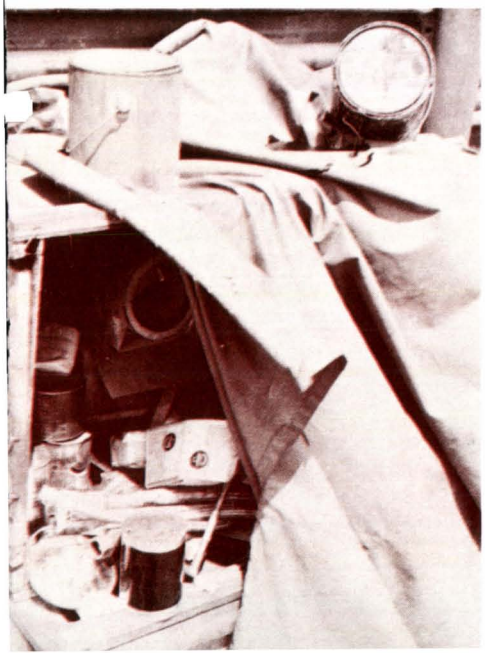
The keys to solving the problem are:

Education to make personnel aware of the problems,

Inspections recurring as often as possible to frustrate those who would ignore the problem and

Command emphasis to ensure that the first two keys are utilized.

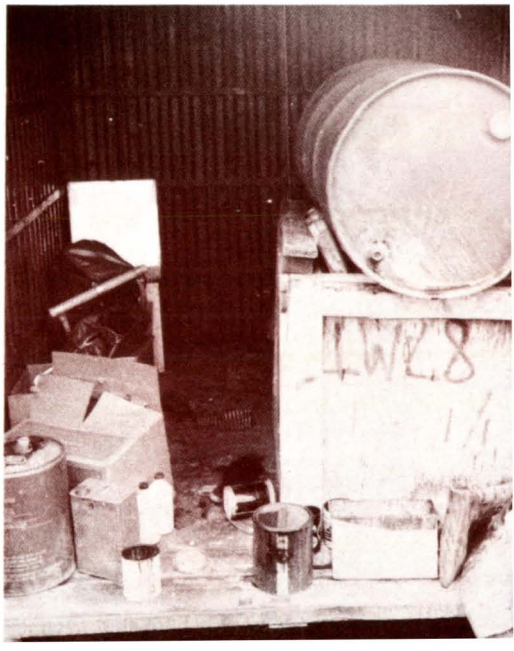
Don't wait for that dreaded cry of *fire* to sound in your area. Get out there and prevent it. Remember, safety is everybody's business.



Leaking paint cans,
open hydraulic fluid,
oily rags,
grease,
oil,
uncapped oil lines,
leaking solvent drums,
paint, ammunition . . .

. . . ARE

ALL FIRE HAZARDS



Charlie and Danny's Write-In

Dear Danny: Request clarification on TM 55-1510-209-10/1, page 10-7, paragraph 10-102. The paragraph reads "Flights through known icing conditions should be avoided if possible." Does this statement imply when forecast icing conditions are present to cancel the flight? During the winter months at this location moderate icing at MEA is a common occurrence.

R. W. P.

Danny's answer: Your request for clarification of paragraph 10-102 in TM 55-1510-209-10/1 has been received. Change 2 to the TM states that "Flights through known icing conditions should be avoided if possible." Change 3, which will be distributed in the near future, states "Flight through known icing conditions is not recommended for U-21A and U-21G aircraft." Neither of these statements were intended to restrict nor limit the operation of the U-21 during light or moderate icing conditions, but merely to suggest that the pilot, if possible, take another route, request a different altitude or develop an alternate plan to complete the mission. However, if this is not possible or practical the flight may be continued.

Chapter 3, paragraph 3-5, c, to AR 95-1 authorizes flight into known or forecast light or moderate icing conditions if the aircraft is equipped with adequate deicing or anti-icing equipment. Therefore, it is our opinion that if AR 95-1 is complied with and local regulations and SOPs permit flights under the conditions you describe would be authorized and well within the capabilities of the aircraft.

★ ★ ★

Dear Danny: Referring to the UH-1B dash 10 on page 4-10, paragraph 4-60, it states that in the event of a complete electrical failure, accomplish engine shutdown as follows: Disconnect main quick-disconnect at engine fuel filter.

Danny, isn't there an easier way? Some of the quick-disconnects don't disconnect so quick!

Anymouse

Danny's answer: We went out on the flight line and tried some of those quick-disconnects and you're right! They don't disconnect so quickly—in fact we couldn't loosen any with our bare hands—found out that this type had been torqued from 16 to 25 foot pounds when installed. So, a change to an MWO is in progress.

We are recommending that the following change be made to the UH-1B and UH-1C and M dash 10s.

For both manuals on page 4-10, paragraph 4-60, change to read:

4-60. In event of complete electrical failure accomplish engine shutdown by one of the following methods:

a. Manually depress engine idle solenoid plunger to allow throttle to be closed.

b. Rotate the manual override on the motor operated shutoff valve to the closed position.

c. Disconnect main fuel quick-disconnect at engine fuel filter.

★ ★ ★

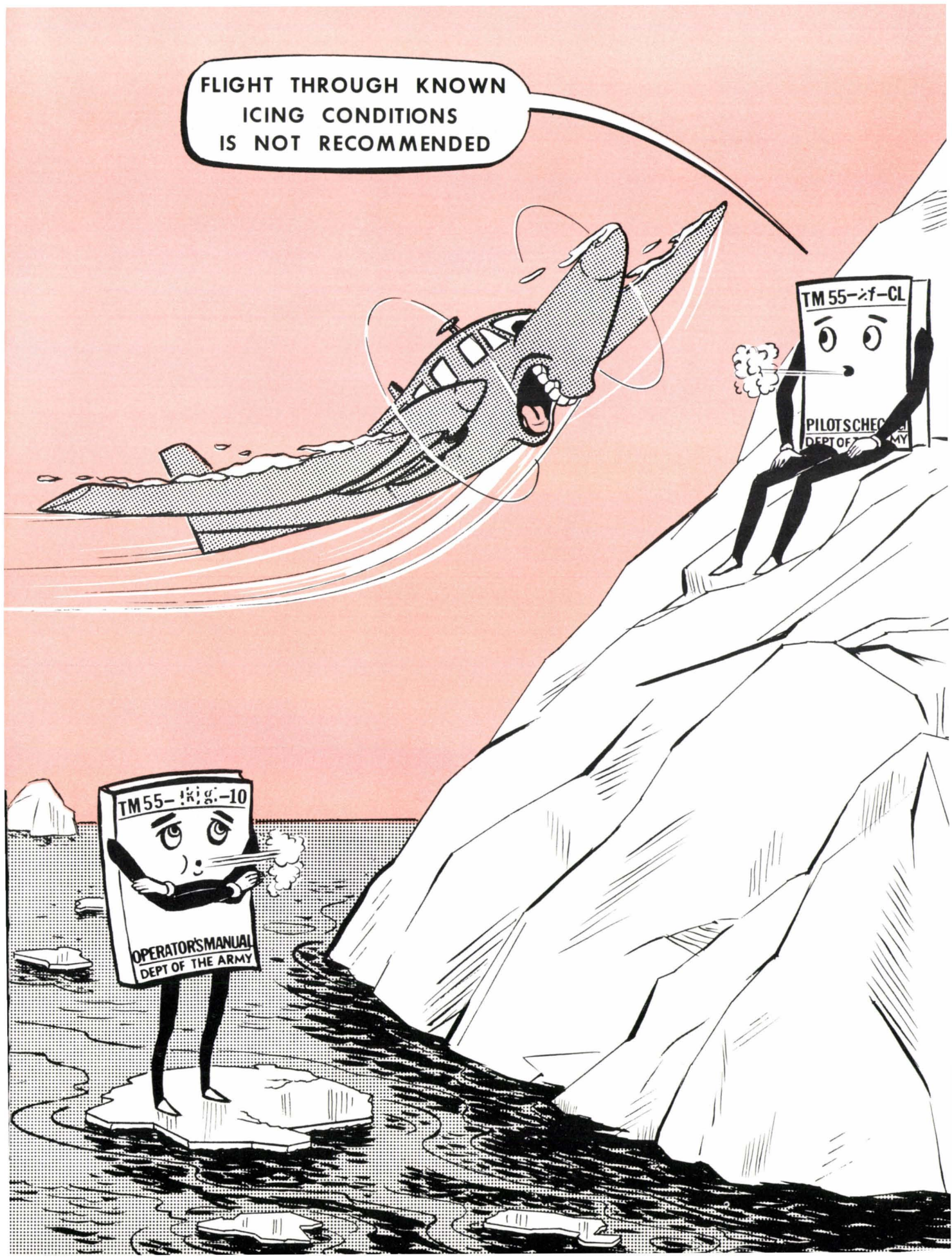
Dear Danny: We have found that aircraft parked in revetments are often subject to tail winds which are not too desirable while starting turbine engines. During engine start, the APU will often shut down due to high EGT. A requirement exists for the proper procedure relative to generator switch position and engine mode to preclude possible generator drive shafts shearing due to accessory drive speed and torque changes. Recommend that proper procedure be added to the Operator's Manual for the CH-47.

J. P. W.
GS-12 Equipment Specialist

Danny's answer: There has been discussion around the flight shack on the CH-47 line about that for a good while, so here goes. The next change to TM 55-1520-209-10 and the 227-10 should have the following NOTE added to chapter 3:

NOTE

If APU shuts down due to overtemp during normal starting procedure after engine or engines have stabilized in ground position, immediately turn generator switches to OFF and advance engine condition lever(s) to FLIGHT. After engine or engines have stabilized in FLIGHT turn generator switches to ON.


FLIGHT THROUGH KNOWN ICING CONDITIONS IS NOT RECOMMENDED
TM 55-
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OPERATOR'S MANUAL
DEPT OF THE ARMY

MISSION:
personal or professional?

Four Navy river patrol boats had been ambushed and the lead craft disabled . . . another ran aground in a vain attempt to rescue the crew of the lead ship. The tide had receded and prevented the other two ships from maneuvering . . . I knew our fire support team was very desperately needed . . . a grounded swiftboat is a sitting duck. Onstation the weather was unusually clear. With relief from the secondary fire team we could turn around and provide support to the boats indefinitely . . . I thought

Captain Rudi Hamvai Jr.

AT 0200 HOURS the nerve-jarring beckoning of our scramblephone brought me out of a restless sleep to a high hover. The receiver screamed into my ear, "This is Ops, a swiftboat has run aground and needs guns ASAP."

As the operations sergeant continued to relay information, I copied the location and frequency and after a "Roger" to his transmission I rousted the night standby crews out of their bunks.

By the time I finished tying my bootlaces I had formulated a tentative course of action. I knew that we were desperately needed. Though not defenseless, a grounded swiftboat is literally a sitting duck. I realized then that we would have to stay onstation until the swiftboat was free from its accidental mooring, and I had resigned myself to the fact that we would probably be up the rest of the night.

After quickly briefing my crews on the mission, we cranked up our Charlie model Hueys (UH-1Cs). I called for departure clearance and led my light fire team off Marble Mountain in the Republic of Vietnam toward the location of the swiftboats.

Enroute I made note of the weather. It was unusually clear for the time of the year. A full moon illuminated the skies and eased that universal anticipation which is characteristic of night flying. We still had very little information on the situation, both friendly and enemy.

I called the boats to inform them I was enroute and would be onstation in about 10 minutes. I had worked with the person who responded many times previously —but under more favorable circumstances. It was obvious he was unnerved. This struck me as very unusual because I had heard this swiftboat crewman react to very trying and dangerous situations with no hint of nervousness in his voice. As he informed me of the situation I came to realize that things were more hazardous than I had originally anticipated.

While returning to home base a team of four swiftboats had been ambushed and the lead craft had been disabled. While vainly attempting to rescue the crew of the lame boat, another had run aground and come under heavy fire from Viet Cong units ashore. The remaining members of the team were unable to reach the stricken vessels because the tide had by this time receded enough to prevent them from maneuvering at all. They would have to remain there until the river rose.

It had been determined now that at least one man was still alive on the grounded vessel, but unfortunately all lives had been lost on the lead craft during the initial ambush.

I informed the Navy boat that as soon as we arrived at its location we would put a stop to the incoming fire and fly gun protection until the boat could again be maneuvered. My contact's anxiety was apparently lessened by our promise.

Upon arrival onstation I had little difficulty locating the four marooned craft. Visibility was excellent due to the moonlight.

The voice again transmitted. This time we received a warm

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Vestibular Illusions

Major Bennett G. Owens Jr., M. D.

Aeromedic

LAST MONTH the first article in this series discussed the normal (on the ground) functioning of the human sense of balance and pointed out some of the limitations in function which can cause trouble for aviators. This article discusses some of the problems encountered by aviators as a result of these limitations and ways to handle them.

The most serious problems are caused by the *vestibular system of the inner ear,* beginning with the semicircular canals. Last month it was pointed out that the semicircular canals are used to detect rotation and that for a rotation to be detected it must be of a certain speed and duration. Because of this limitation, it is possible to change aircraft attitude significantly without being aware of it if the motion is slow enough or of short enough duration. When a change in attitude is recognized by some other means (such as looking out of the cockpit) and corrected, the semicircular canals detect this movement and give a false sensation of attitude. In other words, you develop an illusion. In addition, if the rotation goes on long enough at a constant rate it no longer can be detected by the semicircular canals. The endolymph [the fluid inside the semicircular canals] "comes up to speed" with the walls of the canals and the movement of the endolymph relative to the canal walls stops. The hairs return to their normal resting positions and you no longer realize that you are moving. When you stop the fluid continues moving after the canals have stopped and you have an illusion of motion in the opposite direction. These illusions give a false idea about your attitude and position in space and result in spatial disorientation.

Now let's consider some of the specific illusions caused by these limitations in the semicircular canals. The first and most common is known as *the leans.* It can happen in two ways. If you are flying along and allow one wing to drop very slowly while you are concentrating on something else (such as a map), you can drift into a wing low attitude without it being detected by your semicircular canals. Then when you identify the attitude visually and correct back to level flight, your semicircular canals detect this movement and tell you that you are changing from a wing level attitude to one of having the opposite wing low (figure 1). You think you are in a wing low attitude and tend to lean toward the opposite side of the cockpit to make the attitude your eyes see—and the one your semicircular canals feel—as much alike as possible.

The leans also can develop as a result of a prolonged turn. If you remain in a constant rate turn long enough the fluid in your canals comes up to speed with the walls and you no longer perceive the turn. Then when you roll out of the turn you feel that you are changing from a level attitude to a bank in the opposite direction and again develop the leans.

The next semicircular canal illusion is much more dangerous. It is known as the *graveyard spin.* If you stay in a spin for several rotations, the endolymph in the canals "comes up to speed" and your semicircular canals perceive the spin as a wing level dive. When you recover from the spin you feel as though you are entering a spin in the opposite direction. Since your gyros have tumbled (if you can't see the ground) and you are not proficient enough to fly needle-ball-air speed, you will probably re-enter the original spin trying to recover from one you think you have entered (figure 2). This illusion kills a number of pilots every year, especially private pilots without instrument training who wander into IFR conditions.

The semicircular canal illusion most likely to cause serious problems for Army aviators is the

And How To Whip Them

Provided by the Society of U. S. Army Flight Surgeons

Coriolis illusion. This can occur even in VFR conditions and is caused by sudden head movements during turns. When the aircraft is in a turn the endolymph in one of the semicircular canals is in the plane of motion and is moving within the canal. If you move your head this canal is moved out of the plane of motion but the endolymph continues to move for a short time. At the same time another canal has been moved into the plane of motion and the endolymph in it has started moving. As a result your brain is getting signals from both canals and you feel that you are moving around two axes of the aircraft at the same time (figure 3). The sensation of motion is often overwhelming and may even be accompanied by nausea and vomiting. It is usually so powerful that the pilot tries to correct this illusory unusual attitude immediately . . . without checking his instruments. This illusion is especially dangerous because it is most likely to occur in the traffic pattern, and when the pilot tries to recover he flies into the ground. It is the combination of an overwhelming feeling of motion leading to instinctive attempts to recover and the frequent occurrence close to the ground that makes this illusion so dangerous.

Like the graveyard spin Coriolis illusion accidents continue to take their toll. Several involving private planes have occurred after night takeoffs over water or uninhabited areas where there was nothing on the ground to use as a reference. During climbout it is assumed that the pilots erred in looking back at the airfield to maintain a visual reference. All that is certain about these takeoff accidents is that the aircraft would make a departure turn and then suddenly dive into the ground. This type accident is not just restricted to private pilots. Several have involved the military including several Army aviators in the Republic of Vietnam.

In addition to the illusions caused by the semicircular canals there also are several illusions caused by the inner ear's otolith organs. One of the most common and most dangerous of these is the *oculogravic illusion.* It occurs because the otolith organ can't tell the difference between the force of gravity and G forces. During forward acceleration, as in taking off, inertial force causes the otolith to slide backward. This produces a sensation that the head is tilting backward which makes you think you are in a nose-high attitude. When you lower the nose to correct for this you fly into the ground (figure 4). It is more common among Navy pilots performing catapult takeoffs from aircraft carriers than among Army aviators whose aircraft do not usually accelerate as fast. However, it is a potential problem every time someone makes a takeoff at night without using instruments. Maximum power takeoffs from small, dimly lit strips such as are found in Vietnam have probably taken some toll.

If you are beginning to think that the vestibular system (which includes both the semicircular canals and the otolith organs) is more of a handicap than a help in flying, you have gotten the point of this article. Because of its built-in limitations, the vestibular system is not able to provide accurate information about aircraft attitudes. In fact, in many cases it provides information that is completely wrong and if you rely on it you may wind up dead.

The *proprioceptive system* [seat-of-the-pants sense] does not cause any severe illusions with fancy names. It just doesn't work very well in the air. During aerial maneuvers the force exerted on the aviator is a combination of certrifugal force (which is always directed downward through the floor of the cockpit) and the force of gravity (figure 5). As a result, while your proprioceptive system does an excellent job of telling you where the aircraft seat is located, it unfortunately does not tell you anything about the relationship between the seat and the ground.

The only sense you can rely on in flight is the visual sense. As long as you can look out and see the ground, you can overcome illusions and determine your aircraft's attitude correctly. The trouble starts when you can't see the ground. In the early days of aviation a pilot who lost visual contact with the ground usually wound up dead.

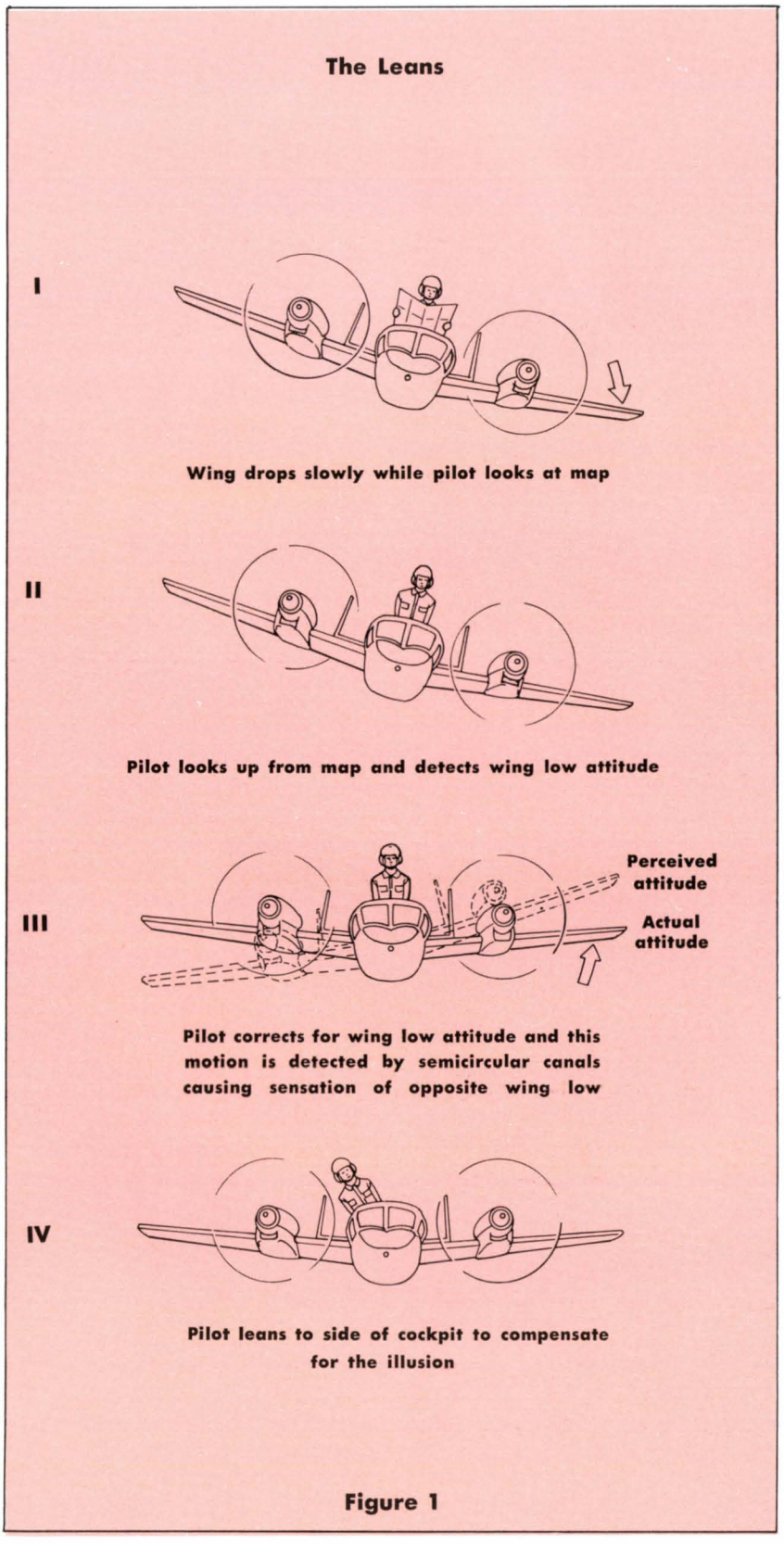

Figure 1

Night flying was limited pretty much to clear moonlighted nights. Weather flying was impossible. To overcome this problem attitude instruments were developed.

Attitude instruments provide you with an artificial horizon inside the cockpit which you can use when the real horizon is invisible. However, as most of you know, *it's not as easy as it sounds.* In order to fly instruments you must learn to visualize the position of the horizon from your instrument indications and at the same time ignore what your vestibular and proprioceptive senses are telling you. Just to make things more interesting, you have to simultaneously remember ATC procedures and navigate.

With these facts about spatial disorientation, how can a person get actual experience with it? The best way is to produce disorientation deliberately. You can do this by following the suggestions below. But before you proceed remember that cheating, such as opening your eyes, may convince you that you are immune. But the day is coming when you can't cheat. Also remember that you must have another aviator flying the aircraft while you are performing the experiment; otherwise, the experience may become too realistic and catastrophic. It is preferable to wear a hood to decrease light clues.

You can produce the leans by closing your eyes and having your pilot make a standard rate 360 degree turn. After he rolls out of the turn, with your eyes still closed, decide what you think the aircraft attitude is and then open your eyes and look. You should feel that the aircraft is banked to the side away from the direction of the turn when it is actually straight and level.

You can also produce the Coriolis illusion. To demonstrate this close your eyes while the aircraft is flying straight and level. Then have the pilot enter a 30 degree

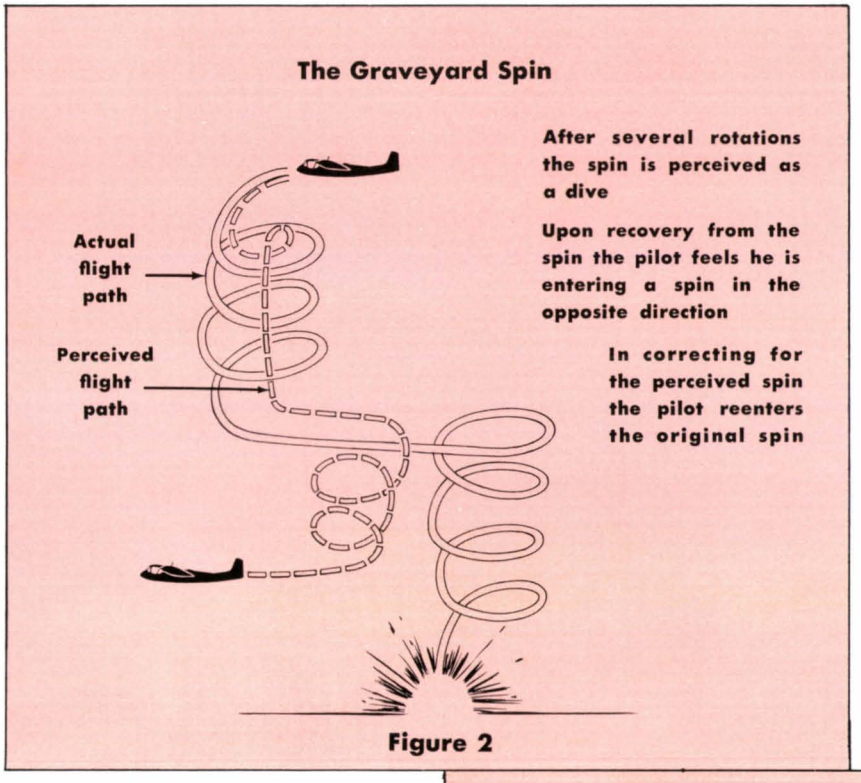

Figure 2

banked turn. While in the turn bend over forward as far as you can, turn your head rapidly to one side, straighten up quickly and after about a 15 second pause open your eyes. You should get a violent sensation of pitching and rolling. (Have a "burp bag" handy for this one just in case.)

There are other illusions you can produce but these should be enough to give you the idea that spatial disorientation can happen to you.

Now that you are (hopefully) convinced that you have a problem, the next question in your mind should be, What can I do about it?

Obviously, the best way to handle disorientation is to try to prevent it. With the knowledge you now have about the mechanisms of disorientation, several possibilities exist.

First, since the basic cause of disorientation is misperception by the vestibular and proprioceptive senses of what is really happening, it should be preventable if there is enough visual input to the brain to overcome these false sensations. *You must always have a horizon to look at while flying.* Whenever conditions are such that you can't see the real horizon, *you must use the artificial horizon provided by your instruments.* To look at instrument indications and interpret them as a horizon, and then use this horizon to overcome what your other senses are telling you, one has to trust his instruments and be proficient in instrument flight. Overcoming the sensations from your vestibular and proprioceptive senses is something you must *learn* to do. If you don't practice it, you forget how and are likely to get in trouble.

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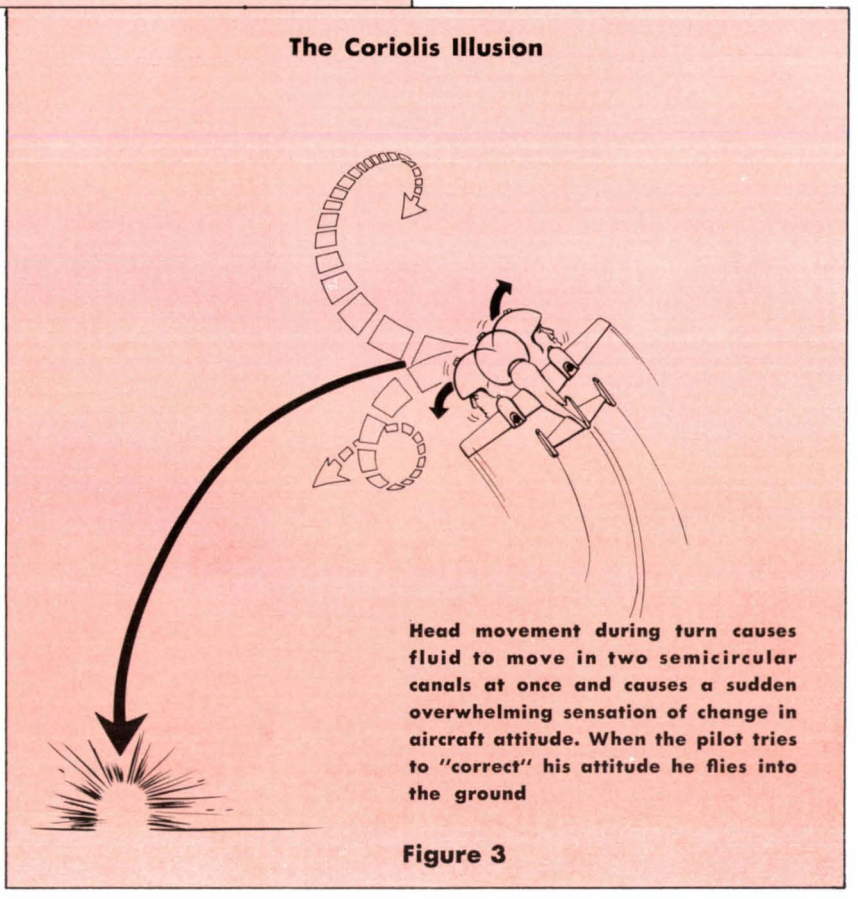

Figure 3

Compromise!
Compromise!
Compromise!

The author discusses communications security during tactical operations

Major Eugene H. Grayson Jr.

THIS IS WIDOW four-six; receiving fire! Raider two-one; going down in the LZ! Phoenix one-six just blew up in the LZ! Receiving fire! Receiving fire! The LZ is surrounded!"

How often do these frantic calls break the silence during combat assault operations? How many of you have listened to similar radio transmissions while enroute or on short final to an intended landing zone (LZ) after a carefully planned mission?

The questions are: Why have there been so many "hot" LZs during the past 8 years in the Republic of Vietnam? Why are so many combat assault operations unsuccessful?

In early 1963 American helicopter units suffered their first disastrous combat assault operation. This occurred in the Delta near the small village of Ap Bac and resulted in five CH-21s and one UH-1 armed helicopter being shot down in or around the LZ. The Army, Republic of Vietnam (ARVN) assault force suffered a similar fate on the ground. The reason for this initial "headline-making" incident was apparent. The mission was compromised, as were so many others during 1964 and early 1965 when U. S. helicopter units were supporting only ARVN ground troops. After-mission reports disclose that the results were often near fatal to the air crews as well as ARVN ground units who sometimes suffered heavy losses in the landing zone. Mission compromises resulted in extremely hot LZs, helicopters downed along flight routes and even pickup zones (PZs) being mortared or coming under small arms fire.

Why do similar incidents still occur today? Certainly the detailed planning, coordination of artillery and tactical air support have improved since the earlier days of the war. Are combat assaults still being compromised? It is a known fact that for every hot LZ there are 10 cold ones. But how often do we hear the reports that "the Viet Cong or North Vietnamese just cleared out," "the cooking fires were still warm" or "they didn't have time to carry off their equipment"? Obviously in many cases the enemy was aware of the impending operation. Certainly the loose talk around hootch maids, bar girls or downtown during some unguarded moment discloses information which may result in the enemy becoming aware well in advance that an operation will be taking place. In many cases this may even relate to actual locations of the proposed landing zones.

Unfortunately the enemy can disseminate this type information with uncanny speed. He can elect to defend an area with all available resources or silently withdraw, often leaving the landing zones mined and surrounded by booby traps.

Let's examine another primary reason for compromised missions. This time the blame is ours, and whether we realize it or not it is just as effective as broadcasting an operation over a public radio network. The reason so many missions are compromised is a result of overreconnaissance.

Today almost every commander and staff officer has free access to a helicopter and with the gross misuse of extensive reconnaissance flights prior to combat assaults it is no wonder that so many are completely unsuccessful. It appears that we have no regard for the enemy's capability to react to these tactics, even after 8 years of frustration while "beating the bushes" for an elusive foe.

Recently there have been several articles written about the enemy's improved capability to monitor allied radio transmissions. Anyone monitoring the majority of these messages can easily piece together the entire puzzle. How often do we hear transmissions such as these: "I am over the landing zone now. The landing zone is on the ridge west of Fire Base Whip. Let's make the approach over the stream and land the first flight next to the tree line. Scorpion six, this is Antenna, can you land 10 slicks at the road intersection? I'll mark it with a smoke grenade." Meanwhile, numerous orbits over the area and even approaches are conducted into the proposed landing zone while constant chatter continues over the aircraft radios.

Two actual combat assault missions will illustrate completely opposite approaches to an airmobile operation. Both were major assaults into enemy strongholds and while one was completely successful the other, while it accomplished a mission, could have possibly resulted in one of the most successful operations of the war.

Both operations involve the 101st Airborne Division (Airmobile) and were conducted into the A Shau Valley. The initial mission was scheduled during the spring of 1969. Aerial photographs of the valley floor disclosed that numerous landing zones were available. Tentative planning including proposed flight routes, formations and the normal se-

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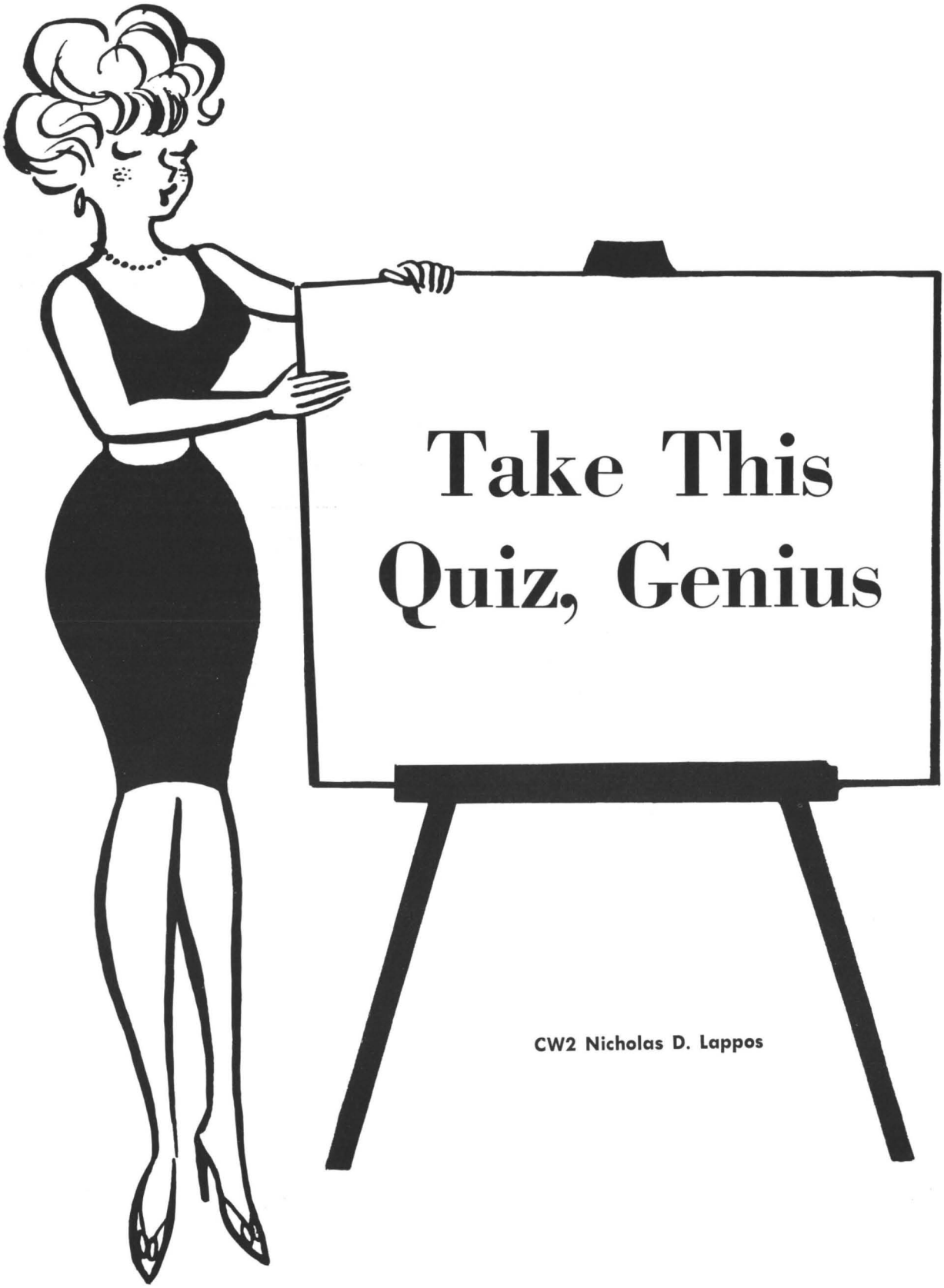
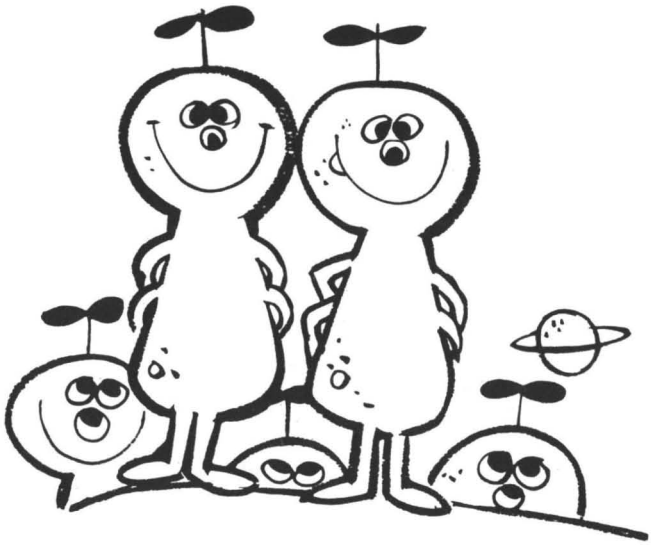


Take This Quiz, Genius

CW2 Nicholas D. Lappos

HERE ARE A FEW general questions on the basic principals of helicopter aerodynamics and some other factors which affect flight. These six questions are based on the UH-1 series aircraft, which should put all Army helicopter pilots in the running.

Okay, time to separate the men from the boys. You think you know how a helicopter works. Let's see . . .



1. The tail rotor of the UH-1 series is subject to a dissymmetry of lift as air speed increases. This asymmetrical thrust is countered by:
   a. Adding left pedal as power is applied.
   b. The installation of a Delta hinge bolt.
   c. Telling the peter pilot to unplug his helmet.
   d. The effect isn't enough to worry about.

2. A high gross weight Huey, when compared to the same ship at lower gross weight, will glide in autorotation:
   a. Farther, if you adjust the rpm down.
   b. Shorter, sort of like a rock.
   c. The same distance, if you let the rpm build.
   d. The same distance, if you adjust the rpm down.

3. The torque effect of the spinning parts of the T-53 series turbine engine is:
   a. Not very important.
   b. Countered by tail rotor thrust.
   c. Negated by counterrotating parts.
   d. Pretty much up in the air.

4. At the bottom of an autorotative approach, when collective pitch is applied the nose of the aircraft in a no wind condition will tend to yaw:
   a. Right, due to torque effect.
   b. Left, due to friction.
   c. No yaw would occur.
   d. Right, due to pucker factor.

5. With constant air speed in a shallow bank, when turning from a downwind to an upwind condition the aircraft will:
   a. Climb slightly.
   b. Descend slightly.
   c. A bogus question.
   d. Maintain altitude.

6. Transverse flow through the rotor system becomes a major factor in flight:
   a. Mainly during autorotation.
   b. Mainly in formation.
   c. Mainly in high speed flight.
   d. Only the morning after.

Here are the answers:

1 - *b*. The upper tail rotor blade is advancing into the relative wind and therefore creates more lift than the lower one, which is retreating in that same wind. This unequal lift tends to tilt the tail rotor disk forward. When the blades are tilted forward, the Delta hinge bolt assembly reduces the angle of attack of the upper blade and increases it in the lower blade. This helps to counter the effect—check on any UH-1, AH-1G or OH-13 or ask your friendly tech rep.

2 - *d*. The glide is essentially unaffected. See chapter 4 of your dash 10, "Autorotational Descent Performance is a Function of Air Speed and Essentially Unaffected by Density Altitude and Gross Weight."

3 - *c*. The Nl (gas producer) of a T-53 spins in a clockwise direction when viewed from the rear. The N2 (power turbine) spins in a counterclockwise direction, canceling any torque effect.

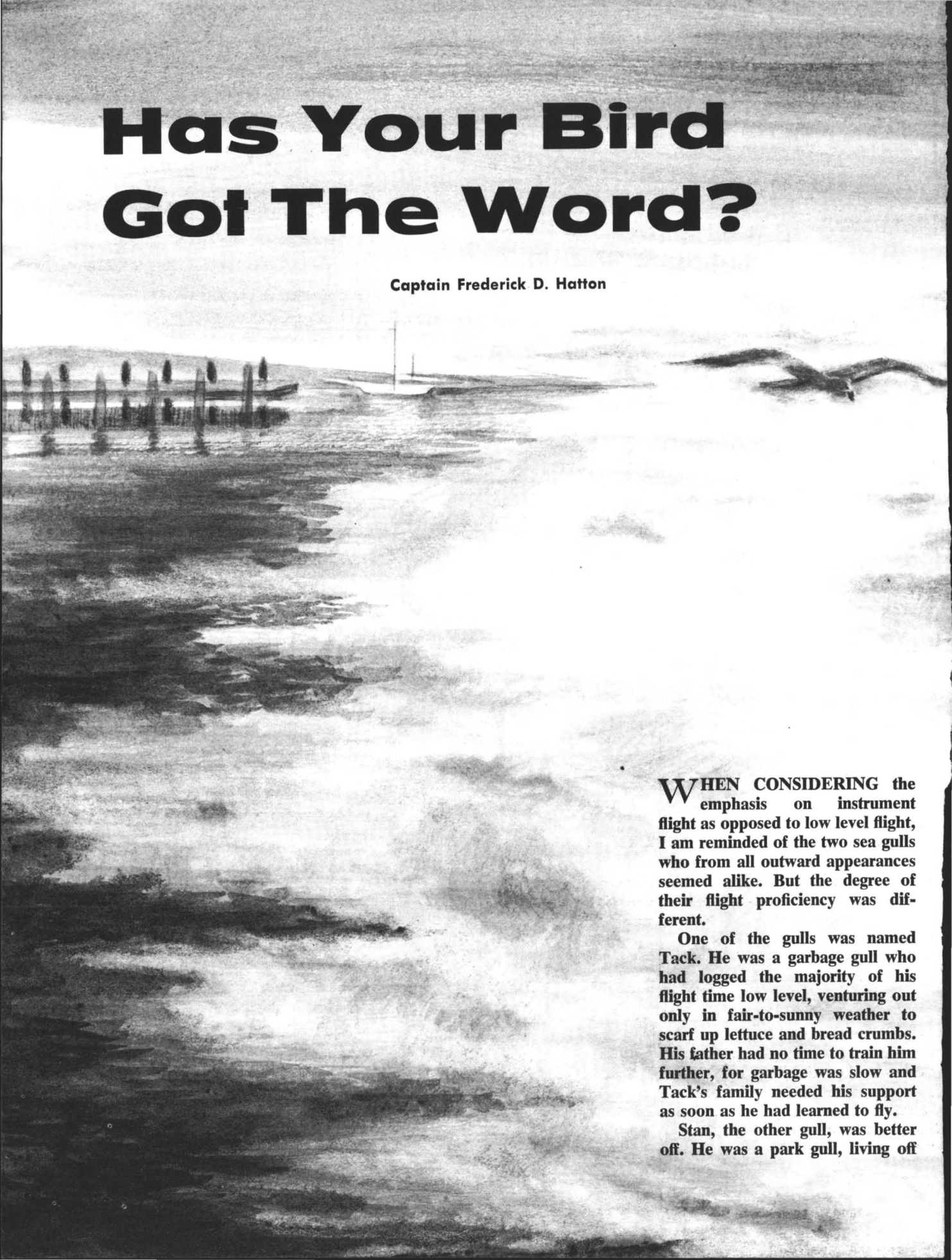
4 - *b*. As the pitch is lifted during a power off maneuver the transmission is loaded with the added lift of the rotor, increasing its friction or binding effect. This would cause the body to spin in the same direction as the main rotor—to the left. At the bottom of your next autorotation, notice which pedal you must add to maintain your heading (on a no wind day, please!).

5 - *d*. This one is always popular. The aircraft is supported by the power setting (a constant) through the aerodynamic forces on the blades, a direct function of air speed (also a constant). You can't help but hold your altitude. If performed with a ground reference the pilot would tend to correct ground speed by varying his air speed, leading to a loss of altitude in the case in question.

6 - *b*. The flow of air down through the rotor system during powered flight is termed transverse flow. It must be considered during formation flight, which is why a helicopter formation is stacked up behind the lead aircraft.

Has Your Bird Got The Word?

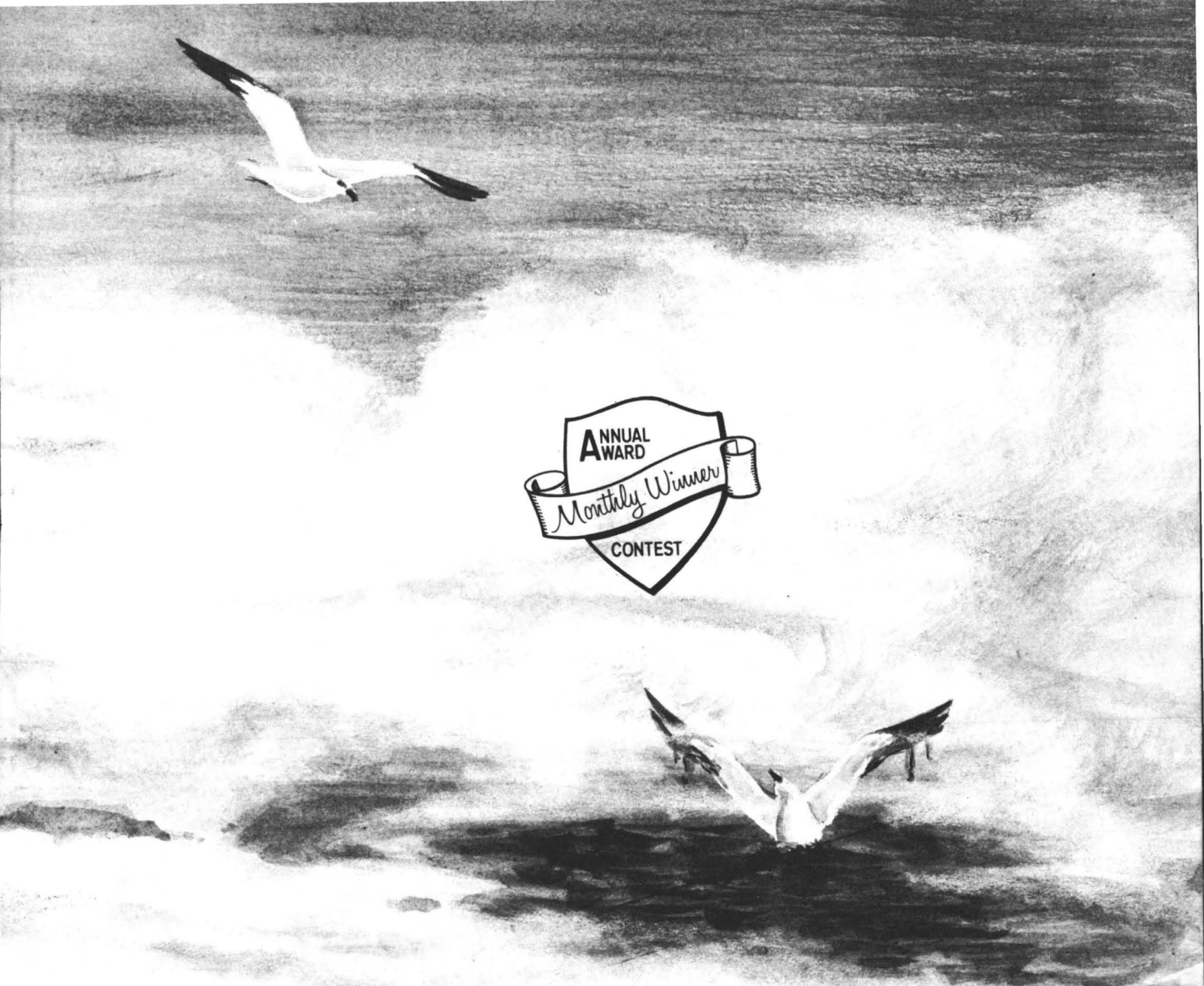
Captain Frederick D. Hatton



WHEN CONSIDERING the emphasis on instrument flight as opposed to low level flight, I am reminded of the two sea gulls who from all outward appearances seemed alike. But the degree of their flight proficiency was different.

One of the gulls was named Tack. He was a garbage gull who had logged the majority of his flight time low level, venturing out only in fair-to-sunny weather to scarf up lettuce and bread crumbs. His father had no time to train him further, for garbage was slow and Tack's family needed his support as soon as he had learned to fly.

Stan, the other gull, was better off. He was a park gull, living off



of popcorn and an occasional sloppy picnic. His father trained him to navigate roadways and fly through the ever-present smog.

As luck would have it, Tack and Stan fell for the same gull named Fanny. She was smart and sexy but couldn't make up her mind between the two.

One day while Tack and Stan stood on the dock brooding their dilemma, Fanny went out flying, hit a patch of fog and set down on the water only to find herself stuck in an oil slick.

Fanny turned on her emergency gull squawk and raised Tack and Stan on the dock. Tack took off immediately on a dead-reckoning route for the slick. Stan, with his advanced training and experience flying in marginal weather, homed in on a nearby buoy with enough altitude to avoid any hazards.

Tack hit the fog and became disoriented, bouncing off a freighter and into a pier which threw him into an inverted spin to a nose dive into a garbage barge. This incident gave him serious thought to aborting his mission.

Meanwhile, Stan had reached Fanny unscathed and extracted her successfully from the sticky oil and returned to the dock.

Of course, Stan won the heart of Fanny while Tack mended his wounds. Well, you might say the moral of this story is that if a bird that is not fully trained takes a

sticky mission he might lose his fanny (turn on laugh track).

To be more serious, low level flight has advantages in combat situations, but the hazards are many.

The need for better instrument training is outweighing the advantages of low level flight as Army aircraft and aviation missions become more sophisticated. When the war in the Republic of Vietnam expanded, the need for the basic aviator was great and there was not enough time to fully qualify him. Many aviators in Vietnam found themselves in a situation similar to Tack the sea gull, and some met the same fate. Now that we are evolving toward a peacetime environment the need for further training becomes increasingly important. With the advances in Army aviation technology in recent years, it becomes essential that the flying proficiency of each Army aviator be equally advanced.

To have aviators qualified for worldwide assignment, the Army must afford them the most advanced training which would enable them to give the ground commander the full use of Army aviation's assets through total mission availability. With the future addition of electronic countermeasures equipment, advanced armament systems and televised terrain displays, mission success will demand greater instrument proficiency of the Army aviator.

It is common knowledge that the instrument proficiency of an aviator is determined by the amount of training that he puts into his rating, whether he has a standard or a tactical instrument ticket, but the performance of the IFR mission requires the standard instrument pilot. In marginal weather this IFR ability can increase his endurance, shorten the mission time and provide full use of navigational and approach facilities to assure increased mission accomplishment. Its advantages to the aviator can be measured in increased confidence in his own ability, as well as greater knowledge and experience in instrument flight.

In order to provide better traffic control and greater safety, the Federal Aviation Administration is considering a requirement that pilots of all military aircraft not involved in tactical training file IFR flight plans. In this respect, the tactical instrument pilot falls short of total mission availability. An aviator who is proficient in tactical maneuvers but deficient in instrument flying could prevent a mission from being completed when confronted with inadvertent instrument conditions.

A standard instrument rating will not physically ensure proficiency in instrument flying, but the ability to do so can be greatly strengthened by continuous practice in actual IFR flight. With an Army aviator's future missions evolving from low level VFR flights to higher altitudes and occasional IFR conditions, so must the individual aviator evolve in order to ensure total mission availability and provide fully efficient aviation force.

Latent Dangers . . .

. . . complacency, parttime consciousness, apathy, nonprofessional attitudes . . .

CW4 James A. Bell

HAVE YOU EVER observed a safety officer planning his monthly safety meeting? He solicits participation and too frequently is treated with a "what have I got to offer" or "not another one" attitude. This lack of interest is notorious and a handholder of complacency.

How many of you have noticed the efforts expended to devise excuses not to attend safety meetings? This vigor could have been used to make a safety meeting interesting.

The general lack of interest in safety meetings leads to complacency. If safety meetings and publications did nothing but occupy our time with their messages, accidents probably would be greatly reduced. Despite the merit in the saying "If it ain't broke, don't fix it" the common misconception is we've heard it all before. This attitude spawns unplanned events, namely accidents.

The safety officer's job is to emcee the entire program. He can provide the time and place (certainly we already have the reason) for the airing of views and ideas on safety matters. These can be presented as a plan to the commander for his acceptance.

The monthly safety program should be posted so the attendees can see the subjects to be discussed and better prepare themselves for off agenda participation. It's up to the safety officer to stimulate curiosity. Adequate publicity can reasonably assure him of this. Discussion of recent accidents and cause factors generate interest because the working environment of those present might expose them to similar circumstances. One of the few things that can be gained from an aircraft accident is the "why." Can we depend then on all personnel reading this in the "Weekly Summary" provided by USAAAVS? One more step to be taken would be to provide and discuss more detailed information (that doesn't compromise any security requirement for protection of accident investigations).

Assistance from the nearest General Aviation District Office (GADO), Federal Aviation Administration (FAA), would prove beneficial as a source of information that affects not only the military but also the flying public. The FAA's general aviation accident prevention program is an indicator of a public need to avoid complacency and gives the military an opportunity to progress together with its civilian counterparts on accident prevention. The FAA has a very active accident prevention program and is anxious to make safety a two-way street for everyone. Although many of the military accident problem areas are unique to those who wear the uniform, we owe it to ourselves to investigate general aviation shortcomings in the accident prevention areas and provide constructive ideas through the GADO office. The number of areas in which we share potential hazards is alarming to say the least.

Excellent films and visual aids may be obtained from the Aeronautical Center in Oklahoma City, OK. Ask your Department of the Army regional representative (DARR) as shown in AR 95-50 for assistance and for the location of your nearest GADO office. The GADO safety specialist is ready to assist and to provide an opportunity for us to reciprocate: Safety is a very important part of his job too.

Our sister services certainly are not exempted from complacency pitfalls and a great deal can be learned from their astute persistence in accident prevention. A continuing effort in this area has proven itself in the past.

Complacency, that latent danger, must be eliminated if we are to professionally pursue our careers in aviation. An amateurish, parttime consciousness characterized by inaction and a know-it-all attitude toward accident prevention marks us as novices.

Let's get aware, become active and interested in the safety aspect of our profession. Just as it's necessary to mentally stay ahead of an aircraft while flying, we need to eagerly retain the upper hand in safety and accident prevention. Army aviation is constantly changing . . . we must change too. SUPPORT YOUR LOCAL SAFETY OFFICER . . . ACTIVELY.

Compromise! Compromise! Compromise!

Continued from page 17

quence of aviation planning covering all aspects of the operation began. On D Day-2 a reconnaissance flight was scheduled in order for the ground commanders, essential staff officers and the aviation commanders who would lead the flight to get their first look at the intended landing zones.

The initial reconnaissance was conducted in a manner as not to divulge the location of the landing zones. The flight remained over the mountain range east of the valley flying a parallel course yet close enough to view the LZs and verify the lack of obstacles such as high grass, stakes and craters.

The flight commanders were completely satisfied with the reconnaissance. The approach route was confirmed and a small stream intersection was selected as the forward edge of the first LZ. Over the objection of the infantry battalion commander the aviation commander refused to fly a low-level flight into the A Shau Valley floor. Unfortunately the story does not end here.

Upon returning to his command post the ground commander requested a command and control helicopter and returned to the valley floor *alone*. Not only was the aircraft orbiting for an excessive period of time, but also a slow, low-level approach was made over the landing zone. This was not the last reconnaissance flight into the area because the next day found countless additional helicopters throughout the area for a "last minute look." The second ground commander used his command and control helicopter to return to the area and flew over the entire valley floor for a considerable period of time. Fortunately he was accompanied by two AH-1G Huey-Cobras and, although the gun company commander violently objected to the "sitting duck" type reconnaissance, it was completed in a leisurely manner and without a doubt helped to further compromise the mission. Additional reconnaissance flights by ground commanders also converged over this area in mass during the next 2 days. There had been no operations into the A Shau Valley since the summer of 1968 so a watchful enemy became readily aware of an impending operation.

What were the results of this assault? First, bad weather rolled in and the entire operation was delayed for 2 weeks. During this time the NVA constructed fortifications which surrounded the southern landing zone. This was discovered by a bomb damage assessment team checking the area following a B52 strike, which was scheduled a week after the original D Day, since the combat assault mission had been delayed. Why had these enemy positions been placed around a single LZ when there were so many others scattered in the near vicinity? Was this part of the enemy's plan to defend the valley at all cost? He could have raised havoc with the flight formation since the approach paralleled high ground on a long final.

Not to be overlooked was the fact that the valley had been previously defended with .37 mm and .23 mm antiaircraft weapons, and for those not familiar with these weapons talk to any aviator returning from the Northern I Military Region about their effectiveness against helicopters.

The weather finally cleared and the combat assault began. The infantry battalions were rapidly deployed in an extensive search and clear operation throughout the lower end of the valley and westward to the Laotian border. What were the results? A fair-sized logistical area was uncovered including several Russian-made vehicles. Where was the enemy and where were the huge logistical storage centers previously reported to be located throughout the valley? Was our intelligence bad or was the enemy tipped off by overreconnaissance, thus withdrawing his units and logistical sites?

The enemy's reaction was apparent and the full benefits of a sudden and uncompromised combat assault were never gained. It should be mentioned here that during the 2-week weather delay the ceiling lifted sufficiently to execute a hastily planned combat assault into the former fire base just east of the valley. Only a rapid reconnaissance was flown by the aviation commander and almost immediately the slicks began touching down. The enemy troops were all over the fire base and caught completely by surprise. The reason should be obvious—the assault was not compromised by extensive and overreconnaissance.

The second illustration involves another major assault into the area of the A Shau Valley. This mission was a combined U. S.-ARVN assault and included elements of six infantry battalions. This operation planned for combat assaults deep across the valley floor next to the Laotian border with the resulting mission of moving eastward, trapping any North Vietnamese units inside the South Vietnamese border. Any premature disclosure of the operation would allow the enemy time to hastily withdraw across the border. No rotary wing reconnaissance flights were permitted over the valley and this restriction was strictly enforced. Infantry and aviation personnel prior to D Day-1 viewed the proposed landing zones while riding with Air Force Facs. Maps and aerial photographs were utilized

extensively in selecting tentative landing zones.

On D Day-1 the airmobile task force commander authorized a "one pass" reconnaissance for key aviation personnel of both assault helicopter battalions. The two flights were restricted to one slick and two Cobras (slick company commanders rode in the front seat and one additional slick remained in orbit well clear of the operational area solely for the purpose of crew recovery in the event of a downed aircraft). This reconnaissance was conducted at 100 knots low level and only one pass was made over each landing zone. These flights paralleled the border with the intent of precluding the possibility of compromising the impending mission. Even the air cavalry squadron was not allowed to penetrate the valley until D Day at H Hour-1.

The enemy was caught completely by surprise. Tactical air strikes began at H-2 followed by conventional artillery from the valley floor and the fire bases located on the mountaintops also guarding the eastern approaches. The two assault helicopter battalions lifted elements of six ARVN and U. S. infantry battalions into the selected landing zones. No slicks were downed by enemy fire although heavy ground fire was received in the north beginning with the second lift. The landings were completely successful and the infantry rapidly deployed, cutting off escape routes. This battle culminated with the victory at Dong Ap Ba, better known as Hamburger Hill.

The advantages of the commander restricting reconnaissance flights paid off in the latter case. The enemy was found and destroyed. Allowing an enemy to withdraw and permitting him to fight again are the dangers gained from compromising a mission.

It appears necessary that we project airmobile operations into a future combat environment; this is the conventional war that we may one day find ourselves involved. When facing a sophisticated enemy armed with similar armored and mechanized equipment, and in an area where we may not enjoy a constant air superiority, overreconnaissance will pose no problem. It simply will not be done. The word will rapidly spread that "strap hangers" and .23 mm antiaircraft weapons do not mix. We won't find the sky filled with helicopters orbiting over the proposed LZ prior to H Hour.

What has happened to the techniques learned during the 11th Air Assault Division tests in the early 1960s? During that period, maps, aerial photographs and good pilot techniques seemed to result in aircraft reaching the landing zone. If an LZ appeared to be in a difficult area then a fixed wing aircraft or gunship would mark it just prior to touchdown. Infantry commanders made extensive use of maps in determining objectives as well as other aspects of the ground tactical plan. The operations did not allow time for lengthy and compromising reconnaissance flights, yet the assaults were successful.

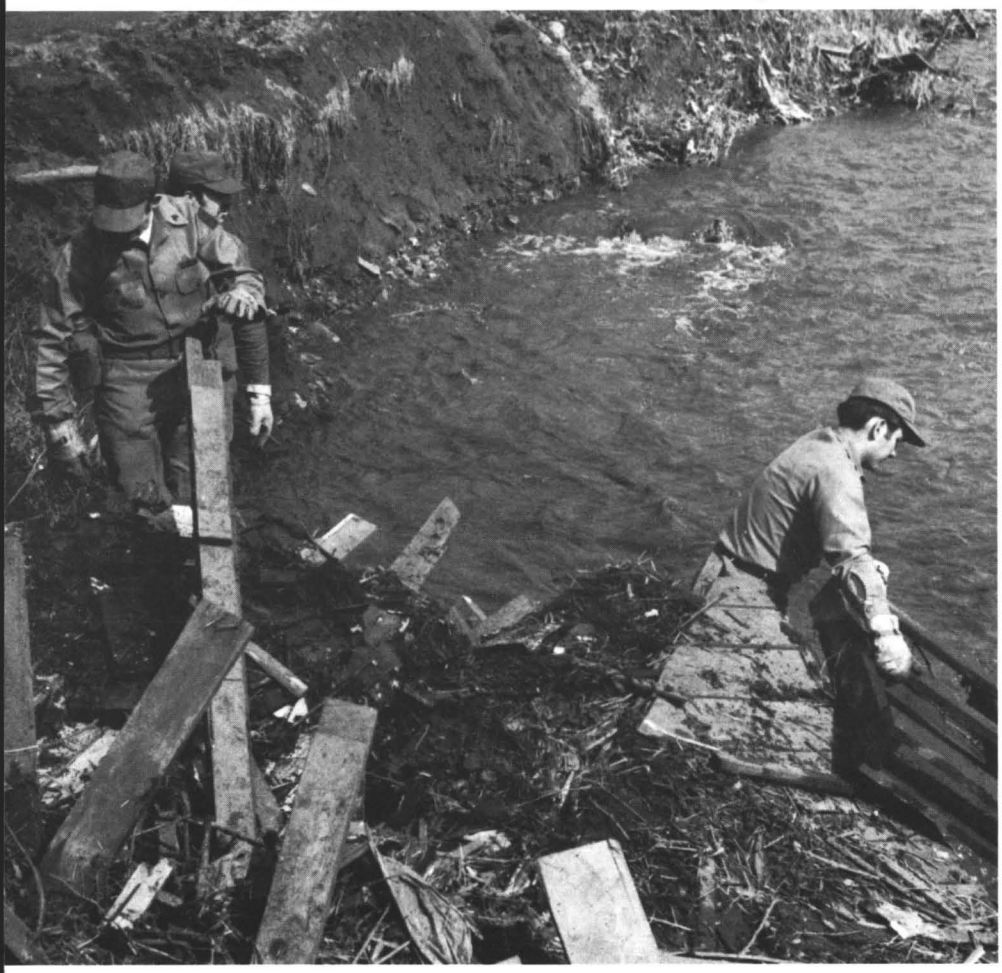
Reconnaissance certainly plays an important part in any battle, however, there is a danger involved when it is misused. Completed afteraction reports from the battlefield would indicate that there are many outstanding examples of how we are doing it the *wrong way*.

In moving large numbers of assault troops, communications security is an important factor

One Army Team Works

In West Virginia

National Guardsmen sift and clear debris while searching it for casualties



HEAVY RAINS in Logan County, WV, have been blamed for a devastating flood when a slag dam broke flushing water through the narrow Buffalo Creek valley with a destructive force.

Army National Guardsmen and U. S. Army soldiers quickly responded and worked side-by-side to provide invaluable assistance to the flood-stricken community. Both coordinated closely with civil authorities and the Red Cross in rescue and recover missions.

The military task force provided many services including the establishment of sanitation facilities as well as a pure water supply. The relief force was instrumental in

CWO Michael Lopez

Photographs by

Specialist 4 Bob Richards

rescuing survivors, controlling traffic and recovering casualties as well as sifting and clearing debris.

The West Virginia Army National Guard provided the bulk of manpower and equipment in relief to the 14 mining towns, with elements of the 3/107th Armored Cavalry and the 1092d Engineer Battalion absorbing the brunt of the workload. The Guard's 254th Transportation Company (light truck) and the 3664th Light Maintenance Company (LDS) served as backup units, while the 157th Military Police Company provided traffic control for the area.

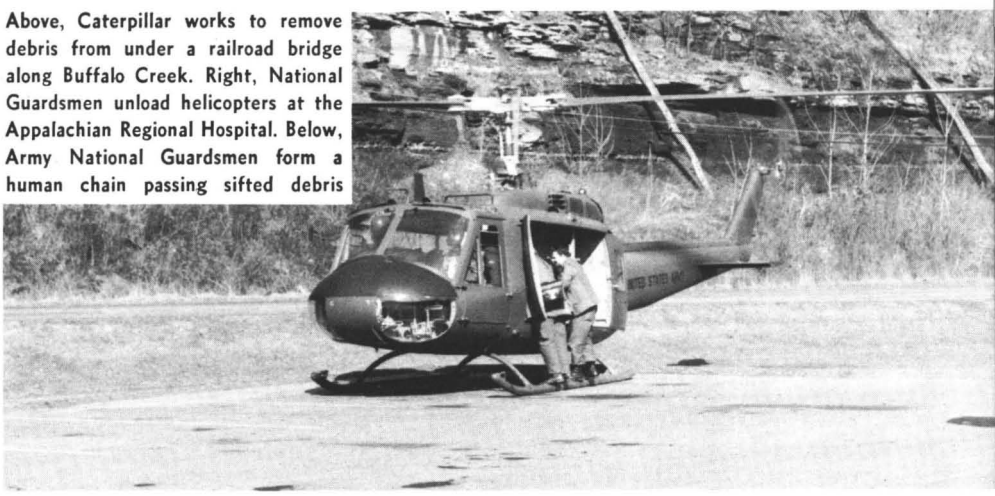
Active Army assets included a water purification team from Ft. Bragg, NC, and a waste disposal advisory team from Ft. Meade, MD.

The Army Corps of Engineers provided civilian teams for bridge building, debris clearance and repavement of roads. West Virginia's 146th Aeromedical Evacuation Company provided aerial ambulance service for the area.

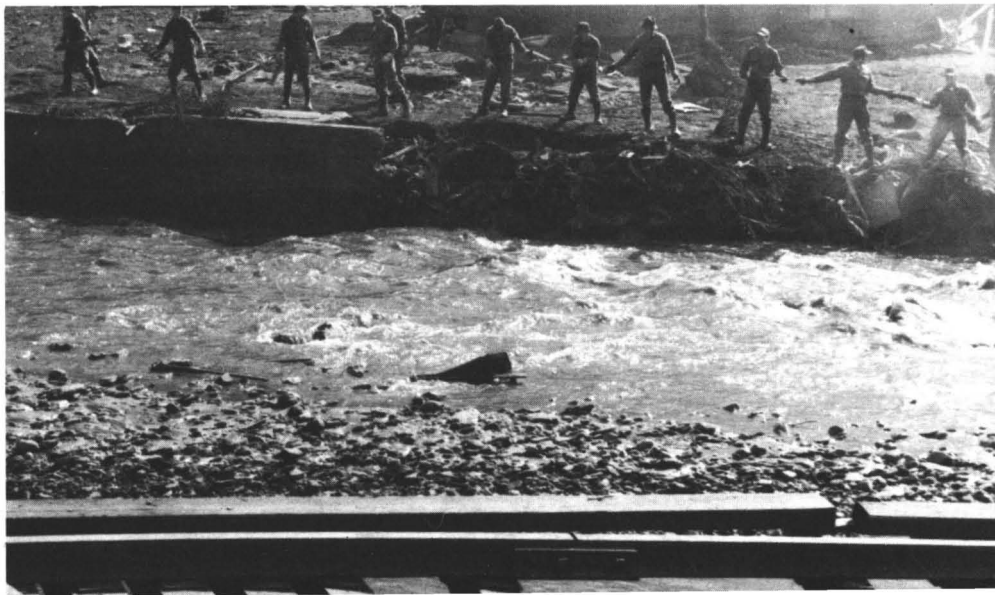
Ft. Knox, Kentucky's 8/1 Cavalry provided a detachment of UH-1H Huey helicopters which airlifted medical supplies and food into the Buffalo Creek disaster area as well as air evacuated casualties.

Active Army pilots credited their experience flying in the Republic of Vietnam as an invaluable asset . . . West Virginia's rough mountainous terrain is similar to that found in Vietnam.

Observers and the survivors of the flood were quick to compliment both the active Army personnel and the National Guardsmen for the professionalism they displayed working side-by-side in time of disaster. Personnel at the scene found it difficult to distinguish any difference in the way the National Guardsmen and active Army personnel handled the relief mission . . . a prime example of the teamwork possible in the One Army Team.



Above, Caterpillar works to remove debris from under a railroad bridge along Buffalo Creek. Right, National Guardsmen unload helicopters at the Appalachian Regional Hospital. Below, Army National Guardsmen form a human chain passing sifted debris



Aeromedic

Continued from page 15

Second, since the Coriolis illusion can occur in any conditions of visibility if you turn your head, the only way to offset it is to avoid sudden head movements in turns.

Third, to allow you to make the most of what actual horizon you do have at night, you should always take time to establish your dark adaptation before a night flight.

There are other factors that alter mental functions and thereby make illusions more likely. Fatigue, hypoxia, hypoglycemia (low blood sugar), alcohol and drugs to mention a few. All of these must be avoided in flying if you hope to avoid disorientation.

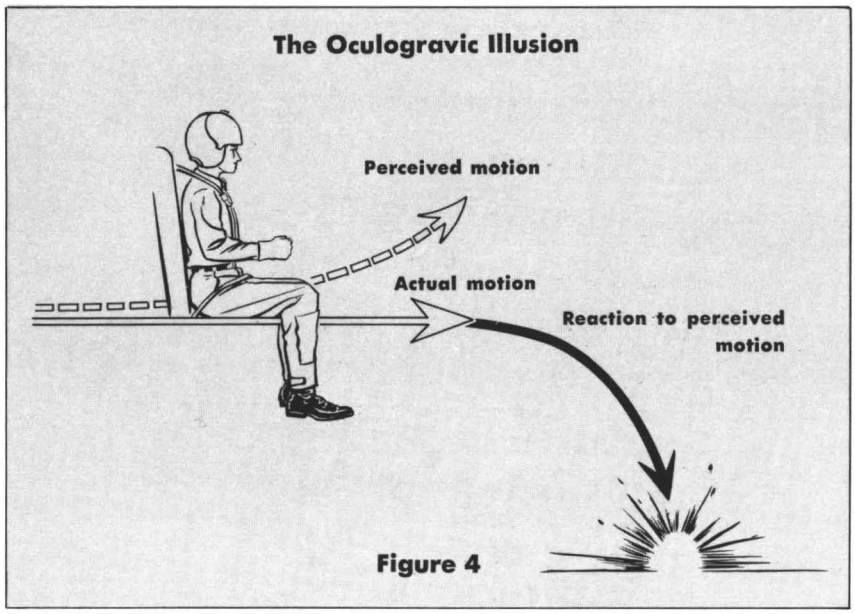


Figure 4

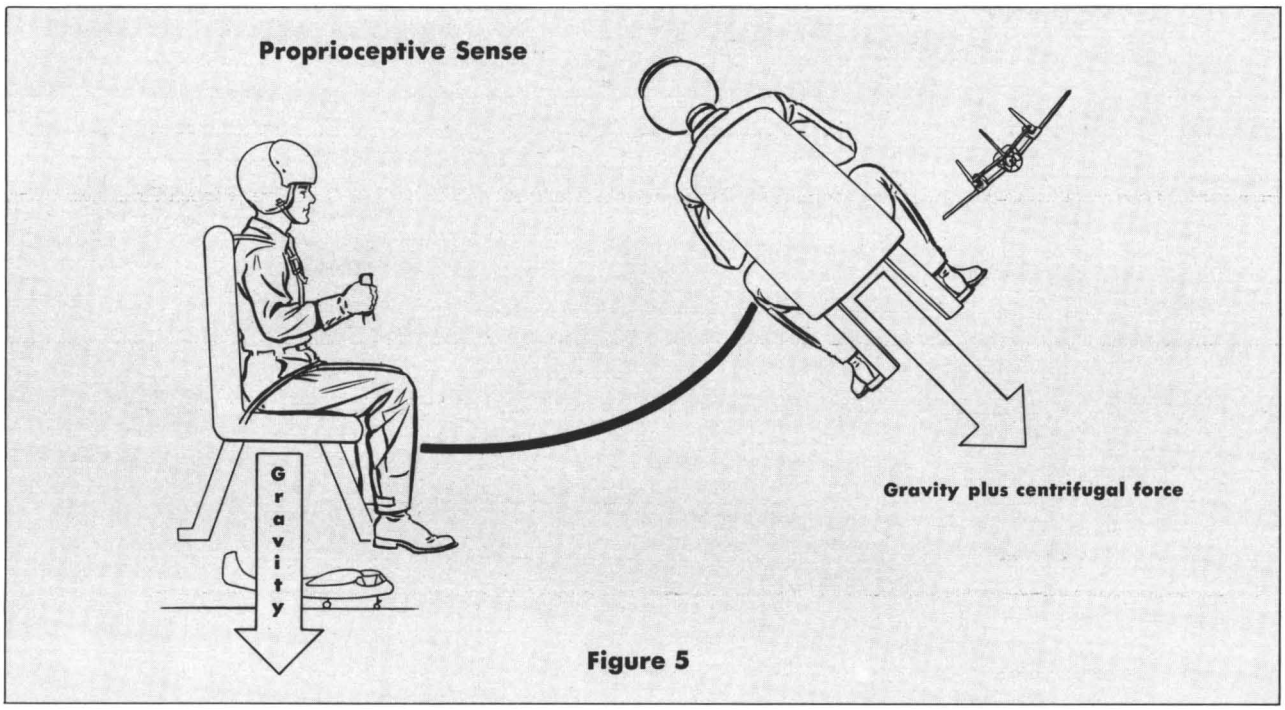


Figure 5

No matter how carefully you follow these suggestions, the day will come when you get disoriented. This is natural and inevitable and should be no cause for panic. Get scared, but it is most important that you do not lose your cool. Before you do anything to correct whatever attitude you feel, *look at your instruments* and make sure that what you feel is what is actually happening. This will delay your reaction to an unusual attitude a little, but it will also keep you from flying yourself into the ground. As long as you wait and look before you take any corrective action . . . even when you do develop disorientation . . . the chances are that you will survive the encounter and go on to become an "old aviator" with interesting stories to tell.

VIEWS FROM READERS

Continued from page 1

gain around in life insurance. It's difficult to imagine that anyone would not want to take full advantage of it. For those who have the self discipline to save regularly, term insurance coupled with a good investment program (mutual funds, credit union, savings bonds, etc.) would be a good supplement to SGLI. And, as you pointed out, the straight life program incorporates an automatic savings program with life insurance protection. The endowment policy is usually pretty expensive considering the cost versus coverage.

Most of us in the flying business get extra money for the slight extra risk involved in our job. Is it unreasonable for us to set aside a small amount of this so our family will be protected?

CW3 Johnny L. Powell
WOCAR
Ft. Rucker, AL 36360

Sir:

The requirement of a large training effort for enlisted aviation skills has diminished in direct proportion to the withdrawal of forces from the Republic of Vietnam. Since the training of these skills was based on short tour authorization, the training needs have nearly evaporated, and so has the need for a number of personnel who have such skills.

If you have one of the aviation enlisted MOS listed below, it's time to look for something new, since these skills and the number of aircraft to which they relate are decreasing in the active Army inventory.

67B O-1/U-6 Airplane Repairman
67C U-1A Airplane Repairman
67M OH-13/OH-23 Helicopter Repairman
67P CH-34 Helicopter Repairman
67T CH-37 Helicopter Repairman
68C Aircraft Reciprocating Engine Repairman

For those who find themselves in the above category, it's time to consider changing your skill. How about a tech inspector, maintenance supervisor or repairman on the newer series aircraft?

See your unit personnel officer NOW!

Enlisted Personnel Directorate
Office of Personnel Operations

INSTRUMENT CORNER

Q. TM 1-225 Instrument Approaches states that a pilot may begin descent from procedure turn altitude when established on the inbound approach course. At what point is the pilot considered to be "established on the inbound approach course?"

A. The reference given is found in paragraph 14-7 of TM 1-225, dated December 1968. FAA Circular AC No: 90-1A Civil Use of U. S. Government Instrument Approach Procedure Charts, dated 10 April 1968 gives the same information on page 18. The altitude prescribed for the procedure turn is a minimum altitude until the aircraft is established on the inbound course.

Without further guidance Army aviation is bound by these publications to the literal meaning of "on course." Literally "on course" is the procedure currently being taught at USAAVNS, Ft. Rucker, AL.

Problems can be encountered by a pilot who waits for an "on course" indication because of head winds. Flying too long at procedure turn altitude can lead to a "hairy" descent or can cause a missed approach.

During a procedure turn, with winds taken into consideration, a pilot can tell when he is within 45 degrees of the inbound course if he is going to roll out "on course."

TM 11-2557-29 Terminal Air Traffic Control, 1 April 1971, gives specific instructions to a controller. Paragraph 1360 says: "Issue all of the following to an aircraft before it reaches the approach gate:

"a. Position with respect to the final approach fix.

"b. Vector to intercept the final approach course if required.

"c. Approach clearance, except when conducting a radar approach. If terrain or traffic does not permit unrestricted descent to lowest published altitude specified in approach procedure prior to final approach descent, controller shall:

"(1) Defer issuance of approach clearance until there are no restructions, or

"(2) Issue altitude restriction with approach clearance specifying when or at what point unrestricted descent can be made.

It can be seen then that on a vector to an ILS approach in actual weather, after clearance for the approach has been received, the pilot may overfly the glide slope if he were to wait until he had an "on course" indication. Also the controller has assured himself that unrestricted descent is permitted.

The procedure used by the Air Force is given in AFM 51-37 dated November 71, page 15-14: "Initiate descent from the procedure turn altitude when the aircraft is positioned within 10° of the procedure turn course and is on an inbound intercept heading. The 10° angle is measured from the procedure turn fix."

Procedures may vary somewhat on the interpretation of "established on course" when deemed justifiable, so long as safety is not jeopardized.

Radar's Role In Air Traffic Control

Continued from page 4

or controller or when requested by the pilot. My last consideration is providing additional services to the extent possible, the category in which traffic information falls. These priorities are clearly defined in paragraph 28 of the TM-29.

At the time you were being vectored, you could hear me controlling several other aircraft. All of you were being vectored for an approach. I was able to reduce separation between you and the other radar identified aircraft to 3 miles in lieu of the 10 minutes or 1,000 feet vertical separation required in a nonradar environment. I was relaying control information to adjacent facilities at this same time which you could not hear. My workload at the time was so extensive that the provision of additional services was not possible.

When you inquired if the target was present on my scope, this momentarily distracted me from providing services of a higher priority.

Pilot: That must be the reason why you failed to vector us clear of the traffic—right?

Controller: No, not necessarily, You never indicated you wanted that service. The traffic situation changes from one minute to another and consequently our workload changes just as abruptly. Avoidance vectors are given only on request as stated in paragraph 1542 of the TM-29, keeping in mind this is an additional service and is given last priority.

In addition, according to AR 95-1, while flying in VFR conditions one must observe the right-of-way and fly clear of other traffic. Obviously in IFR conditions there are no aircraft on a VFR flight plan. For aircraft on IFR flight plans it is our responsibility . . . that is the air traffic control specialists . . . to keep you separated. In a nonradar environment this separation is basically applied by time intervals, NAVAID fixes or vertical separation. In a radar environment separation can be reduced to a minimum of 3 miles between aircraft within 40 miles of the radar antenna and 5 miles between aircraft 40 or more miles from the radar antenna.

Aviators should not become complacent in a radar environment. Radar traffic advisories may be given in one instant and then, as your flight progresses, the controller's workload may increase to the point where he hasn't the time to provide this service further. Aviators should remain on the alert and never expect radar traffic advisories.

Remember the priority given to traffic information, which is an additional service. And let me quote to you paragraph 1540 of the TM-29 concerning the application of additional services: "Provide additional services to the extent possible contingent upon your capability to fit it into the performance of higher priority duties and on the basis of the following:

"a. Provision of a service is not mandatory because many factors (such as limitations of the radar, volume of traffic, communications frequency congestion and your workload) could prevent you from providing it.

"b. You have complete discretion for determining if you are able to provide or continue to provide a service in a particular case.

"c. Your decision, not to provide or continue to provide a service in a particular case, is not subject to question and need not be made known to the pilot/s."

Workload permitting, radar traffic information is issued to all IFR aircraft unless omission is requested by the pilot or the aircraft is operating within positive controlled airspace. Radar traffic information is issued to other than IFR aircraft only when requested by the pilot.

Pilot: It is much clearer now. Furthermore, I can understand now how time consuming this would be in a high density traffic area. The radar sets you normally use are not capable of recording the altitude of all the targets and in some cases your coverage is from 2,000 or 3,000 feet to 20,000 or 30,000 feet, so you have no way of determining which traffic is really pertinent.

When we receive radar traffic information it is just natural to expect more. You mentioned avoidance vectors are furnished only if requested. Does this mean that when you report traffic and we reply that we do not have the traffic in sight you will not take any further action?

Controller: If you're asking would we take the initiative and provide an avoidance vector the answer is no. The reply the pilot makes determines what action the controller will take. If the pilot reports the aircraft in sight, the controller will no longer be concerned about the traffic. If the pilot reports the aircraft not in sight and he does not request an avoidance vector, the controller will inform the pilot when the traffic is no longer a factor. If the pilot simply acknowledges by saying "roger," which frequently happens, it leaves the controller perplexed. Most controllers interpret "roger" as an acknowledgment that traffic is sighted and simply do not concern themselves further. Another acknowledgment made by the pilot which leads to misunderstanding is: "Traffic not in sight, keep me advised." To the controller this means for him to report when the traffic is no longer a factor and not

to keep calling the traffic as its position changes, which you probably have in mind. If that were the case how would we differentiate between the traffic call being the new position of a previously reported aircraft or that of another aircraft?

When a pilot is provided radar traffic information he should acknowledge in one of three ways in accordance with the specific additional service he desires. Either report (1) traffic in sight, (2) traffic not in sight or (3) traffic not in sight and request an avoidance vector. Avoidance vectors are provided only upon request.

Pilot: I guess we will just have to break the habit of acknowledging a traffic call by saying "roger." Speaking of calling traffic, I have another question. Sometimes we hear traffic being reported using the cardinal points of the compass relative to a fix or airport and other times using the 12-hour clock refence to our aircraft. Why is this?

Controller: When you report your position, heading and altitude to the radar operator he selects a target or targets on the radar scope consistent with that information received. The controller then uses one of several methods to ascertain that the radar target is the radar return from that particular aircraft. Once this is done the aircraft is considered radar identified. Until the controller has your aircraft radar identified he will call traffic using the cardinal points of the compass in reference to a fix . . . that is distance and bearing from a fix. After the controller has you radar identified, he will call traffic using the 12-hour clock reference your position. Twelve o'clock is dead ahead.

I should also point out that the controller cannot account for the aircraft's crab into the wind. The controller is using the aircraft's track as a reference. Also, if the controller calls traffic while the aircraft is in a turn, he is calling it with respect to what the aircraft's track will be after the turn is completed.

Pilot: This is a clearer picture of the role of radar in the radar air traffic control system. Radar primarily serves as an aid to navigation. There are other services that radar can provide such as radar traffic advisories, weather advisories, bird activity and so on, generally based on equipment limitations and controller workload.

Controller: Right, sir. You can rely on us to keep you separated from all other radar identified aircraft, but don't be misled into thinking once you hear the term "radar contact" that anything more than separation from other radar identified aircraft is required. Again I quote the TM-29 definition of radar contact: "The term an air traffic controller uses to inform an aircraft that it is identified on the radar display, that radar service can be provided until radar identification is lost or radar service is terminated, and that when the aircraft is informed of 'radar contact' it automatically discontinues reporting over compulsory reporting points. The only area where radar provides relief for the pilot is in navigation."

Pilot: We've enjoyed visiting you; it's been very informative. We'll make it a point to stop by again if for no other reason than for a good cup of coffee. Thanks.

Controller: You're welcome, sir. Any time you're flying in the area ask for a radar approach. The experience will help us serve you better and it sure will make the sky a safer place in which to fly.

The radar controller calls traffic by the actual track made . . . he cannot account for aircraft crabbing into wind

The Air Traffic Controller's Creed

***AS A PROFESSIONAL** air traffic controller I recognize my obligations:*

To the aviators who entrust their safety to my skill and judgment.

To my fellow controllers and supervisors who mutually depend upon me to follow established good practice.

To my subordinates who look to me to exercise my best judgment and leadership.

To my co-workers who are constantly striving for greater achievement and general overall improvement in the air traffic control system.

To discharge these obligations I will at all times observe the highest standards of my profession.

I will never knowingly jeopardize the safety of an aviator by undertaking a risk to satisfy personal desires, nor will I control traffic when my mental or physical conditions might lead to additional or unnecessary risk to an aviator.

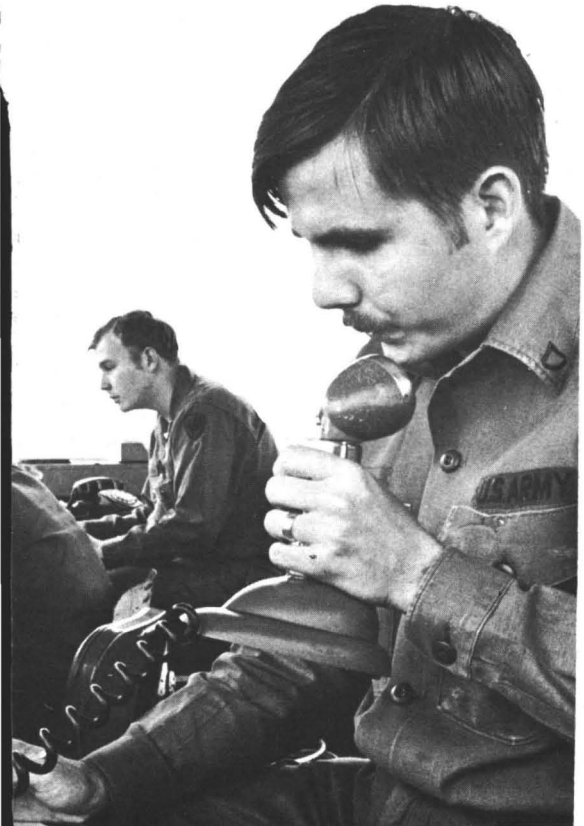
I will use all means at my disposal to assist the aviator in the safe conduct of his flight.

I will continue to keep abreast of air traffic control developments so that my judgment, which depends largely on such knowledges, may be of the highest order.

I will reflect through my deportment, both on and off duty, respect for my profession and for my country and it shall be such as to bring credit to both.

I pledge adherence to these principles for the advancement of air traffic control and to further the dignity of my profession.

Sergeant First Class Herbert L. McCormick


U.S. ARMY

MISSION: personal or professional?

Continued from page 11

welcome, "Boy, it sure is good to hear you guys up above!"

I replied in a very confident tone, "No sweat, buddy, just identify the location of your boat, where the enemy fire is coming from and we'll put a stop to this nonsense."

He identified his position by the use of an M-79 illumination round.

"Roger, I've got a tally on you. Where is the fire? Over."

"About five-zero meters to my south from the shore of the island."

"Roger, we'll be running in from west to east with a right-hand break."

A moment later came the reply, "Beautiful, beautiful, right on. How about another pass just like that?"

"Roger, we've got plenty of air mail for Charlie tonight."

The quivering voice had strengthened and regained its usual composure and that professional matter-of-fact tone that I had been used to hearing.

With relief from the secondary fire team we could alternate and keep this up indefinitely. Because I wanted to provide all the support we had available I had requested that the Firefly (a UH-1 equipped with a light) accompany the secondary team. We were determined to get those Viet Cong who caused all of this trouble.

Our relief and the lightship arrived in what seemed to be record time. Following a quick briefing I instructed the secondary team to hold in orbit above station. I guided the lightship to the riverboats and had it establish contact with them to receive directions.

While the Firefly aircraft checked suspected locations I flew the low ship position and snooped around hoping to find Charlie. Unfortunately, Charlie found me first and with a burst of automatic weapons fire informed us that we were not welcome.

After making several gun runs on the enemy location I had to return to home base for more armament and fuel. The second team set to work where I had left off. From bits of radio conversation I overheard while enroute to Marble Mountain, it appeared that we would indeed be busy the entire night. Charlie wanted those boats badly and was evidently ready to give us a fight.

Enroute back to station after refueling and rearming, I contacted the secondary team to learn what had transpired during my 45-minute absence. The enemy was still attempting to destroy the riverboats and had employed a rocket-propelled grenade against the assailing gunships onstation.

The secondary fire team leader advised that the weather was deteriorating at his location. Clouds had formed and were lightly scattered at 800 feet. This situation offered no deterrent to the mission.

Upon arrival I relieved secondary and the Firefly to return to home base for fuel and ammunition, and after a short briefing my team proceeded to engage various targets.

The clouds continued to thicken and I had to advise the Navy contact that the weather might force us to halt the mission if it got much worse. He worriedly expressed his concern and requested that we remain as long as possible. I well understood the man's apprehensions and vowed to myself to hold out to the last possible moment. I assured him that we would not leave unless the weather made it impossible to stay.

By placing suppressive fire on the island we were successful in quieting the enemy. Although Charlie had slackened his efforts, nature had not lessened hers: Ground fog now was moving in and periodically it became impossible to maintain visual contact with the ground.

The ever-thickening, lowering clouds were growing more ominous. Several times I entered the base of the clouds and continually had to reduce altitude to remain VFR. Our altitude was now averaging 600 feet.

The secondary team and lightship were returning and reported 10 minutes offstation. When they arrived I tried to reorient them but it was becoming increasingly difficult. By now ground fog covered the majority of the area. Our greatest effort was spent keeping each other in sight and staying out of each other's way.

At this point the wisest action to take would have been to scrub the mission, but the overwhelming sense of mission accomplishment seemed to override good judgment. This decision was prompted by the fact that we had often worked closely with the unit in trouble and we felt a personal regard for its safety. Each of us was aware that if we left the boats in this highly vulnerable situation they would likely succumb to the enemy before morning.

The secondary team established itself and I initiated a turn toward Marble Mountain. As I rolled out of my turn I instantly went IFR. A tremor went through my body as I looked to my panel for my attitude indicator. I had forgotten that it was not working, but was quickly reminded as the flag was up "INOP." In the time it took my eyes to fix on the copilot's indicator vertigo took its hold. I tried to radio my wingman to make a 180-degree turn, but I was cut out by a screech over the radio that stated he was IFR also.

That brassy taste of fear welled

up from the back of my throat as I fought my senses to believe the instruments. Like a gift of another chance my crewchief screamed over intercom, "Lights on the ground at 3 o'clock!" With a quick transmission that I was descending I turned toward the lights and came out of the clouds. Shortly thereafter my wingman called clear of the clouds and informed me that I was in sight.

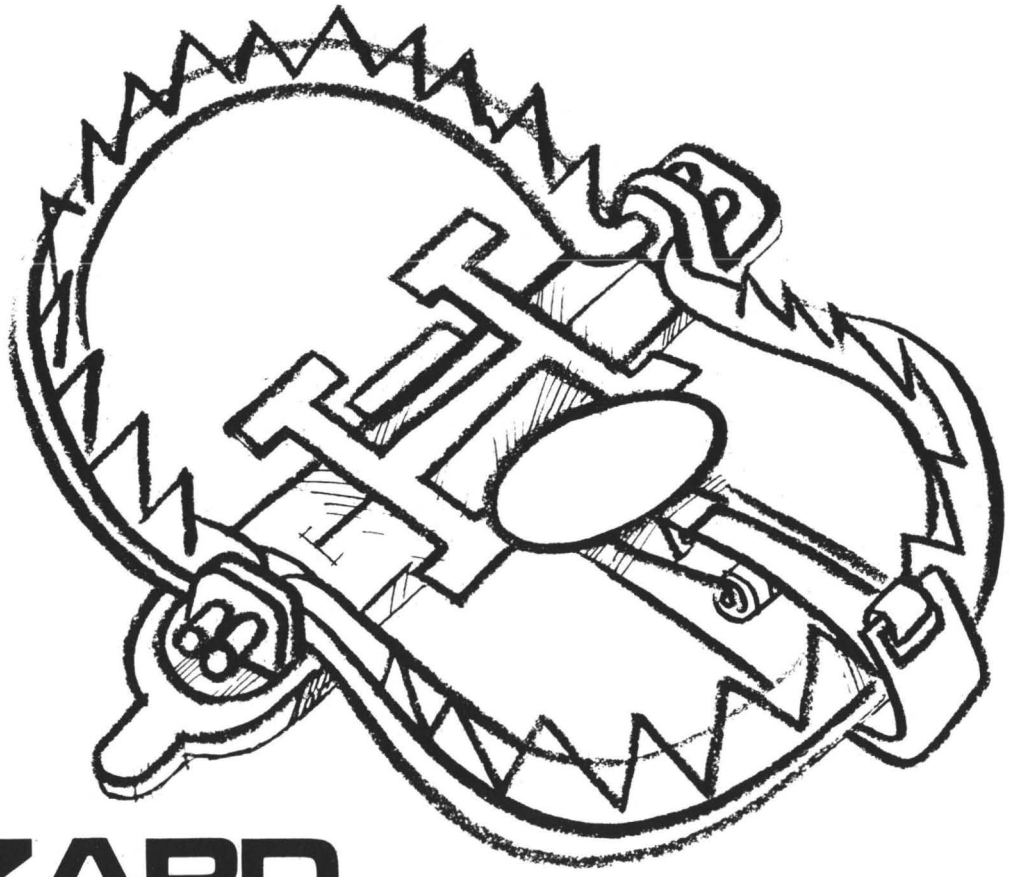
Our shock had waned slightly but was rekindled when the secondary team radioed that it was IFR and one had been at only 200 feet as the low bird.

The next transmission heard was "Firefly IFR" and that feeling of apprehension straightened my spine as I silently wished them out of the clouds, helplessly waiting. Each aircraft tried to relate its position to the other in the clouds. It was then that the sickening thought of how useless this all was overrode my anxiety. While cursing my stupidity, team two called, "Clear of the clouds." They were followed shortly by the lightship.

The second team leader informed the boat team that we would not be returning because of the IFR weather.

We were all safe and heading home, regretting that we had to leave the Navy crewmen to fight it out themselves. But we had tried to help and—perhaps foolishly—had remained onstation too long, thus entering a set of circumstances that could have very easily resulted in the disaster of one or all five aircraft and their 20 crewmen.

I hope that you take to heart the lesson that this imparts; we are proud of a strong sense of mission accomplishment and a burning desire to help embattled comrades. But one cannot allow these two commendable traits to push him across that invisible line into a situation that may exceed his capabilities or the capabilities of his aircraft.



HAZARD PREVENTION SENSE

Major Chester Goolrick

IF YOU don't really appreciate the extent of the disaster a hazard (you can spell that T-R-A-P) can bring down on an unsuspecting chap's head, ask any weekend golfer. You'll get an answer likely to run on the rest of the day and a good part of the night. Somewhere along the line he will bring up the subject of sand. Sand, he will point out bitterly, is fine to have around on beaches where you can lie on it, acquire a suntan and watch the girls in their bikinis. Little children like to build castles of sand. Sand is okay in its place. On the golf course, it's sheer murder for the poor soul who flubs one off the tee and ends up floundering around in a trap like a squad of lost Foreign Legionnaires in the Sahara.

Sand, come to think of it, isn't the kind of stuff you would want lying loose around the intake of a turbine engine, either.

In short, a hazard—

IS ALMOST ANYTHING, HARMLESS OR OTHERWISE, WHICH CAN PREVENT YOU FROM REACHING A PLANNED OBJECTIVE AND DAMAGE YOU IN THE PROCESS

Or which you can *allow* to prevent you from carrying out an assigned task in the proper fashion. That word *allow* carries a lot of weight, by the way.

It's a fact that most hazards *won't* interfere with you unless you permit them to. The bug which causes smallpox is still around, as deadly as ever, but nobody who has been vaccinated gets the disease these days. A sand trap just sits there, waiting patiently for the amateur who persists in flailing away at his ball as if he were trying to weed a potato patch, or the professional who loses his concentration. Sure, a man-eating tiger will go on the prowl when it gets hungry, but people in tiger country learn to stay on the alert by the time they are able to walk. On the other hand, take the case of a banana peel. As packaging material for a banana, it can't be beat. When one is thrown on the sidewalk by a small boy or an organ grinder's monkey you have another kind of ball game, something which can put you down with a broken leg as effectively as a hit and run driver—unless you happen to be banana peel conscious.

So nearly all hazards—and this goes double and maybe even triple for Army aviation—need the assistance of some obliging human being to get in their licks. As far as that goes, would you like to guess what is the worst hazard to your own health and well-being you are likely to run into in the course of a long lifetime?

You are, that's what.

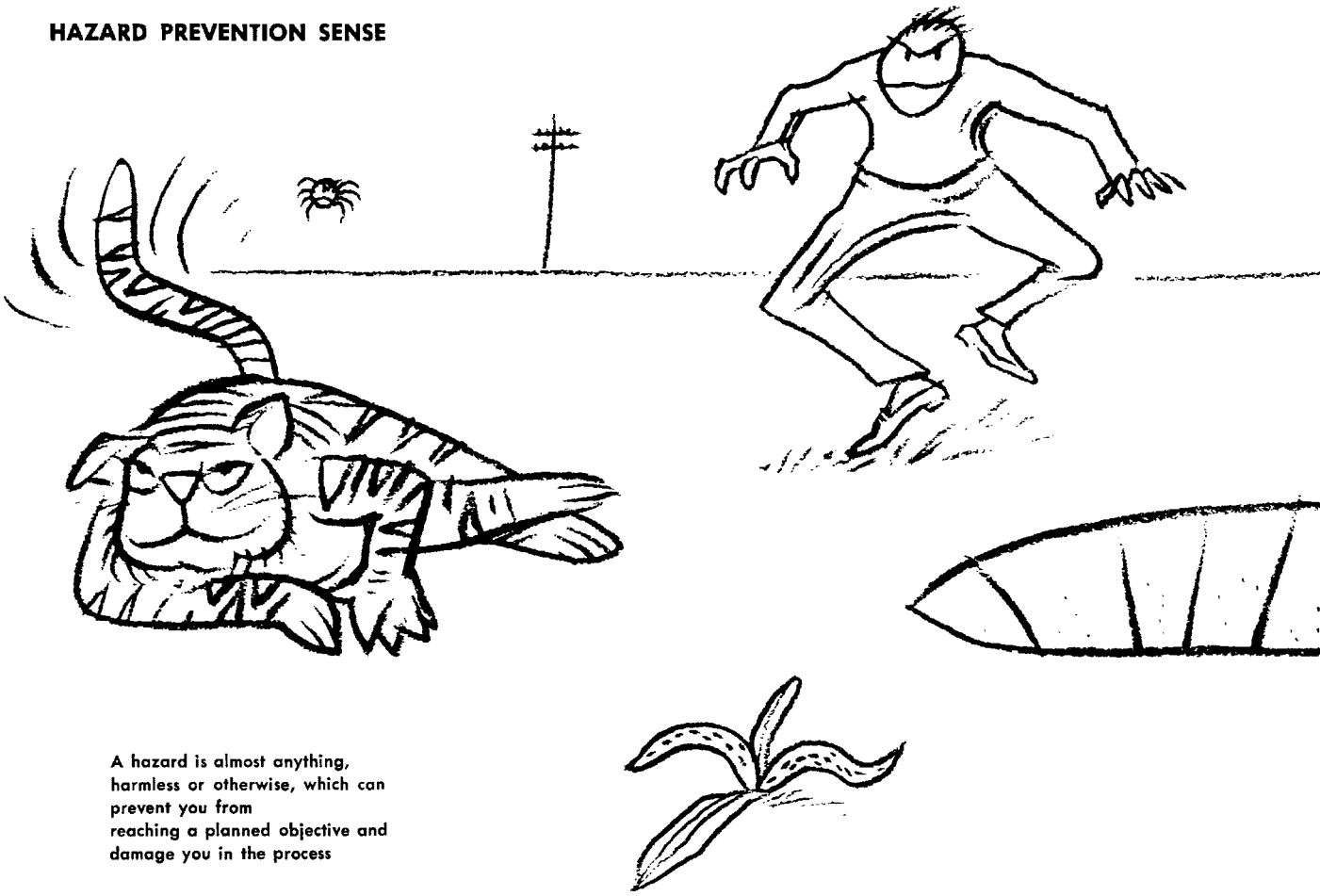
In fact, you could be the hazard which could cause your life to end up considerably short of the goal line.

TWO TO TANGO

Army aviation has two basic components: (1) human beings, and (2) machines. When all is well, when both are in good shape and operating smoothly, things are as peachy as homemade ice cream on a summer day. If either man or machine is out of kilter, being run the wrong way, or out of step with the environment, trouble—and in aviation circles it is usually *big* trouble—sets in.

The *responsibility* for seeing that the cream stays peachy rests with the men who fly, handle and maintain the machines. Nobody has to have it explained that they can't carry out their responsibilities unless they are as finely tuned, themselves, as a symphony orchestra's grand piano.

Every aircraft is just as good as its design limitations and maintenance. Period. You can go on to say that behind every accident, incident or other mishap is some person—more often than not several persons, in fact. The aircraft will do the best it can and, if



A hazard is almost anything, harmless or otherwise, which can prevent you from reaching a planned objective and damage you in the process

asked to fly with an overload or a torque wrench clogging its turbine, it can't be blamed if it fails to do the job it's asked to do.

People, as somebody first observed, probably back about the time of our friend Oog, the caveman, are funny. Not all of us are our own worst enemies, but there are times when most of us act as if we were out to get ourselves with the same enthusiasm the Hatfields went after the McCoys.

There's no simple explanation, either. When a man is just plain bone stupid, you can forgive him for going out on ice which wouldn't hold up an undernourished bullfrog. Army airmen of all ranks are brighter than most and have the sort of training which enables them to spot thin ice a mile and a half away. Their training is designed to breed the kind of judgment, caution and attention to detail which should eliminate the human factors lurking behind the vast majority of accidents.

The fly in this particular batch of ointment is that accidents *haven't* been eliminated. Far from it. Let's look at a not-so-small example. Over a 3-year period, the Army racked up—and *racked* is just the word—a total of 56 midair collisions. When two helicopters run into each other at any distance off the ground, nobody is likely to walk away. Only the other day, for instance, two collisions in the same week took a total of eight lives. The cause for all this mayhem? One or more aircraft where they shouldn't be. More to the point is probable lack of attention to the problem by pilots and crewmen, which is the same as saying they failed to appreciate the fact that a collision was possible and failed to follow prescribed procedures.

Related to collisions between aircraft are wire strikes. There is quite a lesson to be learned here, too. In one period of 5 years, there were 23 major accidents caused by helicopters running into wires, resulting in 55 fatalities. That's horrendous enough, all by itself. What makes the story worse is that most of the pilots were experienced and *knew the wires were in the area.* They are not around to offer an

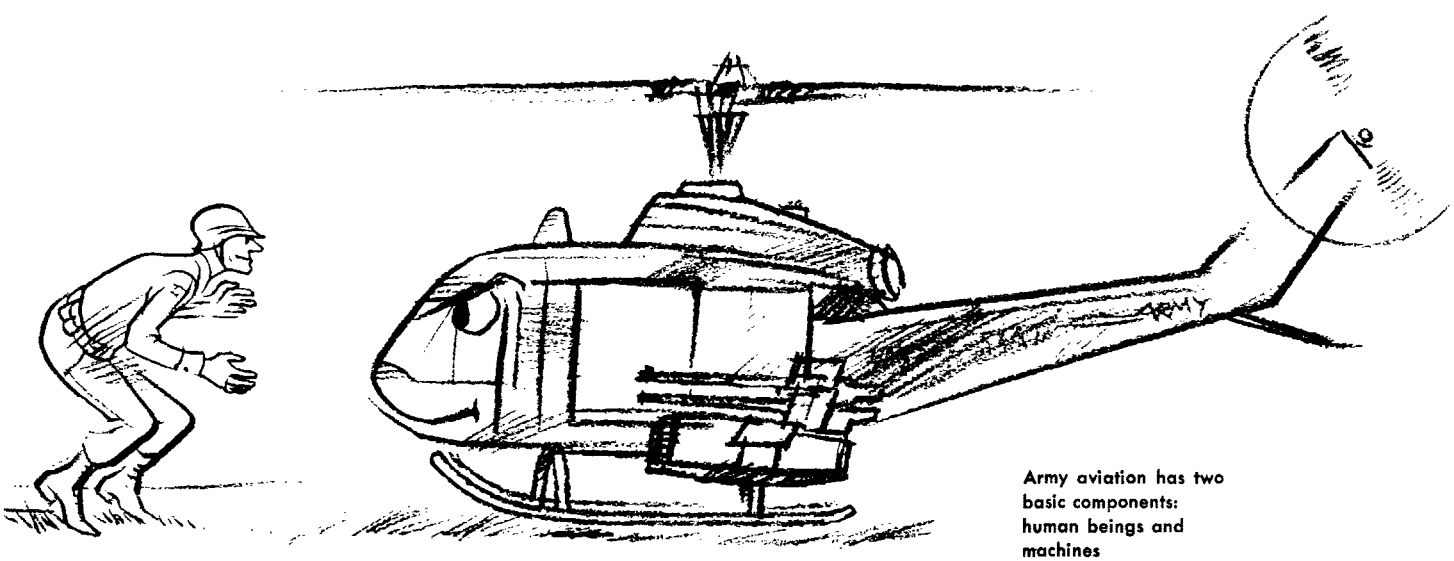
explanation. We can make a solid guess: (1) they hadn't been properly impressed by the hazard wires constitute, and (2) for some reason, they weren't giving their job the 100 percent concentration it deserved.

While we are hanging around in the area, we might as well consider another type of manmade accident which comes up with the monotonous regularity of

ducks in a shooting gallery. *Weight and balance,* that is. There isn't a single Army airman who hasn't had it drilled into him again and again that a helicopter can lift only so much, not a pound more—that changing density altitude values on hot days or at different altitudes can be deadly—and that unless he stays within prescribed limits he is almost certain, one of these days, to have a crash and probably a major one at that. This is an aviation fact of life. You would think everybody would hark and respect. Yet, hardly a week passes without somebody coming to grief because he thoughtlessly loaded his helicopter with men and material past the backbreaking point. People, as Oog sadly observed, indeed are funny, but the results of their funny actions often aren't funny at all.

The worst thing you can do to explain midair collisions or weight and balance crashes—or just about any other kind of accident—is to drag in that old whipping boy, *inexperience,* and give it another going over. As often as not, inexperience doesn't come into the picture at all. You have to dig considerably deeper to find why a trained man will appear to go out of his way to do himself (or somebody else, in the case of a mechanic or supervisor) bodily harm.

An experienced veteran can stray off the straight and narrow just as easily as the youngster, for just as many reasons. For one thing, the caution with which a fresh-minted airman approaches his job can be replaced with the kind of overconfidence which can wipe out experience the way Walter Reed did yellow fever. If a man has managed to convince himself he is the hottest thing in the cockpit since Bleriot made the first flight across the English Channel, he might find himself trying to prove the hard way that there are



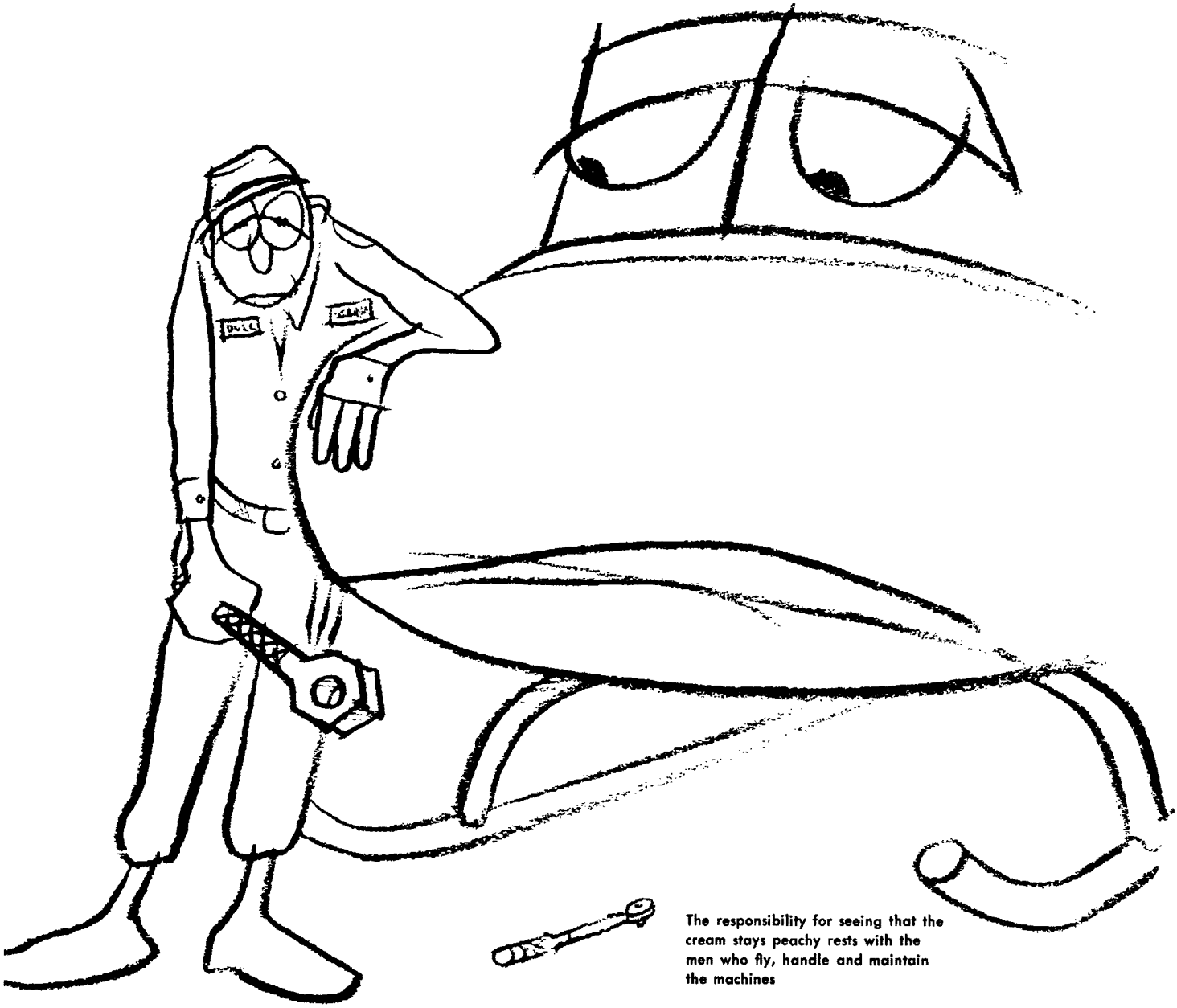
Army aviation has two basic components: human beings and machines

no limits to the things he and the longsuffering aircraft he is trying to fly can do.

Speaking of proving, an underconfident man is capable of extending himself beyond his limitations. He wants to demonstrate to himself, his fellow flyers and maybe even his wife that he is all wool and a yard wide. So he will stick his neck out a mite too far. If he is lucky, it won't get chopped off. Sometimes it does.

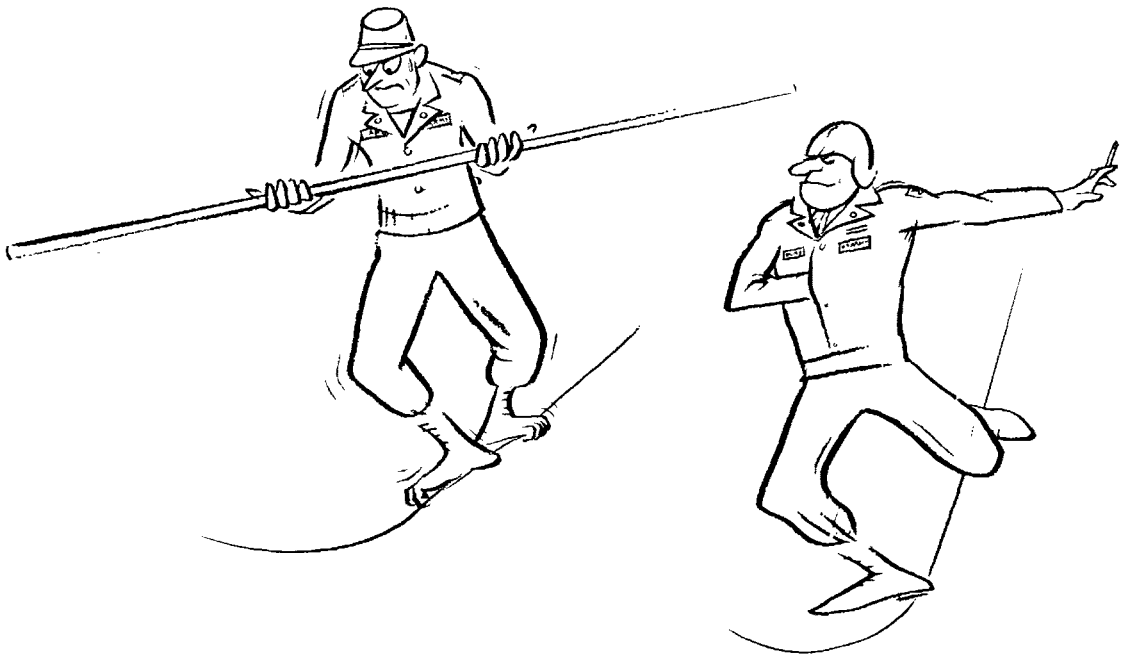
At some point along the road to real maturity, true professionals engage in a session of personal stocktaking and come up with a fair assessment of their capabilities and personal weaknesses, with which everybody comes equipped with a full share. The professional knows when to curb himself, when to proceed with the caution of a railroad engineer at a grade caution and when to realize he has reached the limits of his ability. Boiled down, it means he keeps his old-fashioned common sense at the controls night and day.

Unless common sense has a firm grip on the controls, it's possible for anyone with a fully developed sense of responsibility and duty to view an impending task as all important while overlooking the fact that, important or not, it can't be accomplished successfully by attempting it in an overloaded aircraft or in a manner guaranteed to risk the life and limb of



The responsibility for seeing that the cream stays peachy rests with the men who fly, handle and maintain the machines

The caution of the new airman can be replaced with the kind of overconfidence which wipes out experience . . .



everybody within a half a mile. The more important a mission is, in fact, the more ticklish and risky it is likely to be and the more caution and considered judgment are called for. Not the reverse, that's for sure.

It's a fact, too, that nobody is at his absolute best every day in the year. When Granpaw Snoggins tells you on his 100th birthday that he never had a sick day in his life, the old boy is either lying through his store-bought teeth, his memory is failing, or both. Airmen have their off days too. A man who is suffering from physical or emotional upsets—or for that matter, from a king-size hangover, chronic fatigue or a skipped breakfast—is ripe for the plucking. He will either set up a nice juicy hazard for himself or trip over one he fails to spot. Either way, the result is likely to be the same.

If he levels with himself, when he starts looking around for somebody to blame, he'll do well to start close to home.

MAN'S BEST FRIEND

Midair collisions take place because one or more people were in the wrong place at the wrong time. The fault can't be laid at the feet of the helicopter, which generally does what it is supposed to do when it's treated right. The same goes for weight and balance. No helicopter, no matter how sophisticated, can overload itself to bursting, like J. Hogland McSuet tucking away turkey and stuffing. A helicopter always needs the help of human hands.

When it is flown by competent crewmen who respect its capabilities, any aircraft will deliver the goods. But only, as we've said, if it's treated right—in the air and on the ground, where the maintenance and servicing people are supposed to give it the kind of handling a 3-year-old thoroughbred receives before the Kentucky Derby. Like royalty, that is.

It might not be exact to compare a helicopter to a skittish race horse. The modern chopper has come a long way, baby, as the television commercial says, in the past 10 to 15 years. Today, it is more like faithful old Dobbin that used to plow Farmer Brown's south forty back in the days before the horse got phased out by the tractor. Even so, Old Dobbin occasionally came down with spavins or the dry heaves. When he did, you can bet your bipsie Farmer Brown saw to it that he got the attention of a vet, and an expert one, at that.

Sturdy and well designed as they may be, helicopters are in need of constant, expert attention. Not to be too backward about it, they don't always get it.

HAZARD PREVENTION SENSE

EVERYBODY'S DOING IT

Mistakes, lack of concentration, errors in judgment—all the sins the flesh is heir to—aren't the exclusive, patented property of pilots and aircrewmen. Mechanics, supervisors and the people managing a unit's program suffer from the same weaknesses. And for the same reasons.

The tired, overpressured or thoughtless pilot who overloads his aircraft can be matched by a mechanic who keeps his toolbox in such a state of disarray that it takes him half an hour to find a wrench. An airman who is careless about approaches and snags his tail rotor in a Georgia pine can be equaled by a mechanic who leaves an oily rag where it can be sucked into an air intake. The poor soul who is the victim of a midair collision is the blood brother of the one who walks into a rotor blade he either didn't think about or didn't notice. Same difference.

Okay, so nobody's perfect. Everybody this side of the angels makes his full quota of mistakes. Granted.

The more important the mission is, the more caution and judgment are called for

Granted, also, that accidents and other mishaps will continue to plague Army aviation as long as ordinary mortals are a part of the scene, flying the aircraft, servicing them and taking care of the facilities they operate from.

But you can't just shrug off accidents as being about as preventable as a hurricane or an earthquake. There's no reason why the accident rate can't be whittled down to a point where all hands can live a lot more comfortably than is the case just now. No accident rate, however low, should ever have the word *acceptable* applied to it. And one way to do it is to recognize, pinpoint and eliminate hazards—big and little—caused by unsound practices.

Take the case of psp runways and pads, which you might think are about as harmless as a Persian rug. If so, you might be interested in knowing that, over a 2-year period, there were 18 major accidents and incidents involving psp pads or runways, most caused by skids being hooked, by turned-up edges or by

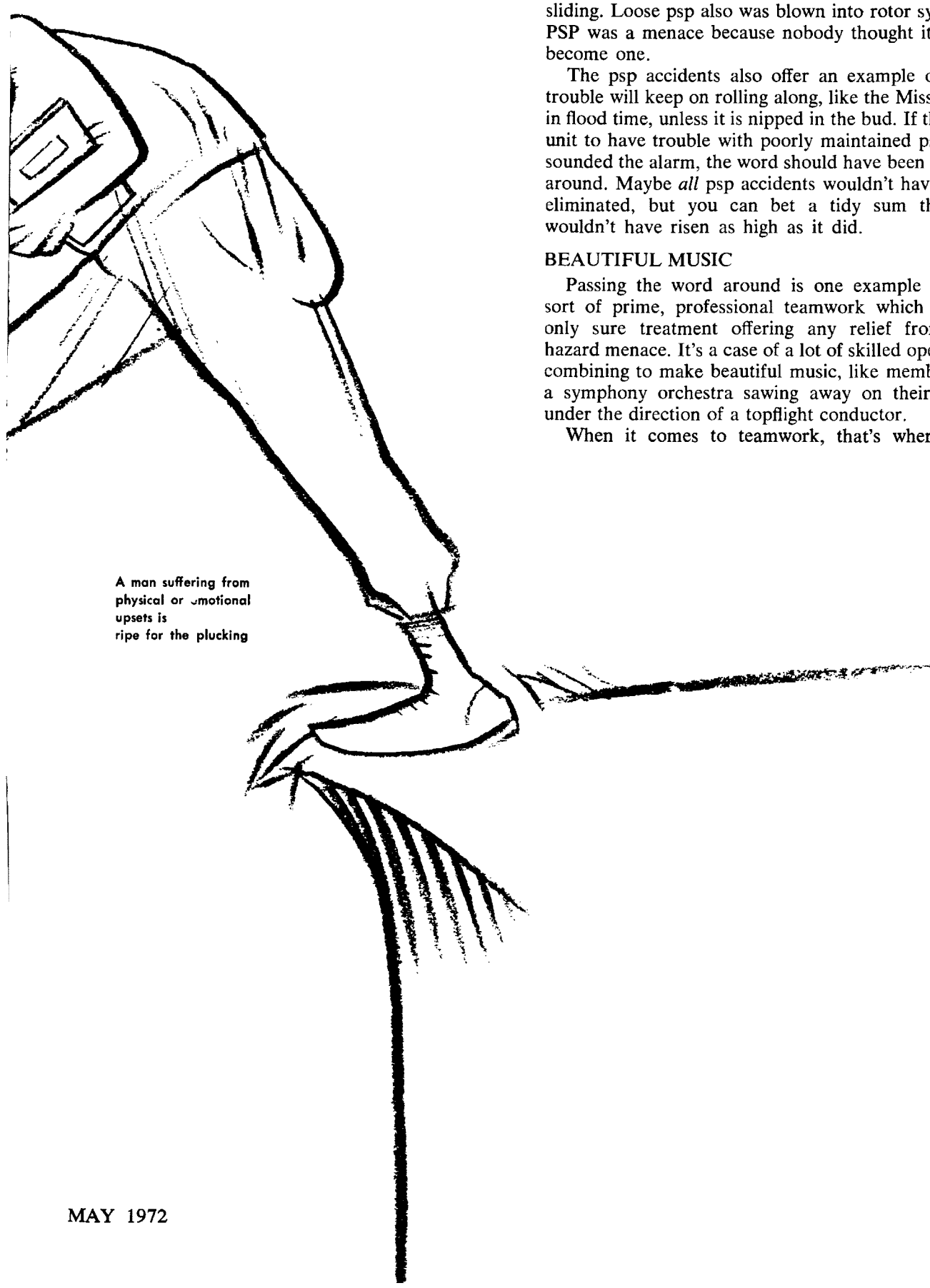
sliding. Loose psp also was blown into rotor systems. PSP was a menace because nobody thought it could become one.

The psp accidents also offer an example of how trouble will keep on rolling along, like the Mississippi in flood time, unless it is nipped in the bud. If the first unit to have trouble with poorly maintained psp had sounded the alarm, the word should have been spread around. Maybe *all* psp accidents wouldn't have been eliminated, but you can bet a tidy sum the toll wouldn't have risen as high as it did.

BEAUTIFUL MUSIC

Passing the word around is one example of the sort of prime, professional teamwork which is the only sure treatment offering any relief from the hazard menace. It's a case of a lot of skilled operators combining to make beautiful music, like members of a symphony orchestra sawing away on their bows under the direction of a topflight conductor.

When it comes to teamwork, that's where you

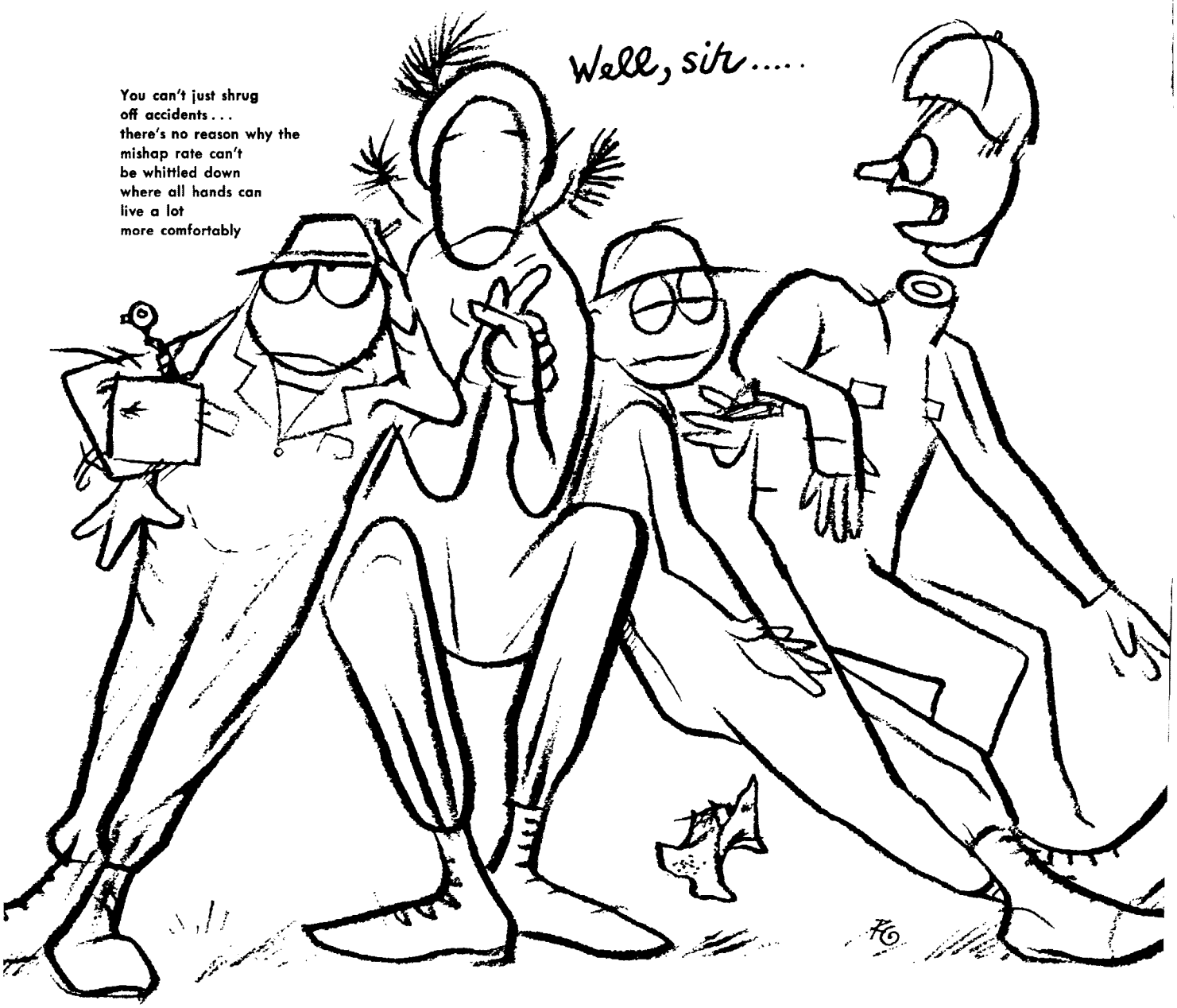


A man suffering from physical or emotional upsets is ripe for the plucking

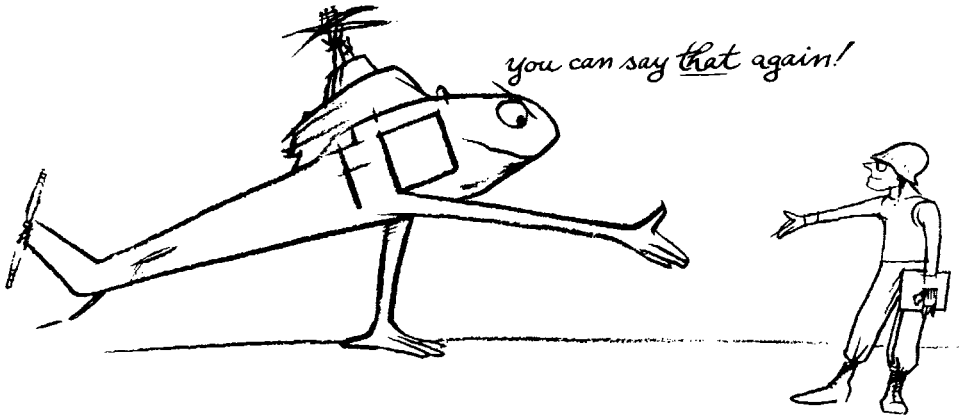
start—at the top, with the conductor, the coach or the manager. When the coach doesn't know or care beans about football, the only way he and the people playing for him will ever get into the playoffs will be to buy tickets at the gate or win them in a raffle. In Army aviation, where sound, well-planned management is lacking, the accident rate goes up and hazards are as numerous and as deadly as mosquitoes in swamps.

A management program is just one way of describing a setup within a unit, designed to prepare for all foreseeable contingencies, to eliminate hazards as they are recognized, to ensure standard, by-the-book practices covering all phases of operations, both in the air and on the ground, and—above all—to keep hammering away at the theme like a jackhammer battering a sidewalk, until a man would have to be as blind and deaf and dumb as a barber pole not to appreciate the seriousness of the problem.

If you dug deep enough, you would probably find that the lack of a constructive management program



You can't just shrug off accidents . . . there's no reason why the mishap rate can't be whittled down where all hands can live a lot more comfortably

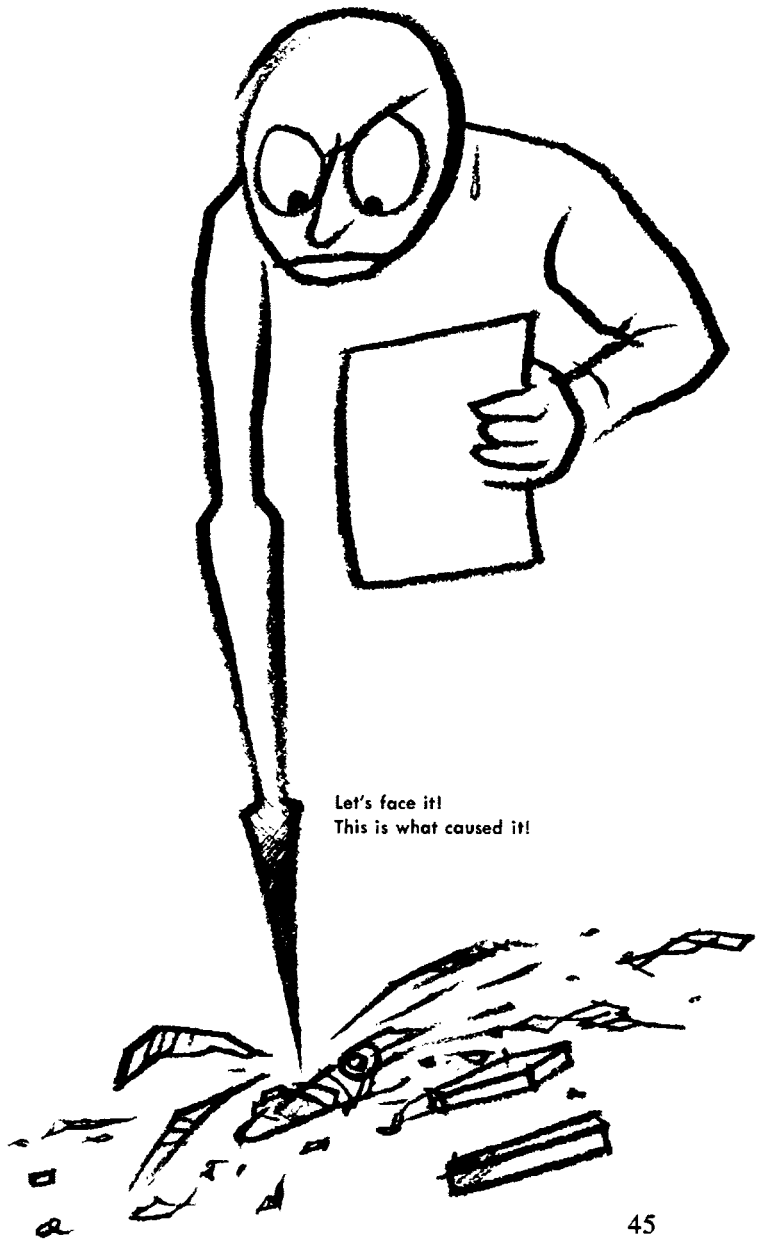


played at least a good part in the accidents involving the unfortunate pilots who ran into wires. As we've noted, the pilots knew the wires were there and they also knew what generally happens to people who run into wires. They just hadn't been totally impressed with the need to keep the danger of wire strikes always on their minds when there was the least possibility of one taking place. As a result, the *least* possibility grew into a *major* possibility and, from there, into a *certainty*.

Lack of effective management can contribute to the creeping complacency which can attack airmen or maintenance personnel, particularly if they are tired or not hitting on all cylinders. Creeping complacency leads to indifference to potential hazards. Doris Day used to sing a song about an Italian proverb which goes, "Whatever will be, will be." This might work fine for Doris Day, but it's bad news in the cockpit or on the ground for Army aviation. There's one thing for sure, at that. As far as hazards are concerned, whatever will be, *will* be, unless well-directed teamwork sees it coming, recognizes its potential and takes effective action to ward it off.

It amounts to a guard against hazards being posted all the time, with the guard being doubled when the going gets rough. This is the plainest kind of common sense when you are being shot at or threatened, as even General Custer should have known. Anyone can spot a tribe of Indians on the warpath and take measures accordingly. But how many people, left to themselves, are as cautious about the weather?

Extremes of weather—heat, cold, thunderstorms and the like, as well as the peculiar problems presented by mountains and deserts—are as much of an



The first unit to have a particular accident problem should sound the alarm

environmental hazard as big-city smog. Maybe more so, because smog is a health threat all can see and appreciate, once they start wheezing like asthmatic mules. High density altitude—just to mention one example—is an *invisible* enemy. The number of accidents caused by overloading aircraft is proof enough that even highly trained men tend to forget what they can't see. A good management program, harping on this subject or the added caution needed in sub-zero temperatures, might begin to sound, after a while, like a nagging wife trying to keep her husband out of the corner saloon. But if the message sinks in and the rate of weather-inspired accidents shrinks to the point where it can't be seen with the naked eye, the program is on target.

But only on *one* target. That's dandy, as far as it goes. Removal of a variety of hazards you could spend a lifetime counting is something else again. Hazard prevention is a state of mind, a conditioned reflex which makes a good fighter start getting out of the way of a left hook at about the time his opponent thinks of throwing it. When a management program is functioning full blast, *everybody* is prepared for anything, all the time.

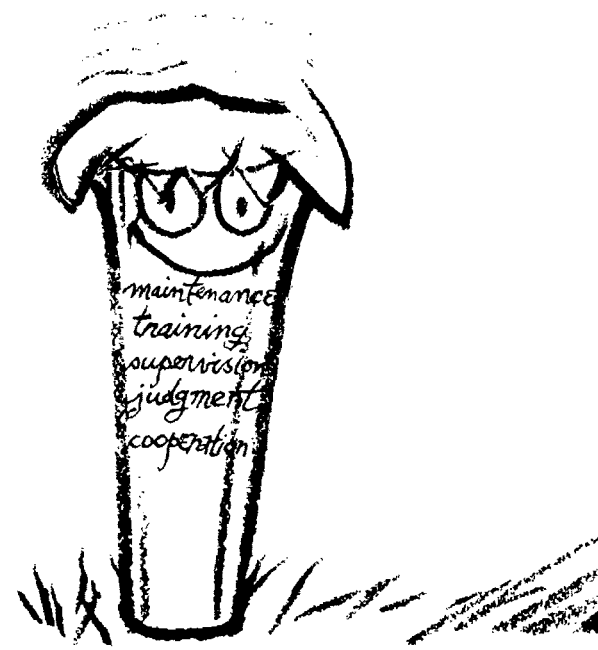
ALL TOGETHER NOW

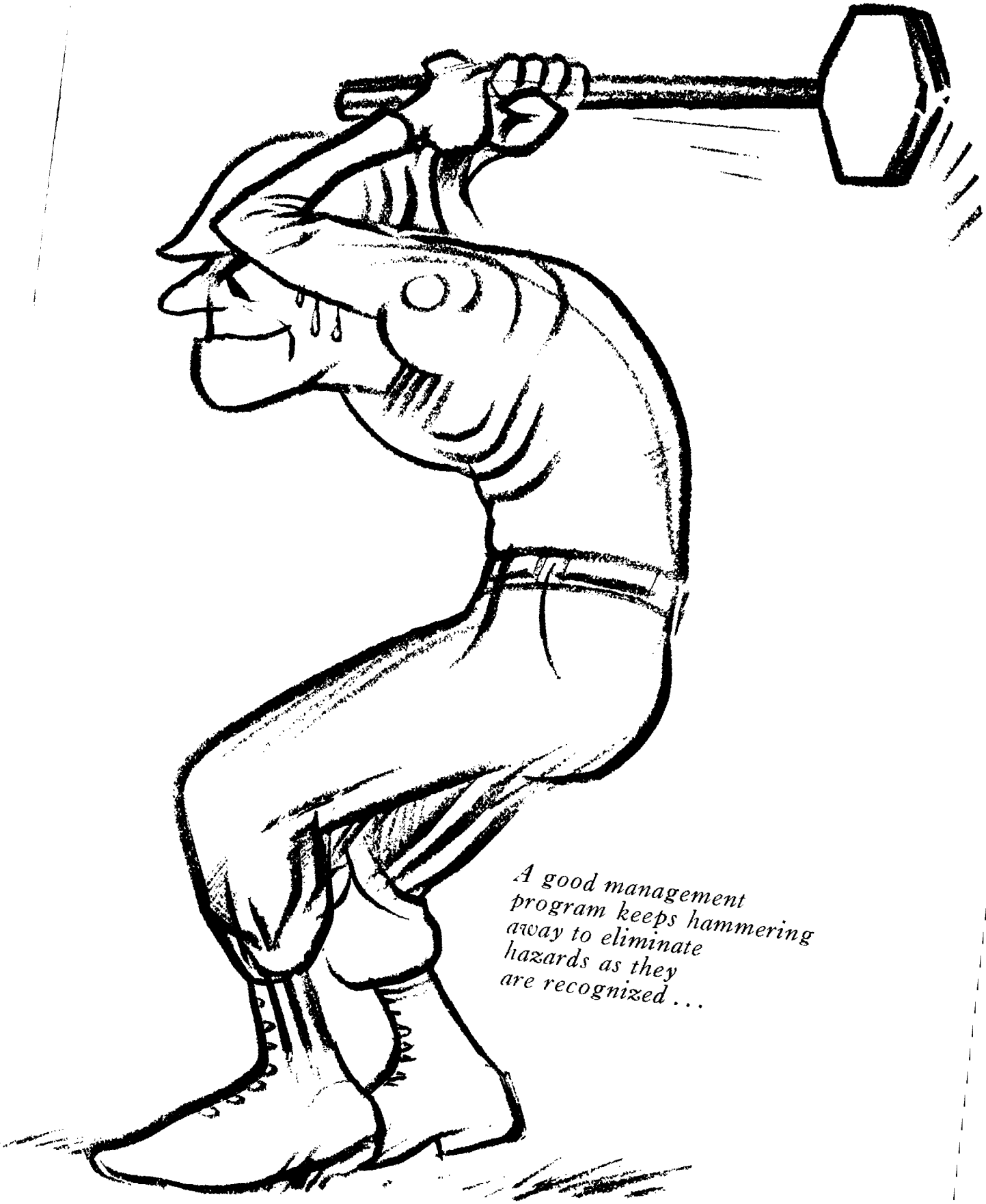
You don't have to possess one of the world's great brains to realize that a full-dress hazard-elimination campaign isn't something that some aviation Hercules dreams up before breakfast and gets done by lunch. Even a family picnic takes forethought and cooperation. Getting rid of hazards is no picnic.

The war on hazards begins the way most wars do, with high-level strategy sessions—surveys, in other words. Surveys to take stock of what has gone wrong in the past, what's happening now and what's likely to occur in the future. It's a process of eliminating the eliminatable—the soft spots in the runway, the misplaced nuts and bolts, the careless preflight inspections, the rotor strikes (how about those tail rotor strikes during confined area operations which happened because nobody in the crew warned the pilot he was backing into a Norway spruce?), the rags in the intakes—the whole can of worms. After that, it's a matter of setting up standard procedures in every area of operations, which everybody holds on to for dear life, like so many snapping turtles determined not to let go until the sun goes down. This means an educational management program carried out with the enthusiasm of a missionary trying to convert a tribe of cannibals. It's not an easy job, but the missionaries have always known that if they fall down on it they are going to wind up in the stew pot.

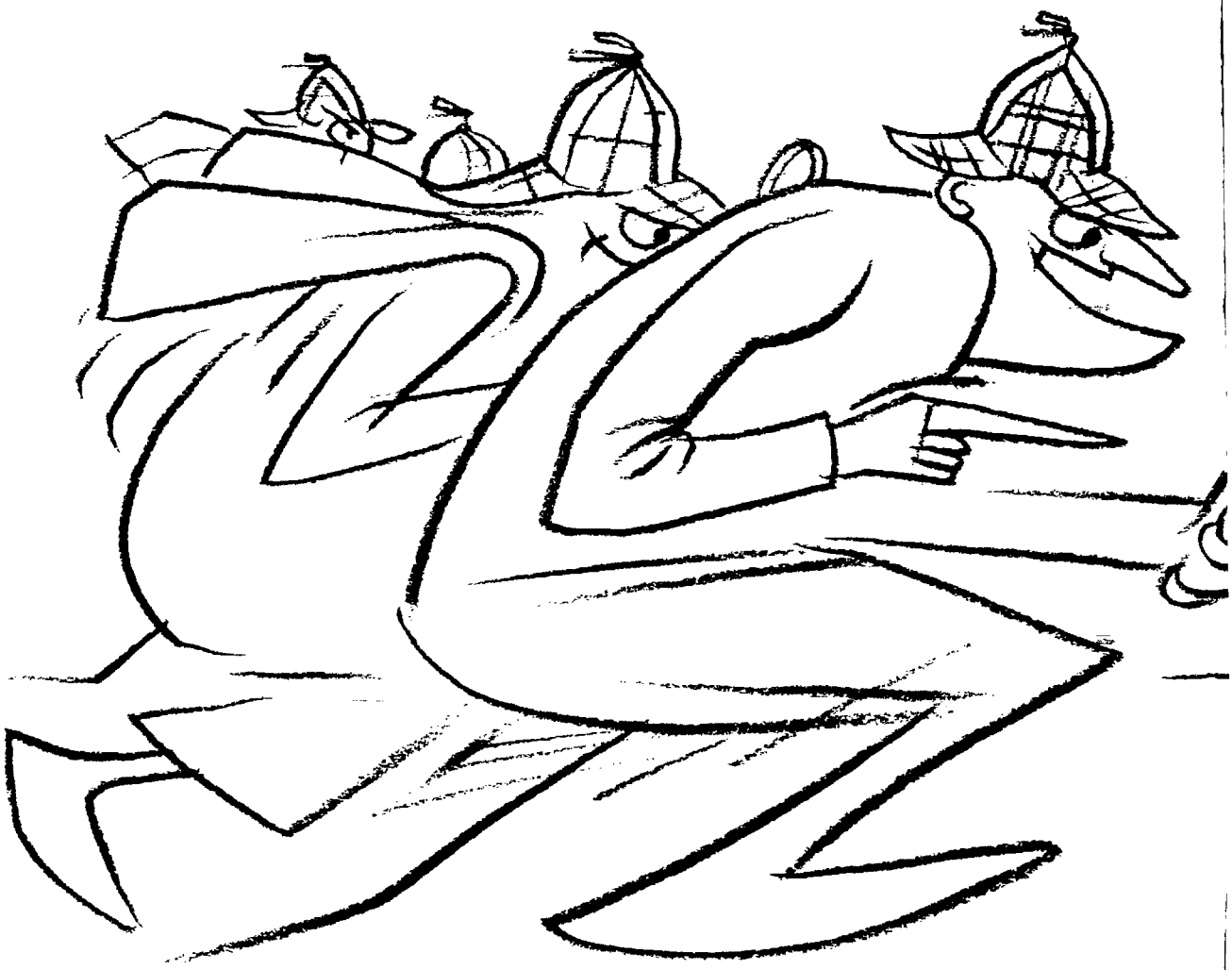
A big part of this is a conscientious supervisory program, one designed to cut out the human error aviation is cursed with.

We all do indeed make mistakes. No program will ever get rid of them entirely. It is also true that there have been accidents caused because a mechanic fell victim to Murphy's Law and the mistake was not noticed by his supervisor, an inspector, the crewchief





A good management program keeps hammering away to eliminate hazards as they are recognized . . .

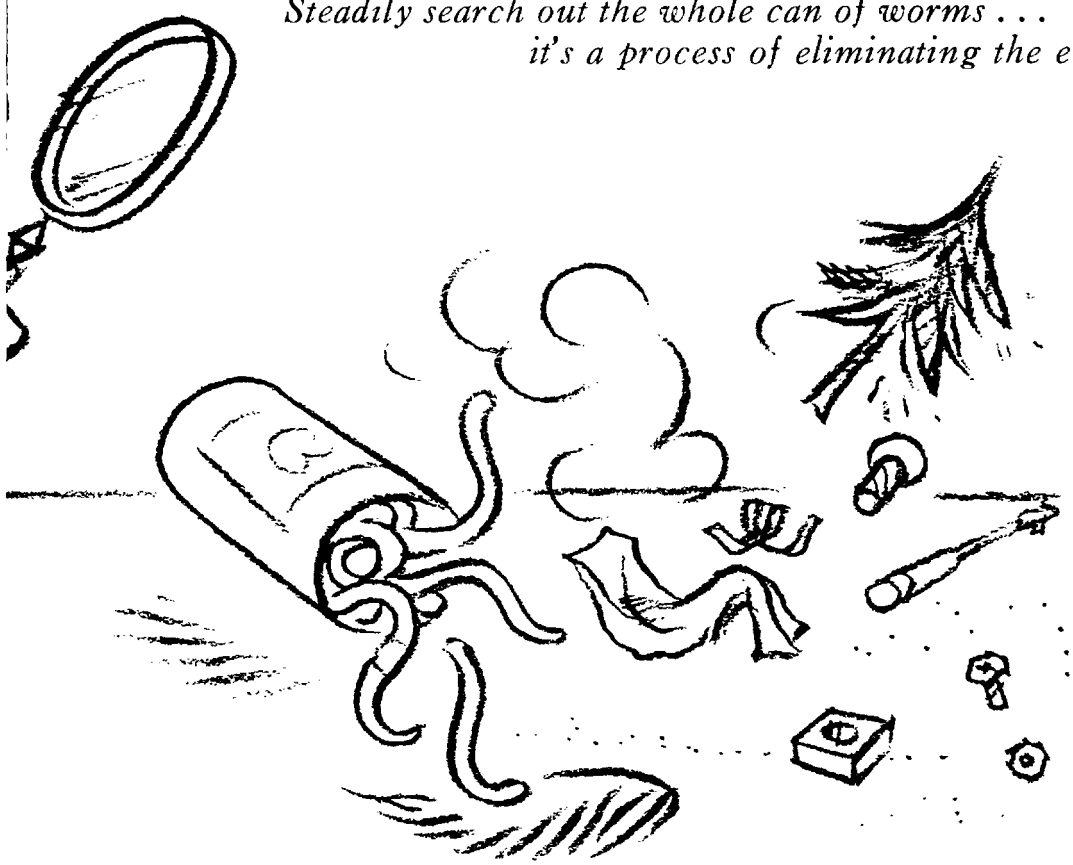


or the pilot. All the same, supervisors can and usually do eliminate hazards before they have a chance to do their damage. Don't get the idea, either, that a supervisor is simply somebody peering over the shoulder of a mechanic and looking for a chance to pounce on a mistake. In a way, everybody is a supervisor. If a panel is carelessly left where it can be sucked up into blades, or loose objects in the cockpit could get out and strike the tail rotor, or soft drink cans and boxes are left around revetments, the first person along should do something about it. He will if he's been impressed with what hazards are and what they can do.

YO HO HO

Old sea captains back in the days of the clipper ships used to say a tight ship was a happy ship. They didn't mean issuing an extra ration of rum to all hands. They knew from experience, sometimes bitter, that they could get safely through the hazardous Straits of Magellan only when the entire crew knew its job and was performing to the hilt. Those that

Steadily search out the whole can of worms . . .
it's a process of eliminating the eliminatable



didn't ended up, if they were lucky, as castaways on desert islands, like poor old Robinson Crusoe.

Maintaining a tight ship wasn't an easy task in the old days and it isn't today. You ought to bear in mind, too, that the war on hazards won't bring on any speedy surrender by the enemy, no overnight transformation. The Age of Miracles came to an end some years back and isn't likely to return this side of Judgment Day. As hazards and hazardous flying practices are recognized and eliminated, the accident rate *can* and *will* decline, but it's likely to descend with the deliberate speed of an elevator in a third rate hotel. Discouragement comes easy.

Discouragement, in fact, where there is no room for discouragement, no thinking wired to the negative pole. You've heard it said that accidents don't just happen, somebody makes them happen.

You've *heard* it, sure.

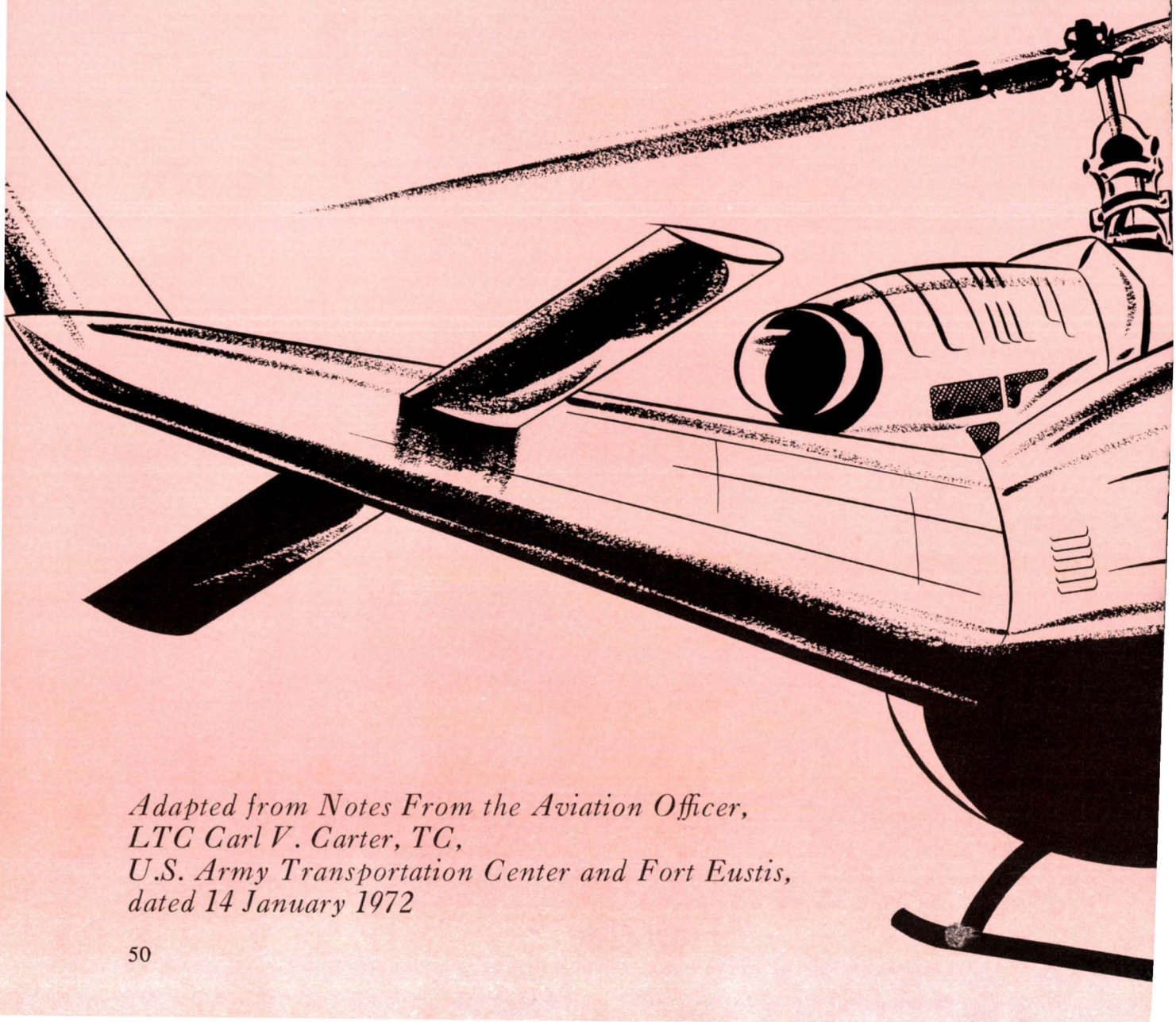
Have you ever really *thought* about it?

Give it the old college try and you'll begin to see what hazards really are.

You'll stay out of the sand traps that way.

MIDAIR COLLISIONS continue to take their toll in lives, dollars and aircraft. Why? What can we say is the cause? Are there too many aircraft flying in the sky or can we blame the pilots and their lack of attentiveness? Accident investigation boards are coming up with a multitude of reasons for midair collisions, and the one factor that appears in each midair collision is the "human factor." Someone performed an unsafe act or failed to follow proper procedures. . . .

Sometime ago, two pilots departed an Army airfield on a local flight plan in a T-41B and headed toward an airways intersection. Visibility was good, but the ceiling was about 1,000 feet. Over the bank of a nearby river, the pilots elected to climb up through the overcast and fly on top, without obtaining a clearance. At approximately 4,000 feet indicated, they still hadn't broken out on top, so they reduced power and let back down through the solid overcast, using the airways intersection as their facility. One of these pilots was instrument rated and the other was not. The T-41B is normally restricted to VFR flying conditions. The intersection they were using was the main facility for all aircraft landing at a large



Adapted from Notes From the Aviation Officer, LTC Carl V. Carter, TC, U.S. Army Transportation Center and Fort Eustis, dated 14 January 1972

MIDAIR COLLISIONS

city airport and a military airbase, as well as the Army airfield they took off from. These pilots set up all the ingredients necessary for a midair collision. They violated regulations and demonstrated a complete lack of common sense.

A blind man was standing at a busy intersection attempting to cross the street. Johnny, a Boy Scout from the local troop, approached the blind man and offered to help him cross the street. The blind man thanked Johnny and they started to cross the street. A few steps into the street, tires screeched as an automobile slid toward them. Before the auto came to

a halt, Johnny and the blind man were knocked to the pavement. The police arrived on the scene, called an ambulance, and Johnny and the blind man were taken to the hospital. The police talked to witnesses of the accident and the driver of the auto. The police then went to the hospital and discovered that Johnny and the blind man were not seriously injured. The police asked Johnny to explain what happened. Johnny told the police that he failed to check the light before starting to cross the street. There is a lot of *Johnny* in each of us. We are sometimes so eager to accomplish our mission that we fail to completely check every phase of our mission to ascertain that our method is proper and that we are not jeopardizing accomplishment of the mission by disregarding sound safety practices.

Midair collisions are not acceptable and can be completely eliminated through the combined efforts of all persons involved in all flights. The *human error* factor, as depicted by investigation boards, can be eliminated when all persons involved in flying think ahead and plan each move; when they develop the initiative to speak up when a situation starts to deteriorate and not sit back to wait for the unfortunate accident to happen.

MIDAIR COLLISION AVOIDANCE

Midair collisions continue to be a hazard to safe flight. It is a paradox that some collisions have occurred under visual flight conditions in which the pilots of both aircraft could have seen each other in time to avoid collision—if they had been looking and seeing, whether they filed VFR or IFR. There are many reasons for a pilot failing to see another aircraft. Some of the most important ones are:

Cockpit preoccupation: A conscious effort to improve pilot instrument scan will greatly increase the time spent looking outside the cockpit. The high closure rate of modern aircraft demands that considerable time be spent looking outside the cockpit during visual flight conditions. Crew members can greatly assist pilots, particularly if they are properly briefed on how to look, what to look for and how to report targets.

Factors affecting vision:

1. Fatigue—Adversely affects vision by slowing muscular action of the eyes.

2. Glare—Overstimulates the eye and causes loss of sensitivity.

3. Hypoxia—Results in loss of visual acuity construction of visual field and difficulty in focusing.

4. Space Myopia—Reduces ability of the eyes to focus. Due to the absence of objects to focus on (horizons, clouds), eyes tend to focus at the wind screen or just outside the cockpit. Sighting distances are greatly reduced. To prevent, shift your gaze frequently to the instrument panel, wingtips (rotor blade tip path planes) and distant objects, if available.

Fixation: A tendency for fixation must be avoided. Scan in sectors. Shift your gaze vertically, as well as horizontally. Practice focusing on objects of known or accurately estimable distances, when available. This avoids fixation and aids earlier detection of other aircraft.

Contrast: Objects are more easily seen against contrasting backgrounds. In extremely low illumination, objects are detected almost entirely by contrast. Contrast or relative motion are the visual values which will most likely stimulate the eye. In dull skies, total airframe contrast is likely unless its color scheme blends with the background.

Reduced illumination: Central vision is lost in light values less than moonlight and corner vision must be employed.

Turbulence: In extreme cases, turbulence can cause deterioration of vision. Prolonged flight in turbulence is fatiguing and degrades alertness.

Total reaction time to avoid collision: Total time required to perceive and recognize an aircraft, become aware of a collision course and decide which way to turn may vary from as little as 2 to 3 seconds to 10 seconds or more, depending on the variables affecting the individual, the types of aircraft involved and the geometry of the closing situation.

Sighting distances: Frequently as low as 3 miles for jet aircraft and light planes, and 5 to 7 miles for larger transport type aircraft.

Aircraft on collision course: When a collision course is recognized, the pilot may not instinctively take the correct actions. Turning into the aircraft to break the collision course, or changing altitude, will sometimes be the best solution. However, in some cases it may increase the hazard. Therefore, all collision situations that can possibly be conceived must be considered and planned for. Finally, evasive action should include maintaining visual contact with the other aircraft, if at all practical.

In summary, don't assume that an IFR clearance will provide separation, particularly when flying in and out of clouds or in VFR conditions. Aircraft can legally fly VFR in 1 mile visibility outside of controlled airspace. As it is with any hazard, avoidance of midair collisions is a matter of recognizing the hazard and reducing exposure to it. A great deal of effort has been expended to develop better rules, procedures and navigation systems to decrease midair collision hazards. All pilots must do their parts and

use every available means to reduce the possibilities of midair mishaps.

Following are recent safety recommendations made by the National Transportation Safety Board:

ISSUED: November 9, 1971

Adopted by the National Transportation Safety Board at its office in Washington, D. C., on the 15th day of October 1971

FORWARDED TO:

Honorable Melvin R. Laird
Secretary of Defense
Washington, D. C. 20301

SAFETY RECOMMENDATIONS A-71-48 thru 51

The National Transportation Safety Board recently concluded a public hearing to document certain facts surrounding the midair collision between a Hughes Air West DC-9 and a United States Marine Corps (USMC) F-4B jet fighter, which occurred near Duarte, California, on June 6, 1971. Our investigation has not been completed; therefore, no determination has been made as to the probable cause(s) of the accident.

We are pleased to note the cooperative efforts of the Federal Aviation Administration and the military services to place renewed and additional emphasis on the voluntary use of the air traffic control system to the maximum extent practicable by all military aircraft. This should contribute significantly to the prevention of midair collision accidents involving military and civil aircraft. However, the Safety Board believes that additional steps could be taken by the military services to provide more safeguards for the benefit of all users of the nation's airspace without inordinate jeopardy to the mission of military flights.

At this hearing we examined the USMC and United States Navy (USN) flying regulations, operational procedures, and their interrelationship with the Federal Aviation Regulations (FARs).

The FARs prohibit flight at indicated airspeeds above 250 knots (250 KIAS) at all altitudes below 10,000 feet msl. Certain military aircraft, whose flight characteristics preclude safe operation at speeds below this limitation, have been granted relief from this provision. The applicable U.S. Navy regulation reiterates the restriction, the waiver relief, and states that operations at airspeeds in excess of 250 KIAS below 10,000 feet msl should be held to a minimum. Testimony at the hearing established that the F-4B, on this point-to-point cross-country flight, was flown at speeds far in excess of 250 KIAS while below 10,000 feet msl. While no violation of the FARs or U.S. Navy regulations was involved, the intent of the regulations may well have been circumvented. The Safety Board believes that the DOD should consider rephrasing the regulation to delineate explicitly those instances wherein the 10,000 feet/250 KIAS limitation may be exceeded. Specifically, we believe that there should be only two exceptions to this limitation:

1. Climbs and descents to:
   a. Traffic patterns
   b. Authorized and/or designated training areas
   c. Low-level navigation routes
2. Those instances where either the safety of the crew or aircraft require operations outside the parameters of this limitation.

Testimony established, also, that low-level, high-airspeed training was being conducted by the USMC at altitudes below 10,000 feet msl outside of the designated warning areas and off the low-level navigation routes. The Board believes that the DOD should review the necessity for permitting this training to take place in areas other than those specifically set aside for such flying.

The hearing established, further, that no attempt was made by the pilot of the F-4B to contact the FAA Radar Advisory Service while he was traversing the Los Angeles area. Had this service been used, the F-4B would have been given traffic advisories, and his presence might have been made known to the DC-9.

USMC witnesses testified to the fact that the radar aboard the F-4B has the capability to afford target avoidance as well as intercept information, and that it has been used to provide separation from other aircraft. There is no published procedure for using it to provide such separation, and its use for that purpose is left to the pilot's discretion. The Board believes that the feasibility of using such military intercept radar for traffic separation information should be explored. Its use for this purpose, if feasible, should be encouraged.

In view of the above facts, the Safety Board recommends that the DOD take the following actions:

1. Review the feasibility of restricting all types of low-level training, which requires airspeeds in excess of the FAR limitations, to designated restricted areas and low-level navigation routes.

2. Rephrase the wording contained in your altitude/airspeed limitations and delineate explicitly those instances wherein airspeeds in excess of the 10,000 feet/250 KIAS limitations are authorized. The Board believes that the exceptions should be limited to the following:

   a. Climbs and descents to traffic patterns, authorized and/or designated training areas and low-level navigation routes.

   b. Those instances where safety of either crew

or aircraft require operations in excess of the limitation.

3. Explore the feasibility of using the air intercept radar on all military aircraft to provide collision avoidance assistance as an additional aid to the "see and be seen" concept; and should this prove feasible, institute and establish procedures to use the radar for this purpose on all flights where its use is not required for more urgent military mission requirements.

4. Institute a program to provide more publicity to the existence, function, and use of the FAA Radar Advisory Service in those instances where VFR flight is required through high density traffic areas. Consideration should be given to making the request for such service a mandatory procedure.

Members of our Bureau of Aviation Safety will be available for consultation in this matter if desired.

These recommendations will be released to the public on the issue date shown above. No public dissemination of the contents of this document should be made prior to that date.

Reed, Chairman; Laurel, McAdams, Thayer, and Burgess, Members, concurred in the above recommendations.

/s/John H. Reed
Chairman

ISSUED: November 9, 1971
Adopted by the National Transportation Safety Board at its office in Washington, D. C. on the 15th day of October 1971
FORWARDED TO:
Honorable John H. Shaffer
Administrator
Federal Aviation Administration
Washington, D.C. 20591

SAFETY RECOMMENDATION A-71-52

Investigation of the Duarte, California, midair collision revealed that there is an apparent lack of knowledge on the part of users of the airspace over greater Los Angeles and Orange County, California, regarding typical traffic flow and the airspace requirements of military and air carrier aircraft.

The Los Angeles and Orange County areas include, in addition to the air carrier hubs, numerous military air bases. The requirements generated by this traffic have created flow patterns which, to a certain extent, are predictable, both as to altitude and location. This appears to be true of the military traffic as well as the air carrier. We are not aware of any concerted, broad-scale, effective program designed to apprise either the military or the civil aviation community of the direction and flow of this traffic. Portrayal of this information on a systematic basis does not exist at many of the numerous fields situated throughout this area. The Board is of the opinion that a similar lack of knowledge probably exists in other areas where intermixes of this nature occur. We believe that typical traffic flow information should be made known to all pilots operating in such areas. An expanded program is required which is designed to assure adequate dissemination of graphical information depicting civil/military airspace requirements and resultant flow patterns. Such a program would forewarn pilots regarding areas of traffic concentration and the necessity for exercising high levels of vigilance while traversing them. A program of this type would be of value to all pilots in that, having knowledge of such areas, they could plan their flights to avoid them and/or be particularly alert while therein.

all pilots must do their part and use every available means to reduce the possibilities of midair mishaps . . .

The Board is aware that the Terminal Control Area program will do much to eliminate a part of the hazard. However, the recently implemented Los Angeles Terminal Control Area would not have prevented the midair collision between the Hughes Air West DC-9 and the USMC F-4B near Duarte, California, since the accident occurred above the boundaries of the Terminal Control Area.

In view of these facts, the Safety Board recommends that the FAA take the following action:

Coordinate with the Department of Defense, and, in areas where a large intermix of civil and military traffic exists, develop a program to insure that appropriate graphical depictions of airspace utilization and typical flow patterns are prominently displayed at all airports and operational bases for the benefit of all airspace users.

Members of our Bureau of Aviation Safety will be available for consultation in this matter if desired.

This recommendation will be released to the public on the issue date shown above. No public dissemination of the contents of this document should be made prior to that date.

Reed, Chairman; Laurel, McAdams, Thayer, and Burgess, Members, concurred in the above recommendation.

/s/John H. Reed
Chairman

This article was written by the author while attending the USAAAVS Aviation Accident Prevention Course

First Lieutenant Keith Bittle

"There Wasn't Any Need For Survival Gear"

FOLLOWING IS a transcript of a message written on the backs of some papers found at a crash site. The aircraft had gone undiscovered for 8 months.

"We've been down for 2 days now. I didn't begin to doubt we'd be found until just now when the major died. I'm writing this to explain what happened, in case we don't make it. My copilot is still unconscious and the colonel and major are dead. I haven't seen the crewchief but he's probably somewhere near the point of impact.

"If it had been just one thing going wrong, we probably wouldn't be here. But problems always seem to come in bunches. Our problems started with a rush call to take the colonel to a training site at an alternate area. When we came in the night before we were told we were off until afternoon and weren't expecting the early call. When we got to the aircraft, the crewchief was removing the covers and tiedown and stowing them in the avionics compartment. The colonel and the major were already aboard and in a hurry. We abbreviated the preflight. We pulled pitch at 0955 for the flight over the large forest that ended here.

"I had flown the colonel before. He was not rated and didn't like aviators. He called us 'hot-rocks' and 'taxi drivers.' And he was usually impatient about any time spent sitting on the ground. Rather than get into it with an 0-6 and a half, I cut my procedures to the bone and got airborne.

"The latest weather I had, from our briefing the day before, called for VFR, with a possibility of thunderstorms in the early afternoon. We didn't have VFR for long. Thunderstorms were building, but the visibility was reasonable, so I figured I could circumnavigate them and remain clear if I stayed low.

"The first indication of problems developing was the loss of the navigation radios, but I blamed the low altitude and rain. About 45 minutes out and 20 miles south of our intended flight path we got into the edges of a really big thunderstorm. The turbulence was bad and visibility was worse, so we were slowed down when we hit a tree top. We got a severe vibration but stayed airborne for a couple of minutes until the visibility dropped to zero-zero and we impacted the ground.

"We must have hit along a firebreak or something and gone under the tree canopy. I've heard some airplanes, but we're probably hard to see.

"I'd signal if I had anything. There wasn't any need for survival gear on this flight, so we didn't bring anything. Anyway, who carries survival kits in the states?

"I can't move much and I'm getting thirsty. The rainwater has about dried up.

"I'll rest now and try to continue this later."

No additional entries were found.

PEARL'S

personal equipment and rescue / survival lowdown

If you have a question about personal equipment or rescue and survival gear, write Pearl, USAAAVS, Ft. Rucker, AL 36360

Your crash restraint equipment is . . .

NO STRONGER THAN ITS WEAKEST LINK

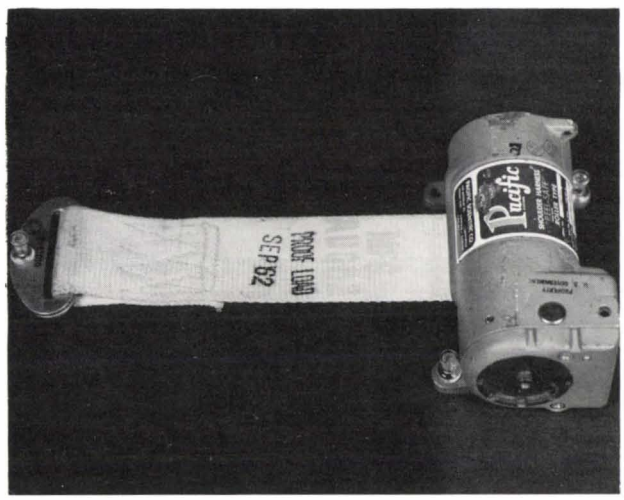
INVESTIGATION of a recent aircraft accident revealed shoulder harness failure which possibly contributed to the fatal injuries received by the pilot.

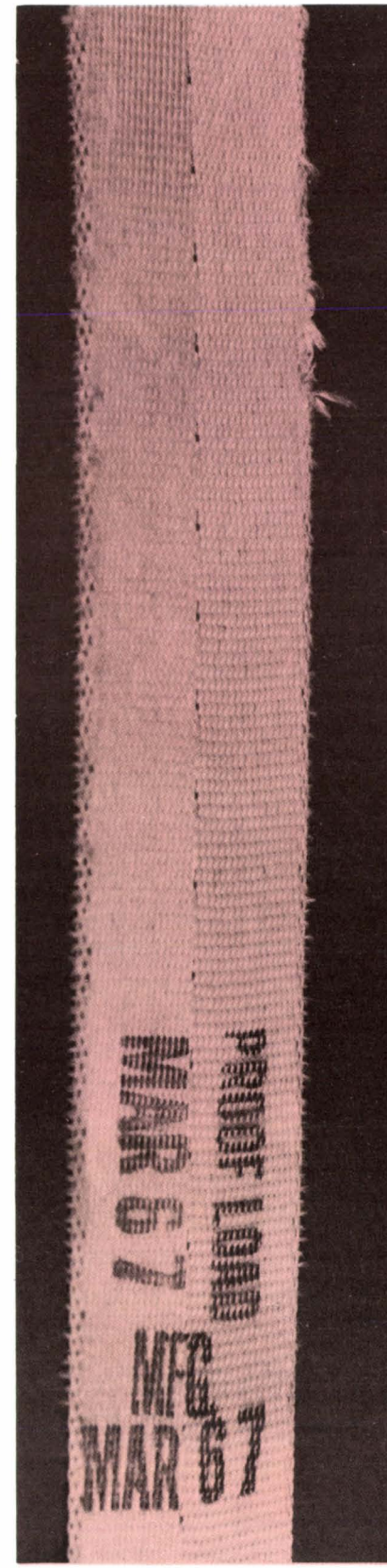
Through laboratory analysis, it was found that more than 50 percent of this shoulder harness strength was lost due to fraying at the edges. This fraying resulted in loss of strength of the webbing to a level far below that required to provide adequate protection in a crash.

General Aircraft Maintenance Manual, TM 55-1500-204-25/1, dated April 1970, chapter 3, section IV, paragraphs 3-305 through 3-314, provides the guidelines for inspection, replacement and cleaning of the restraint system and cargo tiedown equipment.

Take a look at the two shoulder straps in the photos. The frayed strap in photo 1 needs replacing for two reasons: (1) It's frayed and (2) it's 5 years old (automatic replacement time). Note the strap in photo 2. Looks new huh? But look again. The date of manufacture was nearly *10 years* ago! It's easier to replace shoulder straps than aviators!

Do us all a favor and send seatbelts and shoulder harnesses which have been replaced due to fraying, cuts, tears or other physical damage to the U. S. Army Aeromedical Research Laboratory, Ft. Rucker, AL 36360, for analysis. Include a brief description of the restraint system you send in. For example, if a seatbelt/shoulder harness fails, include the weight of the individual using it and the circumstances surrounding the failure.





Signal Kit

My supply man tells me our reserve unit cannot obtain the signal kit 1370-921-6172 due to the fact that we are not under CTA 50-901/2. Is there another authority which includes reserve aviators? It seems we should get the same survival gear as the regular aviators since we are flying the same equipment on similar missions in the same environment.—MAJ, ASO, USAR

It seems to us you should get the same survival gear, too. CTA 50-901, which for noncombat units, authorizes the issue of "one [signal kit, 1370-921-6172] per aircrewmember on flying status." Apparently, this authority should apply to any Army aviator, regardless of component, so long as he is on flying status.

AVIATION ACCIDENT PREVENTION FORUM

an interchange of ideas between readers and USAAAVS on subjects of aviation accident prevention

Truth Serum

There has been some discussion about the use of truth serum in getting personnel who were in an aircraft accident to tell exactly what happened during the accident. Since USAAAVS is concerned with accident investigation and safety, could you tell me whether the practice is approved.—MAJ, Aviator

This technique, including hypnosis, has also been discussed at USAAAVS. USAAAVS does not recommend the use of sodium pentothal, sodium amytal and hypnosis as techniques in aviation accident investigations, except in rare, carefully selected cases where the need for the information outweighs the recognized shortcomings of the techniques and the dangers involved with their use. The reasons for this position are:

The role of hypnosis, sodium amytal and sodium pentothal techniques in eliciting useful information from participants in an aviation mishap is debatable. That is, while the proponents of these techniques claim significant results, a considerable body of opinion exists that encompasses varying degrees of doubt about each and all of these techniques. This is not surprising in light of the still prevalent controversy about the basic concepts in psychiatry itself. Each of these evocative methods has enjoyed its own period of popularity in psychotherapy. After an initial wave of enthusiastic employment, each has assumed a much more limited part of the psychotherapeutic armamentarium.

The problems inherent in using these techniques involve not only the techniques themselves, but the nature of the accident sequence itself, if one can speak of a generic accident. The assumption that an individual involved in an accident necessarily has useful information buried in his subconscious awaiting resurrection is erroneous. In a specific accident, a specific individual may have the information desired and it may be retrievable. Those with accident investigation experience soon learn, however, that not only do many accident participants not know even the most elementary information, but that eyewitnesses often do not see what actually occurred.

Therefore, we have the first problem: The individual simply may not have recorded consciously or subconsciously the significant information the interviewer is seeking. The "simple" recording of observed events—if they were recorded at all—must be distinguished from the recording of significant events operative in the development of personality and the genesis of psychiatric problems. Thus, even before any of these techniques are used, an informed judgment must be made that the available individual is likely to have the information needed. One surviving passenger out of a total of 30 from a CH-47 mishap would be much less likely to have significant information than a surviving crew member, especially a pilot. Thus, the need for any information at all in the passenger's case would have to be much stronger than the need in the pilot's case to allow the passenger to become a subject. This is before any evaluation of the individuals themselves.

These techniques are not without dangers, both physical and mental,

to the individual subject. The individual must be adjudged emotionally stable and be a willing, informed participant. It would be wise to have a consent form outlining the specifics signed by the subject. It must be understood by all, especially the subject, that if he was a crew member, material obtained could possibly indict him, the subject, (depending on the evidence and/or theories developed in the investigation to that point) for an error of commission or omission. The subject might be excluded from sharing in the information obtained either by prior agreement or post facto judgment, but this is a complete problem in itself. The subject may wish the information to be confidential, which would restrict its use in court. While hypnosis is probably the least physical and mental threat to the subject, it requires the least preparation and almost no emergency equipment; it is also the most superficial and easiest to resist. Amytal and pentothal are not without the usual risk of allergic or other adverse drug-related reactions. Extensive safety precautions are necessary; hence, the need for these interview techniques must be serious indeed.

The person using these techniques must be well versed in both the hazards and the methodology. It is rather easy to lead the subject into answers which have been planted or suggested, perhaps only by the logical progressive sequence of questions asked. Even the best information obtained is only as good as the corroborative evidence that, it is hoped, is available.

Suffice it to say, these techniques can be of value in a very few well selected instances where the need for information outweighs the recognized shortcomings and dangers involved. Each case should be evaluated individually, and it is not expected that there would ever be more than a rare instance where one of these techniques was used. This is not to preclude the possibility that a reasonably aggressive program might at some time be established to select mishaps for study as they occur. Nevertheless, an a priori judgment on the subject cannot be made except to say that each case must be weighed on its own merits.

Readers are invited to participate in this forum. Send your ideas, comments and recommendations to Commanding Officer, USAAAVS, ATTN: E&P Department, Ft. Rucker, AL 36360

Nomex Underwear

Reference the article (February 1972) concerning the CWO, ASO who wanted to know how to procure Nomex underwear because his VIP flight is required to wear either the green or short sleeved khaki uniform when transporting general/flag officers. Ridiculous. . . .

I'm really proud to be an Army aviator and this type of information quickly touches a nerve. . . . With all the outstanding officers we have from WO1 to General rank, there must be someone in the hierarchy who can put a stop to this nonsense, now and forever. I recognize that we have a number of swaggering, rather handsome pilots, but I can't believe the Class "A" or "B" uniform adds more to their masculinity than does the Nomex. The basic question here is, Who are they supposed to be looking pretty for? I'm sure the senior officers who ride in back couldn't care less about the uniform of the troops up front, as long as they meet military standards.

Fortunately, I don't get too involved in air taxi type operations, nor do I care to get involved. I recognize this is an ideal assignment to become a truly fine instrument pilot and recognize it as a necessary function of Army aviation. Too many times though, I get the feeling that the majors and chief warrant officers flying U-21s are being equated to staff car drivers. We have to destroy that image somehow.

There is one key point here. I am a Medical Service Corps officer and can look back at having evacuated just over 12,000 patients. Most of these were combat casualties and I would estimate that at least 250 to 300 were burn patients . . . Many of these resulted from aircraft fires. Until one has touched and smelled burned flesh and has witnessed the agony these patients suffer, it would be difficult to comprehend the seriousness of it all. They go through a living hell which I, for one, would rather not experience. Other than the pain and disfigurement involved, the resources used to save these patients' lives are staggering. The special C-141 flights, months of intensive care and expensive prosthetic devices cost many, many dollars.

If the wearing of Nomex suits prevents or reduces burn injuries to any extent, we should be required to wear the uniform, VIP flight or assault company. Don't bother to tell me that specially equipped Hueys, U-8Fs, and U-21s don't crash, because the Weekly Summaries will be on my side.

To the CWO, ASO in question, perhaps you should paraphrase the bumper stickers proclaiming the POW's plight by placarding your aircraft with the sticker, "Crispy Critters Never Have A Nice Day." Maybe you'll get your CO's attention.—MAJ, Executive Officer

Doorgunners Do The Damnedest Things

THE BIG hand was on twelve and the little one on six when we completed the last sortie to the field site. It had been strictly pigs and rice all day and we were all tired. Now in the late afternoon as we were grinding along, shuffling home at 1,500 feet, I leaned back in the seat of the UH-1H, and snaking out a cigarette, felt for and found a packet of matches. It was empty.

"Anybody got a light?" I intoned on the mic. There was no reply. I glanced at the copilot and found myself mildly irritated, remembering he didn't smoke. A few moments went by while in the back of my mind's eye I envisioned the doorgunner and crewchief searching themselves for some hidden fire-making tool. Then I heard a rapping on the window outside the cabin door.

Not wanting to look, I shot one quick glance to the left and saw Jones' face leering at me through the plexiglass. He was balanced on the skid and seemed to be enjoying his excursion as, holding onto

Major Robert L. Clewell
Data Center
USAAAVS

whatever was out there, he held up a battered cigarette lighter. Uncrossing my eyes, I eased onto the controls and banked sharply left. Grinning into Jones' astonished face, I saw him thrashing to grab on, still holding the lighter, as he disappeared in the wind. Looking back and down, I could see him spinning 15 feet below on his monkey strap. It wasn't long until he climbed back up and plugged in his helmet. A long silence followed while everyone waited, expecting him to say something. Finally, Jones spoke in a voice remarkably casual. What he said had nothing to do with his most recent experience and was addressed to the crewchief sitting on the other side. "You got a light? I lost mine." The crewchief replied, "Sorry about that." Meaning that he didn't have a light either but appreciated the manner by which Jones had gone about losing his. And so we flew along in silence, each with his own thoughts and I with my unlit cigarette.

We all heard the Mayday when it came, bringing that special tenseness to the stomach. It was another UH-1H going down not far from our position. That he was in serious trouble was evident by the voice which broke our thoughts.

We arrived in minutes and circled a gaping hole in the dense undergrowth from which a column of black smoke was beginning to boil. Hovering upwind over the trees, we looked for a way to land and reported all we saw over the radio. It was a bad, bad area far from friendlies and long known to contain a hodgepodge of enemy units which hid their activities beneath the jungle roof. We knew that any survivors would have to be got out quickly before the enemy reached the crash. But there was no place to land and darkness would soon make any attempt to secure the site an operation of great risk.

Then faintly we heard a survivor, obviously transmitting over one of those emergency portable radios, trying to contact us. His voice, though weak and garbled, sounded determined despite obvious pain. A few words and short phrases came through. "Hurt badly" and "Need help" were enough to touch our souls as we searched for a way, hovering over the trees.

Again Jones' casual voice came on the intercom. "I've got a tiedown rope ready, and I'm ready," was all he said. Remembering we carried these on board, I glanced back and saw Jones out on the skid in full battle dress, holding onto a long nylon rope, one end of which he had fastened to a tiedown ring on the cargo floor. Knowing the other end couldn't possibly reach the ground, Jones had already started down. Straining, we maneuvered him into the top of a tall tree and he disappeared.

A few moments later we could see him near the still smoldering wreckage as he went into some thick bushes. He reappeared carrying someone in his arms, then went back for others. In seconds he had located the entire crew and now waved his arms to us. By this time, the crewchief had pulled in the long tiedown, and joining it to another from his own container, guided us directly over the hole and down until our rotor blades were cutting branches.

Lowering the rope, we saw that it just reached Jones' outstretched arms. Jones had managed, by a series of loops, to strap the men together and now he hooked them on and signaled. Upward we hovered, the aircraft trying to run out of control and do a combination of other unusual things with so much weight on that single strand. Getting the bundle clear of the branches, we hovered on off over the trees. About a mile away we came to a big enough clearing where we carefully deposited the men and landed to get them all inside. Although injured, none was too badly hurt. We went right back after Jones.

By now it was dark, and although we looked until our fuel got low, we couldn't find the spot. The next day when we went back in force, the area was too hot to get into. On a high speed low level recon, one of the AH-1G Cobra pilots said it was like being inside a popcorn popper. That much enemy fire was more than we wanted to take, and besides, by now everybody figured that Jones was probably a goner. There wasn't much point in risking any more lives with the odds so much in the enemy's favor.

We listed Jones as missing in action on the morning report and put him in for an award, citing his "constant fortitude" and "perseverance in the face of danger." I doubt if Jones knew what any of those words meant but it was a way of making us all feel better.

One morning about 2 weeks later I was sitting in my office when I heard the 1st sergeant roar slightly off key, "Where in the HELL have you been?" Looking out, I saw two MPs, and in front of them, stood Jones. In a casual voice he began to explain how he'd returned about 3 days ago and had figured he'd better spend a couple of days in town. No, he didn't know the town was off limits . . . no, he didn't know he was missing in action. . . .

When the adjutant called, we cancelled Jones' award. Later that day he was back flying.

Major B. W. Addy
Education and Prevention Department
USAAAVS

GO!

THE COMPANY'S mission required 10 lift aircraft, four gunships and a command and control ship. Because of necessary maintenance, only eight lift ships were immediately available. The battalion commander informed the company CO that he would accept no excuses—the mission would be carried out with all the aircraft requested. To provide the 10 slicks, the maintenance platoon performed an overnight PE on one aircraft and assigned another that had been written up on the previous day as having had a severe but momentary loss of power during a normal combat assault landing. This discrepancy had been entered under a red diagonal symbol which had not been cleared.

The aircraft with the uncorrected discrepancy was assigned to the flight commander in the lead position of the formation. The reporting time for the flight was 0730. At approximately 0830, the flight was suppressing the LZ with all weapons firing. Simultaneously, the ARVN unit advisor was pounding the flight commander on the back, telling him that this was the wrong landing zone—mistakenly, it turned out. Meanwhile, the pathfinder leader in the PZ began calling for help because his element had come under attack from small arms. The flight leader broke off two gunships to go to the PZ and turned the controls over to the copilot while he rechecked the LZ location on his map. When he looked up, he noticed that the advisor had convinced the copilot that this was the wrong LZ. The flight commander, having confirmed this to be the proper LZ, took over the controls, continued the approach and ordered the flight to continue suppression.

Shortly thereafter, the flight commander realized that the flight had gone too far to land in the designated LZ, and he initiated a go-around at approximately 50 feet. Due to the confusion in the cockpit, neither he nor the copilot noticed that the engine had failed and rotor rpm had decayed until the engine reached approximately 4000 rpm. Fortunately, he was able to level the aircraft prior to impact at 60 knots. Although no one was killed, several serious injuries resulted and the UH-1D was destroyed.

Command pressure such as that exerted by this battalion commander always creates hazardous situations, particularly when a commander is the authoritarian type leader who obtains results by command pressure—pressure which keeps company commanders in a constant state of fear of being relieved at the first slip-up.

It is unrealistic to expect 100 percent aircraft availability, and to honor any unrealistic request for aircraft, a company must resort to unsafe practices. Overnight PEs become the rule rather than the exception. So do night test flights. No unit can operate safely in such an environment. If it is forced to, an exorbitant price must be paid in an increased number of engine failures, accidents, destroyed aircraft, deaths and injuries.

Aviation commanders must face the fact that safety cannot be commanded. It results from genuine command interest—and action. There will always be a need for an effective safety program in every unit. Let's recognize this and welcome safety as a full-fledged member of the aviation team.

USAASO Sez

The U. S. Army Aeronautical Services Office discusses

Give Us One Flight Plan Form For All Flights: Many military and civilian aviators are asking, Why not have one official flight plan form for use in all domestic and overseas flights? Why in the name of Orville Wright do we need so many different flight plan forms? We now have DD Form 1080, DD Form 175, FAA Form 7233, DD Form 1801 and the ICAO flight plan form. Aviation authorities throughout the world agree that one flight plan form can be made to satisfy all requirements, and they're doing something about it.

The 115 nations in the International Civil Aviation Organization (ICAO) developed and agreed to use what is known as the ICAO flight plan form. The U. S. Government did not join that agreement because the ICAO flight plan form was not compatible with FAA's air traffic control computer procedures. However, within the last year FAA has decided to revise its procedures to permit the adoption of the ICAO flight plan form for use within the U. S.

The U. S. military services are doing their part in this move toward the ICAO flight plan form. They have adopted an ICAO type flight plan form; DD Form 1801 for use by all U. S. military flights in overseas areas.

The joint coordinated adoption of an ICAO type flight plan form by FAA and DOD for use in the U. S. is an established goal. When that happens aviators will file only one type flight plan form for all flights in the free world. Optimistic estimators say it could occur within the next 2 or 3 years.

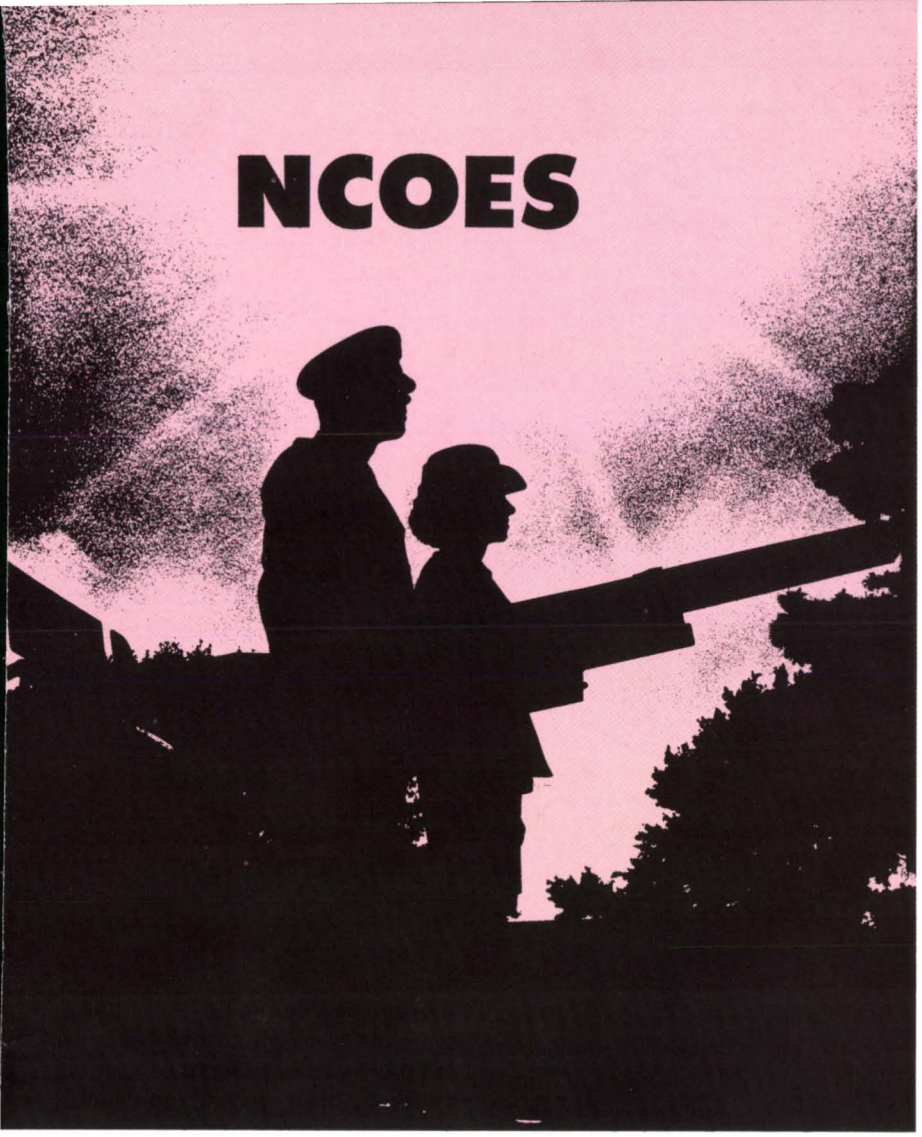
"No-Joy" And "Tally-Ho": When radar traffic information is provided the pilot should acknowledge in one of three ways, depending on which further service he desires. Either report "traffic in sight," "traffic not in sight" or "traffic not in sight and requesting an avoidance vector." Avoidance vectors are provided only when requested. If the pilot simply acknowledges by saying "Roger," the controller interprets this to mean traffic is sighted and they no longer need to be concerned (see "Radar's Role In Air Traffic Control," page 4, this issue).

The use of the brevity code in the Tactical Aerodrome Directory for Vietnam to reduce the language barrier between pilots and Vietnamese controllers is not authorized for Army pilots use in CONUS.

Perhaps the terms "No-Joy" and "Tally-Ho" to indicate the status of visual contact with called traffic should be adopted for CONUS use. However, unless the proposal is made and an agreement between the military services and FAA is reached, the response desired by the controller is as indicated above. A controller may tell you in response to a "No-Joy" that he's not having much fun either.

Aircraft Save: Congratulations to Specialist 5 Jon T. Eubanks, 519-46-8337, air traffic controller stationed at Cairns Army Airfield, Ft. Rucker, AL. His timely warning to an Army aviator flying a T-42 Baron on 10 January 1972 prevented the aircraft from landing with the gear up. The alert manner in which he operated in the local control position prevented possible serious injuries to personnel and thousands of dollars damage to an expensive aircraft. His high degree of dedicated professionalism, initiative and knowledge has brought credit upon himself and the U. S. Army. To SP5 Eubanks, USAASO sez WELL DONE!

NCOES



FOR VETERAN sergeants on-the-job training has been *the* mainstay. They have given the Army supervision and stability using experience gained mainly on the job. It hasn't always been easy, but there really was no other choice.

This reliance for on-the-job training of career NCOs is changing as the U. S. Army moves toward a volunteer force. The change is the Noncommissioned Officer Education System (NCOES), a stepped career education program for enlisted personnel. The NCOES is improving the Army as a career for enlisted men and women by giving them more opportunities than ever before for career progression and continuing professional development.

The NCOES is a progressive system, somewhat like the one for officers. The officer attends a progression of schools designed to prepare him for the demands of the successive command and staff levels. As the NCO progresses in rank and responsibilities he attends NCOES courses at the basic, advanced and (as now planned) senior levels. These courses will train him for supervisory duties from the squad level through high-level staff positions.

Basic level courses covering 34 career management fields will be in full effect by July.

Basic level NCOES courses, for E5s and below, focus on duties required of sergeants and staff sergeants. These are not just military occupational specialty (MOS) courses, but emphasize supervisory skills as well. Here, junior or prospective NCOs learn basic leadership and other military subjects needed at team, squad, section or comparable levels.

Service schools are now revising the basic courses to program students by career management field. The change will give each student instructions in subjects common to his career management field but will allow specialized MOS training near the end of the course.

Advanced level NCOES courses are for E6s and E7s, and prepare them for the duties required of E8s and E9s. CONARC's advanced courses are planned to be in full operation by January 1973.

The senior level of the Noncommissioned Officer Education System is still only in planning. It is intended to train selected NCOs for key assignments at division and higher headquarters, or a joint or combined command. Attendance at the senior level of NCOES will be highly selective, roughly comparable to the Army War College for officers.

All enlisted members of the active Army and the Reserve Components are eligible for schooling under the NCOES. As planned, selection for attendance at each level will be on a "best qualified" basis. Besides gaining career development schooling, graduates of the NCOES basic courses earn 42 promotion points.

For the career enlisted soldier the NCOES opens new, equitable opportunities for professional development. For the Army the NCOES will ensure a pool of highly trained and dedicated professionals to fill positions of increasing responsibilities and trust.

Next month the DIGEST will carry a story on the air traffic management career field courses now being prepared by the U.S. Army Aviation School at Ft. Rucker, AL.

Accidents don't just happen,
Somebody makes them happen...
HAZARD PREVENTION SENSE
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