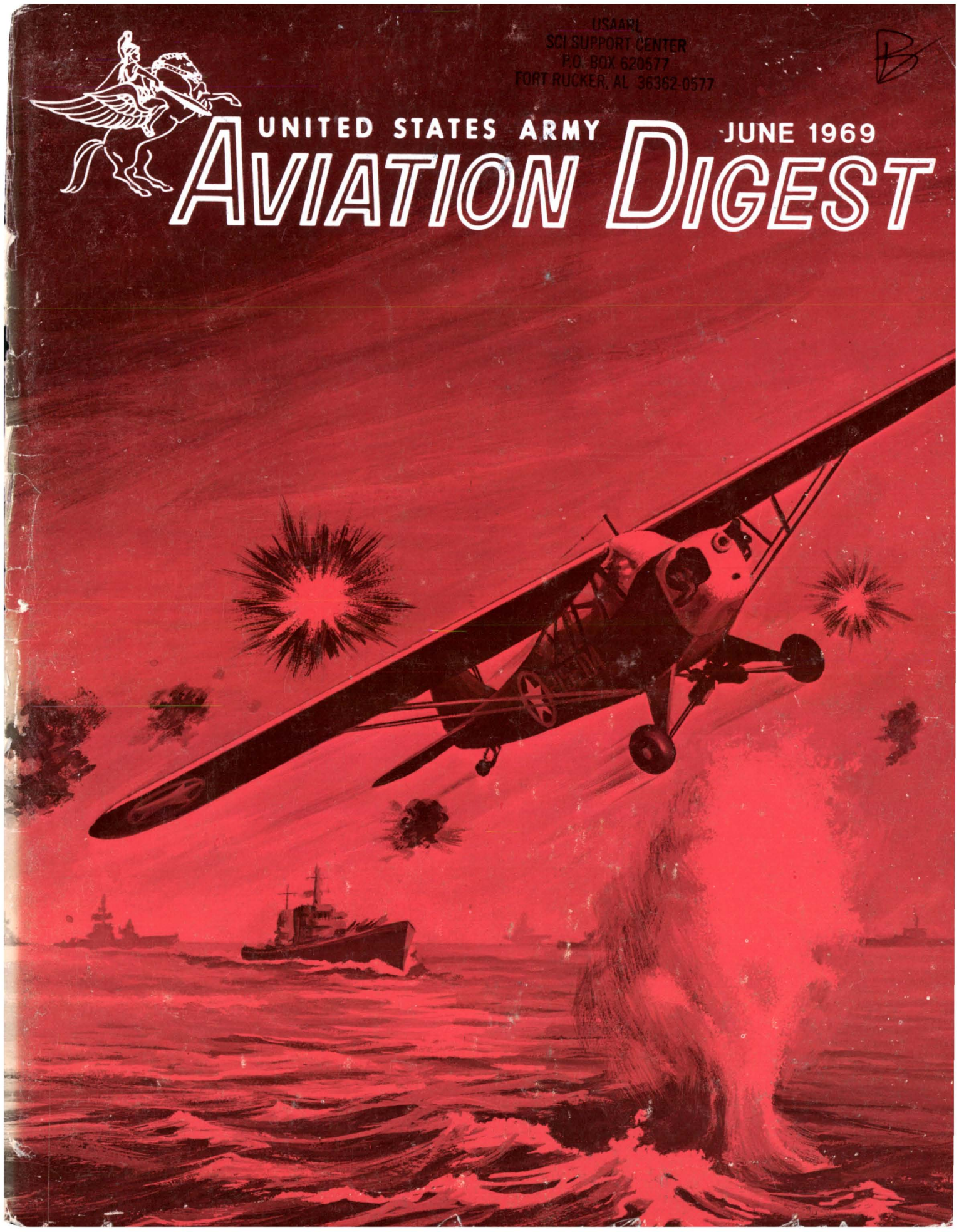
USAARL
SCI SUPPORT CENTER
P.O. BOX 620577
FORT RUCKER, AL 36362-0577

UNITED STATES ARMY
JUNE 1969

AVIATION DIGEST



UNITED STATES ARMY AVIATION DIGEST

DIRECTOR OF ARMY AVIATION, ACSFOR DEPARTMENT OF THE ARMY
COL Jack W. Hemingway

COMMANDANT, U. S. ARMY AVIATION SCHOOL
MG Delk M. Oden

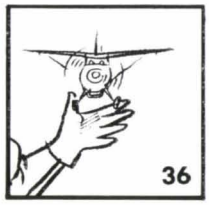
ASST COMDT, U. S. ARMY AVIATION SCHOOL
COL M. H. Parson

DIGEST EDITORIAL STAFF
LTC Robert E. Luckenbill, Chief
Richard K. Tierney, Editor
William H. Smith
CPT F. J. Lewels
Marlan Jones
Linda McGowan

GRAPHIC ART SUPPORT
Harold G. Linn
Harry A. Pickel
Dorothy L. Crowley
Angela A. Akin

DIRECTOR, U. S. ARMY BOARD FOR AVIATION ACCIDENT RESEARCH
COL Russell P. Bonasso

USABAAR PUBLICATIONS AND GRAPHICS DIV
Pierce L. Wiggin, Chief
William E. Carter
Jack DeLoney
Ted Kontos
Charles Mabius
Patsy Thompson
Mary W. Windham



JUNE 1969 VOLUME 15 NUMBER 6

VIEWS FROM READERS 1
COMBAT NIGHT AIR ASSAULT, COL Kenneth D. Mertel 2
CLIMB TO FAME 8
THE CARE AND USE OF THE AIRCRAFT REPAIR TECHNICIAN (NON-RATED) CW2 Robert R. Vaughan Jr. 10
HANGAR FLYING! WHY NOT? Instructor Pilots 14
ANNUAL MINIMUMS, LTC Roger D. Byrd 17
DEVELOPMENTS IN AIRMOBILITY IN THE UNITED STATES ARMY, LTC Donald F. Harrison 20
TRACO, MAJ Richard H. Seignious 25
AIR TRAFFIC CONTROL SCHOOL, MAJ Peter H. Mitchell 28
THE ARMY'S W-STOL, Bill Herman 32
AVIATION WO CAREER PROGRAM, CPT F. J. Lewels 35
CRASH SENSE—UNIT TRAINING SENSE MAJ Chester Goolrick 36
TELL IT LIKE IT IS, COL Robert M. Hamilton 49
UNBELIEVABLE! Pierce Wiggin 54
PEARL'S 58
COLLATERAL—TO HANG OR DECORATE LTC H. L. "Rip" Collins 60
USAASO SEZ 64

27TH ANNIVERSARY COVER

Army aviation was born on 6 June 1942. A few months later—on 9 November 1942—the late Colonel Ford E. Allcorn became the first Army aviator in combat when he flew his L-4 from the USS Ranger during the invasion of North Africa

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.

The DIGEST is an official Department of the Army periodical published monthly under the supervision of the Commandant, U. S. Army Aviation School. Views expressed herein are not necessarily those of Department of the Army or the U. S. Army Aviation School. Photos are U. S. Army unless otherwise specified. Material may be reprinted provided credit is given to the DIGEST and to the author, unless otherwise indicated.

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.

Use of funds for printing this publication has been approved by Headquarters, Department of the Army, 3 November 1967.

Active Army units receive distribution under the pinpoint distribution system as outlined in AR 310-1. Complete DA Form 12-4 and send directly to CO, AG Publications Center, 2800 Eastern Boulevard, Baltimore, Md. 21220. For any change in distribution requirements, initiate a revised DA Form 12-4.

National Guard and Army Reserve units submit requirements through their State adjutants general and U. S. Army Corps commanders respectively.

For those not eligible for official distribution or who desire personal copies of the DIGEST, paid subscriptions, $4.50 domestic and $5.50 overseas, are available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

VIEWS FROM READERS

History is sometimes summed up as the dead facts of yesteryear—interesting but of little value. Although we should not live in the past, neither should we try to live in the future. To do so makes for an unrealistic present. Yet, to some extent, today and tomorrow are based on yesterday for, as human beings, we evolve ideas slowly and progress is rarely made by great leaps forward. Progress is, in the main, empirical and history allows the past to point the way to the future.

In Army aviation, our heritage is most important. We can take pride in everyone's contribution to our program—from Thaddeus Lowe and his balloon to Ford Allcorn and the L-4s, from the historic happenings in the Korean War up to the most recent event five minutes ago in Vietnam. The significant events become our heritage and form that precious moral value called pride. Pride is part of esprit and esprit is the catalyst which holds a fighting force together.

Unless this heritage is documented faithfully and passed on to succeeding generations in Army aviation, a vital part of their education is neglected. Each year the AVIATION DIGEST dedicates an issue to the vital contributions which constitute our heritage. We trust that you will enjoy this one.

The Editors

★ ★ ★

CW4 J. P. Ervin, who helped establish the pending world altitude records (see page 8), is not only an accomplished aviator, but also an excellent photographer. He has provided the DIGEST with the three outstanding photographs illustrating the article "Physical Fitness" in the April issue and the back cover of the January issue. Also, Mr. Ervin contributed the photos which were selected for the December 1968 and February 1969 DIGEST covers and many others which have been slated for publication in future issues.

Good photography, as well as good articles, constitute a continuing need for the DIGEST and are most welcome at any time. Mr. Ervin's deep interest in Army aviation is indicated by the time and expense incurred by him in his efforts to give the DIGEST the best possible photographic coverage. With Mr. Ervin's retirement last month, the staff wishes to publicly thank him for the many hours of his own time he has given to support the DIGEST, and to wish him every success in future endeavors. The Editors

★ ★ ★

Sir:

Reference your November issue showing a Dustoff ship with its medic standing outside in short sleeves, with no gloves, etc., which drew considerable criticism from other readers, i.e., January jab by Major Don Murphy. I happened to be the aircraft commander of that ship in late 64 or early 65 when the picture was taken. The oldtimers remember when you wouldn't be caught dead with your sleeves rolled down. Our weapons were the initial issue of AR-15s and everyone flew with an old .45 holstered in a cowboy pistol belt tucked between your legs for an added sense of security. We didn't have survival radios with voice capability and only one out of maybe 200 pen gun flares would work (the supply officer and I fired the entire stock one day and didn't get one to light). Agreed, we weren't too smart in those days, but the H-21s had all been turned in and Army aviation was growing.

Times have changed and equipment has improved. Techniques have changed and support has gotten better (wish we had arty preps in the LZ before we landed at Dong Xoai and at Hotsville). This means that we have had to change also, not only in the sense of a little more grey hair and a few more ankle biters around the house, but also in the professional attitude that we take toward this war. The old APH-5 (vintage 1964) which was so comfortable, took an AK-47 round which entered the front and exited over my left ear. The old green gal has been reverently placed away and now I wear a ballistic hat that hurts like hell after a few hours of wear, but I strap it on so tight that I have permanent indentations. I use, and insist that my pilots and crews use, all equipment available to them. We constantly discuss and work on flying techniques to outwit "Charlie" because if a Dustoff ship loaded with U.S. personnel went down coming out of an LZ it would be a terrible morale buster. As a result, they can hover that beast down in between the trees with minimum clearance, in pitch black darkness, under fire and still laugh about it at breakfast.

Professionalism is a real challenge to all of us whether it's wearing available equipment, developing and using new techniques, improving radio procedures, insuring that a complete pre-flight is done or any of the other myriad things which we must do to protect and advance the image of Army aviation. Heard a Master aviator a while back state that we have done the impossible so long that the ground tribes expect it daily and he proclaimed that we have completely over-extended Army aviation. Can't disagree with him more and we will prove him wrong if we continue in a strict professional manner and learn from our mistakes just as I have since the picture was made back in the old days. So if the AVIATION DIGEST wants to keep up with the rest of us, I would suggest a file cleaning and get some current pictures, i.e., your January issue had a fine article entitled, "Combat Infantryman or Aviator? (Or Both)." The tall, handsome, captain aviator, with sleeves rolled up, sun shades on, wearing a personal sidearm, who spent more time in country than Ho Chi Minh, is a Dustoff pilot by the name of LTC Paul Bloomquist, known much better by his nickname of BUB (Big Ugly Bear). The picture must have been made in 64 or 65 when the Dustoff mob shared the west end of Tan Son Nhut with the UTT (new guys, try to figure out which unit that is now). We are keeping up, DIGEST, how about you?? Need any current pictures? Come visit us at Cu Chi.

Major Douglas E. Moore
159th Medical Detachment
(Hel Amb)
APO San Francisco 96353

• Ouch!—Major Moore has discovered our Achilles' heel, which is a distinct lack of an adequate input of current photos with which to illustrate articles in the DIGEST.

We need all types of photos; terrain, weather, personnel, air-to-ground, etc. and from wherever Army aviation personnel and aircraft are based, to include such exotic spots as Iran, Turkey, Ethiopia and Greece.

We depend on you field types for support so please get your cards and photos on the way—and thereby help us avoid those slings and arrows.

The Editors

Combat Night Air Assault

The author asserts that airmobile units capable of conducting good daytime operations, which have good SOPs and efficient commanders can execute effective night air assaults . . .

Colonel Kenneth D. Mertel

FEW NIGHT AIR assaults were employed in the Vietnam War prior to arrival of the 1st Cavalry Division (Airmobile) in II Corps Tactical Zone in August-September 1965. The first two night air assaults under fire were conducted by a single company in one battalion of the 1st Cav. The following combat examples detail the specifics of those two night air assaults, the first on 3-4 November 1965, the second 30 March 1966.

These night air assaults set the stage for further night operations against the Viet Cong (VC) and the North Vietnamese Army (NVA), not only in the 1st Cav but in other U.S. and South Vietnamese Army units in Vietnam.

Battle of Ia Drang: The battle of 3-4 November 1965, in which "A" Company of the Jumping Mustang Battalion (1st Bn, Abn 8th Cav) executed a first night combat air assault into an enemy held landing zone under fire, was the first in Vietnam, first in the 1st Cav and first in the history of the United States Army.

"A" Company was released to operational control of the CO, 1st of the 9th Cavalry Squadron, to move to Duc Co at 1815 hours. The mission was to initiate a night air assault in support of the 1st of the 9th.

The action of the 1st of the 9th Cavalry on the Ia Drang River, part of the Ia Drang Campaign,[1] began with a mission from the assistant division commander directing a reconnaissance in force. A patrol base was established in the afternoon, north of the Ia Drang River, close to the Cambodian border. It was anticipated escaping North Vietnamese Army units would use the several withdrawal routes and excellent trails that paralleled the Ia Drang River and led across into Cambodia. Three ambushes and two observation posts were set out along these likely routes.

At 2105, the south ambush was triggered. The ambush force was then withdrawn to the patrol base and occupied the southern sector of the base perimeter.

Shortly after, at 2200 hours, the first NVA attack was initiated against the patrol base. It was followed by four additional attacks at 2315, 0030, 0115 and 0330 hours. In the intervals between attacks there was constant sniper fire. During the first attack it was obvious to the commander on the ground that if his small force was not immediately reinforced it would be overrun.

The commander of the 9th Cavalry Squadron, alerted "A" Company, Jumping Mustangs, for immediate employment to reinforce the patrol base. In addition all remaining ambush platoons were ordered to return to the patrol base.

The 3rd Platoon of "A" Company was alerted for an immediate air assault. It was lifted off in six UH-1D transport helicopters provided by a Blue Team,[2] 1st of the 9th Cavalry, escorted by armed helicopters (Red Team[3]) from the squadron.

A flare was dropped from a C-47 aircraft to illuminate the landing zone, since a night landing had not been attempted in that area before and normal landing aids were not available. The illumination provided adequate visibility and the platoon was landed at the fire swept patrol base at 2345 hours. As the lift helicopters touched down, they came under intense ground fire which hit every helicopter in the lift but did not disable any.

---

[1] **19 Oct 65—12 Nov 65, first major action of the 1st Cav against an NVA division**

[2] **Blue Team. Rifle platoon with UH-1D transport helicopters**

[3] **Red Team. Two UH-1B armed helicopters**

The 3rd Platoon took moderate casualties in assaulting enemy positions. They advanced to the southern edge of the landing zone (LZ) to take up defensive positions and reinforce the existing perimeter. This action resulted in an estimated 30 percent casualties.

Wounded personnel were evacuated under fire to the middle of the LZ to await further evacuation. Tube artillery support was not within range. Consequently Aerial Rocket Artillery (ARA) had been requested and were scrambling to join the mission from bases near the Stadium (code name for Catecha, a tea plantation).

At 2400 hours the situation was reported as still deteriorating. The remaining elements of "A" Company were committed to conduct a company air assault, reinforce the perimeter and hold until the enemy withdrew or reinforcements could be landed at daylight. On landing, the already committed platoon of "A" Company would revert to parent company control.

The 2nd Platoon and command group were loaded on the next available lift helicopters. The aircraft lifted off and landed in the LZ under fire at 0020 hours. This lift was again subject to heavy ground fire from a range of less than 100 meters, however, none of the ships were damaged to the point of not being flyable. This was partially due to the fact that illumination was not employed. Pilots stayed on the ground longer to unload troops in order to take on casualties of the already committed 3rd Platoon and evacuate them to safety. This proved to be the only method of medical evacuation for the remainder of the night.

North Vietnamese probes increased in frequency and strength and several final protective lines were fired in portions of the perimeter. The 81st Mortar Platoon fired mortars without firing tables or plotting boards. All corrections were made by turns of mortar hands wheels. During course of firing, two complete basic loads of ammunition were fired without inflicting friendly casualties. Ammunition supply became critical at 0130 hours and all available ammunition was received from Duc Co and other units that could be reached by helicopter.

The helicopter pilots again landed in the perimeter under fire, kicked off ammunition, took on casualties and lifted out. ARA from Catecha arrived on station at 0300 hours and after identifying

The ARA is scrambled to join in the assault

the perimeter executed a professional job reinforcing fires of the 81 mm mortars.

At 0430 hours contact ceased with only an occasional burst of fire at suspicious targets by troops on the perimeter. Friendly personnel moved more freely and began carrying dead and their equipment to central locations and began, for the first time, to make an accurate assessment of casualties.

At first light, "A" Company assaulted from its perimeter in a walking "mad minute."[4] The assault moved several hundred meters out and halted. Observation posts were left at the limits of the assault and the remainder of "A" Company completed its mission. It had reinforced and held the perimeter until reinforcements landed.

This action was the first violent attack "A" Company had participated in since arrival in Vietnam. This full scale baptism by fire occurred in as difficult a situation as could be imagined. This reinforcement action was the first air assault in the history of the United States Army conducted at night by helicopters while a unit was engaged in direct contact with the enemy.

Operation LINCOLN: The second combat night air assault in the history of airmobile warfare took place on the night 30 March 1966. "A" Company, 1st of the 8th, again was the Infantry unit, this time in a pre-planned night air assault mission—the first actual planned night air assault in Vietnam by the 1st Cav and the second to be executed by this airmobile company.

---

[4]A technique for discouraging infiltration of enemy personnel to within effective ranges of friendly troops. It consisted of each soldier spraying his sector of fire to include trees at a specified time, usually just after dark or slightly before dawn

The second phase of Operation LINCOLN required an assault beginning 1 April into Chu Pong which is a large mountain mass south of the Ia Drang River, near the Cambodian border, in which large numbers of NVA and VC were believed to be hiding. This action was a combined operation of three brigades: the 1st Airborne Brigade; 3rd Brigade; and the 3rd Brigade, 25th Infantry Division.

The 3rd Brigade of the 25th operated to the north of the Chu Pong, our 3rd Brigade on the east of the Chu Pong mass and the 1st Airborne Brigade in the south. The 1st Airborne Brigade moved in, encircled its portion of the mountain for the assault of the massif itself. By use of airmobile techniques, troops were landed on all high peaks with the usual technique of working down the slopes, searching for VC and NVA.

On the afternoon of 30 March, the 1st Battalion, 12th Cavalry attempted to extract a rifle platoon (Blue Team) of the 1st of the 9th Cavalry that had landed south of Chu Pong to capture three VC. The VC were located first by a White Team (OH-13 Scouts). They called for reinforcements and a Blue Team moved in to capture the VC. The platoon ran into at least an enemy company and were soon heavily engaged.

"A" Company, 1st of the 12th, was committed to secure and extract elements of the cavalry troop, and continue the mission to develop the situation and destroy the enemy in that area. The rifle platoon of the cavalry troop was extracted, however "A" Company became heavily engaged and suffered a number of casualties.

In the meantime, four UH-1Ds from the cavalry squadron were shot down, three of them total losses. An effort was made to extract the rifle company, however one CH-47 attempting a landing in the only available small LZ was seriously damaged by fire. It managed to land safely, blocking the LZ, but could not be flown out again.

The brigade commander made the decision to leave the company in position for the night. A sporadic fire fight continued throughout the early hours of the evening. Ammunition resupply was dropped in by low level parachute extraction from cargo planes that executed low passes over the LZ prior to dark.

During the early part of the evening, it was obvious more enemy were in the area than anticipated. It was possible "A" Company would run into trouble during the night, as the VC reinforced its positions. The company was out of range of tube artillery and was depending entirely on ARA and tactical air support. Although ARA fire was directed effectively,

Troops are unloaded on high peaks and work their way down the slopes

Combat Night Air Assault

it was still essential to have tube artillery available.

Plans were made to execute a night air assault of one rifle company from the 1st of the 8th, secure an LZ close enough to the area of operations to move an artillery battery by Chinook to provide tube artillery support for the engaged rifle company.

"A" Company, 1st of the 8th, was in reserve, and thus selected to make the second night combat air assault in the history of the 1st Cav.

"A" Co, 1st of the 8th, air assaulted into the area without any prior reconnaissance, either by company or battalion commander, and most important, without prior reconnaissance by aviators of the 227th Assault Helicopter Battalion.

The landing was attempted initially with the use of flares dropped from a flare ship. The timing was unsatisfactory but final efforts to drop flares from UH-1D helicopters were successful and provided sufficient light for the pathfinders to land, set up navigational aids and guide in the remainder of the flight. Within an hour the LZ was secured, the artillery battery moved in by Chinooks and "A" Company, 1st of the 12th, was soon receiving necessary tube artillery support.

Operations continued in the Chu Pong with the rest of the 1st of the 12th going in the following day to reinforce its actions, and the remainder of the 1st of the 8th moving in to expand the night LZ and conduct further search and destroy operations. This action led to the final division level operation to clean out the Chu Pong.

A successful night combat air assault against an enemy under fire requires superb training on the part of both the supporting aviation unit and the airmobile Infantry company or battalion. There is little real difference in the conduct of an air assault at night in comparison with one under daylight conditions. The same principles of movement, firepower, command and control, intelligence and reconnaissance and logistics still apply. As in any night operation, however, little things are more important and detailed planning, rehearsals and a good standard operating procedure are most essential.

A night air assault ideally is made under the most adverse weather conditions possible in order to take advantage of the weather for the assault and gain surprise on an unsuspecting enemy. Illumination may be used, however with navigational aids and Pathfinder operations inherent in the 1st Cav today, illumination is not a requirement. Navigational aids must be included in initial planning however in order to assure that aircraft reach the LZ, execute a safe landing and return to bases.

In a night operation an advance preparation consisting of all types of firepower, including tube artillery, aerial rockets and tactical air support may be employed. I feel that an assault could also be unsupported by taking advantage of the surprise afforded by night and bad weather conditions, to seize the LZ.

Command and control is more difficult and the battalion commander must depend upon his command and control UH-1D helicopter in order to be prepared for any eventualities and changes of plans that may arise. Pre-arranged planning and SOPs are important; however, all commanders should be prepared and ready for changes and willing and ready to execute them without hesitation.

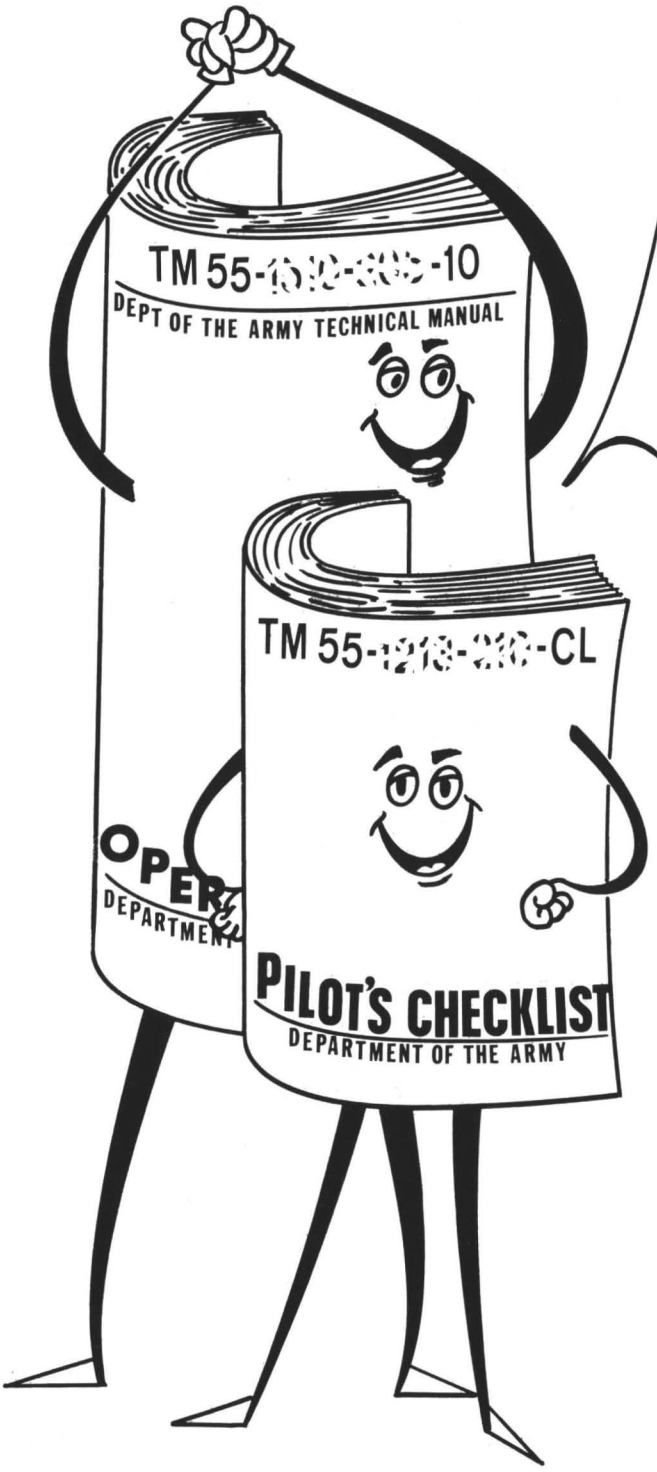
Few different problems are inherent in the logistics aspects. Resupply and medical evacuation must all be planned as in any normal air assault operation.

Intelligence and reconnaissance are more important in the initial planning to obtain best available information about the enemy, specifically his locations near the proposed LZ, weapons and reinforcement capability.

Times for H hour in the air assault vary. The time immediately after dark is desirable to take advantage of existing daylight for preparations and movement to or near the LZ. Air assaults have been conducted late at night to take advantage of darkness for movement and then be prepared to continue the assault during daylight hours. The decision on H hour must be gauged on the objective and mission of the force as well as the enemy situation.

In summary, as indicated by the two combat examples of these first night combat air assaults, night air assault operations vary little from the concepts and principles of night operations as taught in service schools and tactical operations. I contend that units, both aviation and airmobile Infantry, capable of conducting good daytime operations, which has good SOPs and effective commanders can execute a night air assault with little difficulty and little prior planning, either in bad weather or good, daylight or darkness.

The activities and operations of "A" Company, 1st Battalion, 8th Cavalry, on 3-4 November 1965 and 30 March 1966 are ample proof that night air assault operations are practical and can be successfully conducted. They have set the stage for other numerous night operations conducted not only by the 1st Cav but by other divisions and the South Vietnamese Army, supported by the elements of the 1st Aviation Brigade.



Hi—I'm Charlie Checklist. Me and my big brother Danny Dash 10 will be appearing in the AVIATION DIGEST whenever you have questions for us to answer or when we have information to pass on concerning status of and latest changes to DA checklists and dash 10s. Look for us in future issues.

Questions regarding dash 10s and checklists should be directed to:

Chief, Evaluation Division
Director of Instruction
ATTN: Charlie Checklist
U. S. Army Aviation School
Ft. Rucker, Alabama 36360

Climb To Fame

"TWA 291 this is ATC, be advised there's a helicopter at your 9 o'clock position descending out of 27,000 feet at a rate of 4,000 feet per minute"

AS 1968 DREW TO A CLOSE two Army warrant officers entered a race with time and ended the year with four new world altitude records which have been verified by the National Aeronautic Association.

CW4 James P. Ervin of Ft. Rucker, Ala., and CW3 William T. Lamb of Ft. Sill, Okla., were asked to attempt the new world marks at the Sikorsky plant in Stratford, Conn., in an off-the-shelf CH-54A Flying Crane.

Ervin explained the Crane was basically the same as any CH-54A in the Army's inventory.

"We had very little modification. The APP hoist and four-point load-levelers were removed to reduce the weight by about 2,000 pounds. Also, both hydraulic systems were pressurized, even though the only probable adverse effect would have been a slower response to the controls without equalized pressure.

On 24 Dec. Ervin and former Army aviator and Sikorsky test pilot John J. Dixon made their first attempt to set time-to-climb records and a new maximum altitude record.

"We set the 3,000 meter (9,762 feet) record in 1 minute and 48.5 seconds and the 6,000 meter (19,-

Chief Warrant Officer James P. Ervin (right) and Chief Warrant Officer William T. Lamb stand next to the CH-54A Flying Crane in which they set four official altitude records

524 feet) mark in 4 minutes .8 second. When we went through 28,000 feet we had an increase of 800 pounds in the second stage hydraulic system so we aborted our attempts for the 9,000 meter (29,286 feet) and maximum altitude records," Ervin said.

The next record attempts were made on 29 Dec. by Ervin and MAJ James H. Goodloe of Ft. Sill, Okla. They were after the 5,000 kilogram (11,023 pound) payload-to-altitude record and had reached 20,050 feet before adverse winds and excess fuel set them back. Despite several later attempts they were unable to take the record from the Soviet Union who established the record 23,461.2 feet on 26 May 1965 in a Mil 10 helicopter.

On 30 Dec. Ervin and Lamb attempted to break the horizontal flight altitude, 9,000 meter time-to-climb and absolute altitude records.

Lamb piloted the Crane to more than 9,000 meters but was .2 second shy of the 3 percent excess required for time-to-climb records. He held in level flight for 2 minutes and increased his speed from 34 knots to 45 knots. Regulations require that level flight be maintained for at least 90 seconds and airspeed must be increased. After the level flight, Lamb climbed to 34,500 feet, and made another level run and increased his airspeed.

The altitude, however, was not sufficient to set a new absolute altitude record and the camera ran out of film so the horizontal flight-at-altitude record was established at 31,280 feet, the lower level flight run.

Next Ervin and Goodloe were to attempt another 5,000 kilogram-to-altitude run.

Ervin said the temperatures were cool and the total amount of fuel had been reduced to 2,400 pounds; 3,200 pounds of fuel had been carried on the previous attempt. The men flew the aircraft to 22,217 feet which was still too low for the record.

Ervin and Lamb teamed up again for another try at the 9,000 meter time-to-climb and horizontal flight-at-altitude records.

Ervin said he had sad memories of the previous run which could not be substantiated because the camera ran out of film. Since photo certification is needed on all official record attempts he was determined he wouldn't turn the camera on until the very last minute.

In order to establish a precise timing for taking off, a light is mounted in one corner of the photo panel. This light is connected to an external power source by means of an easy disconnect coupling. Once the aircraft lifts, the coupling disconnects, the light goes out and the camera will show the precise second ground was broken by recording the time on the stop watch in the first frame that the light is not illuminated.

Ervin commented that he waited to turn the camera on until the coupling was connected. Then the tower advised him there would be a short delay, so he continued to hold off turning on the camera.

"We got the 9,000 meter time-to-climb and a higher level flight record. As we were descending Lamb scanned the gauges and asked, 'Jim, did you turn the camera off?' Then I realized we had made the run and I had not turned the camera on," Ervin stated. As a result they did not set any official new records on that run.

The final flight for the series was an attempt to beat their own time-to-climb records for 3,000 and 6,000 and to set a new 9,000 meter mark.

Ervin remarked that prior to this time they had used Sikorsky's published best rate of climb charts.

"I thought it over and decided that the cleanest air you can get is that which is coming straight down, through the top of the disc. So I decided to try a totally vertical ascension," he said.

Ervin piloted the ship straight up at vertical speeds exceeding 6,500 feet per minute with zero forward airspeed through 10,000 feet. He then switched to Sikorsky's published climb data at 20,000 feet.

Of the published official records only the U. S. Navy's F4 Phantom jet has a faster time to 3,000 meters.

When Ervin went through 30,000 feet he was still climbing at a rate of 995 feet per minute but it was too late and dark to try for the absolute altitude record. On that single run Ervin set new records for all three altitudes.

His new marks are: 3,000 meters, 1 minute and 36.8 seconds; 6,000 meters, 3 minutes and 31.5 seconds; and 9,000 meters, 7 minutes and 36.4 seconds. The Navy Grumman F8F Bearcat, considered to be the fastest climbing U. S. aircraft in World War II, took two minutes to reach 3,000 meters.

Ervin said that while the attempts carried a lot of pressure and anxiety, there were lighter moments too.

Planes were detoured around the test area by the Federal Aviation Administration's regional air traffic control center and all radio communication was tape recorded.

In listening to one of the tapes, Ervin said ATC radioed a commercial airliner flying at 17,000 feet to "be advised there's a helicopter at your 9 o'clock position descending out of 27,000 feet at a rate of 4,000 feet per minute."

Ervin said there was a brief pause, then the airline pilot exclaimed, "Good lord, you mean they're up here now?" Another pilot could be heard to ask, "What kind of helicopter is that?"

The Care And Use Of The Aircraft Repair Technician (non-rated)

The white knight, when properly used, is one of the most effective of all the chess pieces. Skillful employment of the knight is the mark of a good commander as is judicious use of the non-rated aircraft repair technician

CW2 Robert R. Vaughan Jr.

COLONEL John Hargity (Ret.) put the custom-made chess set on the polished mahogany table in front of him. He opened the case, removed the delicately carved pieces from their individual felt-lined compartments and placed them carefully on their respective squares on the chess board.

He bought the set in the Philippines in 1932, while he was assigned there as a lieutenant of Cavalry. All the white pieces were of ivory and the black were onyx. It was one of the colonel's most prized possessions.

"Good evening sir," Major Jack Thomas said as he joined the colonel in the lounge of the Officer's Club. "I'm sorry I'm a little late, but I am having some problems with replacement personnel."

"Quite all right major," COL Hargity replied. "I'm not so long retired from the Army that I can't understand administrative problems."

MAJ Thomas began arranging his chess pieces for the game. He picked up a black knight and looked at it. It was a beautifully carved figure of a knight in full armor, astride a pawing stallion. "You know," he said, "this is certainly beautiful workmanship to be wasted on a knight."

"Eh? What's that you say?" COL Hargity barked. "Wasted on a knight?"

"Yes sir, the knight is such a fine-looking chess piece, but he is probably the most useless on the board. Even a pawn can be promoted."

COL Hargity held the knight in his hand. He tested the point of the raised lance with the tip of his finger. "MAJ Thomas, the knight, when properly used, is one of the most effective of all the chess pieces. Skillful employment of the knight is the mark of a good commander."

"Really sir," MAJ Thomas laughed. "Commander? Isn't that stretching things a bit far to equate a man's ability to play chess with his ability as a commander?"

"Not at all. I specifically said that skillful employment of the knight is the mark of a good commander. Chess is the oldest game of conflict known to man, except for war. A good chess player, therefore, is a good commander, and a good commander is able to utilize all his resources, especially men, to the maximum advantage."

"I believe I can see your point sir," MAJ Thomas answered, not wanting to get any more deeply involved.

The two officers played their game, both men truly savoring every move and deriving great satisfaction from well executed plays. It shaped up as a pretty even battle for a while until the colonel, after having placed MAJ Thomas in check, reached down to his knight, and hooked it into MAJ Thomas' king. "Mate," COL Hargity said with a smile.

"Touche," MAJ Thomas answered. "You underscored your point quiet effectively."

The two men settled back in the leather chairs, to drink their drinks and conduct a post-mortem of the game. After a while COL Hargity pulled out a cigar.

"Tell me Jack," the colonel started as he held the match to the end of his cigar, "what type of administrative problems are you having?"

MAJ Thomas declined the offer

The Care And Use

of a cigar. "Maintenance officers, sir. I'm trying to get a maintenance officer, and DA wants to send me a 671B. Well, I told them right off I don't want a 671B unless they send me a 062B as well."

"You will have to forgive me, I'm afraid that I'm not current on MOS codes."

"A 671B is a maintenance officer, he is a non-rated aircraft repair technician; a non-rated warrant officer. What good is a maintenance warrant who can't fly? That's why I won't accept one unless I'm given a pilot as well."

"In other words major," COL Hargity spoke without removing the cigar from his mouth, "you're unable to make use of your manpower, so you're seeking twice as many. That smacks of your reasoning of the abilities of the knight."

"With all due respect colonel, I feel you may not understand the problems of the aviation commander. If I accept a non-rated repair technician I'm carrying dead weight. I could utilize a 671C, a rated technician much better." MAJ Thomas stirred the ice around in his drink, and avoided COL Hargity's eyes.

"Horse feathers major," the colonel exploded. "I understand maintenance, and I understand command. It is just as I said earlier this evening, a good commander is one who makes the best use of his resources and personnel. Good maintenance is the backbone of effective utilization of resources, whether the resources be helicopters or horse saddles."

"But it isn't the same thing sir. As an aviation unit commander I have mission commitments. I frequently need every pilot I can get just to meet these commitments. I can't be detailing my mission pilots to test-fly aircraft. Also, by having a rated maintenance officer I can have a pilot in reserve for mission emergencies."

"In other words, you're putting mission commitments over maintenance requirements. You don't want a maintenance officer, you want a pilot. The temptation will always be there to use your rated maintenance officer as a pilot. He will be doing more and more flying, and less maintenance. When this develops who will mind your store?" COL Hargity flipped a long ash off the end of his cigar then studied it for a minute before speaking again. "I know the Army Warrant Officer program is designed to utilize the specialties of uniquely qualified persons. A person who gets a direct appointment as an aircraft repair technician for example, has proven himself to be especially effective in aircraft maintenance. He has no other purpose in life. Maintenance is not merely an additional MOS, acquired almost as a second thought to supplement his flying.

Because his prime responsibility is maintenance, the non-rated aircraft repair technician has more time to develop an efficient maintenance operation

"Figure it this way. Because his prime responsibility is strictly maintenance he will have more time to develop liaison with supply. He will be better able to supervise the shop and won't be as prone to jump to conclusions in diagnosis.

"Also, being military, you have to think about mobility. What if your unit had to move? He would be available for supervision of the move, rather than having to fly one of the aircraft. He can conduct training and, just generally speaking, because his time is not divided, he can keep current with the unit's activities firsthand, without an after-the-fact briefing," the colonel concluded.

"I'm sure that the non-rated maintenance warrant is effective, as long as he is assigned somewhere like a depot, but I would rather have flying warrants in the field," MAJ Thomas replied, holding his ground.

"I'm sure there are advantages to having flying warrants, but I'm equally certain your non-rated warrants offer some advantages. For example, I'm sure that flying is almost a full-time profession in itself. I'm not a pilot myself of course but I've worked with them for many years. I know that you must devote a great deal of time to maintaining pilot proficiency and so forth. Your maintenance warrant devotes this additional time to maintenance proficiency.

"There is another factor to consider. I recently read a report which stated that 70 percent of all Army aviation personnel have less than two years experience. It stems in part from the rapid growth of aviation over the last few years, but it encompasses all phases of aviation from the enlisted ranks through the officer ranks. If this is the case, then it would appear to me that the non-rated repair technicians would provide some much needed experience for those units lucky enough to get them. I know young officers who have graduated from flight school and attended a brief maintenance course are doing a marvelous job, but in many cases they're trying to learn two very important professions at the same time: flying and maintenance. I'm sure that they would be among the first to welcome the stabilizing influence of a maintenance officer with proven maintenance experience."

MAJ Thomas had listened respectfully during the colonel's

monologue. He chose his words carefully, because although he didn't wish to offend the colonel, he still disagreed with him. "Perhaps what you say is true sir, however, I just don't believe that a maintenance officer who does not fly, can be as effective as one who does. Regardless of their relative experience."

"Have you ever heard of Colin Chapman?" COL Hargity asked.

"No sir, I can't say that I have."'

"He designs, builds and supervises the maintenance on his racing cars. Very fine racing cars as a matter of fact. His cars have established many records in international racing."

"I don't get the connection sir."

"Perhaps there is none, just allow an old soldier to ramble for a bit. By the way, does your wife drive?"

"Yes sir," MAJ Thomas answered. He was glad that the colonel had finally changed the subject, albeit a bit abruptly.

"So does my wife," the colonel answered. "She is a pretty good driver too, very careful and quite safe. But bless her heart, the only thing she knows about a car is how to make it go and how to make it stop."

"That's just the way it is with Linda. I guess most wives are about the same there," MAJ Thomas agreed with a chuckle.

"Wouldn't know a fuel pump from a hub cap," COL Hargity laughed.

"That's right sir, that's truly right," MAJ Thomas agreed "I remember one time I had Linda convinced that she needed to change the air in her tires every 5,000 miles," MAJ Thomas answered, remembering the look on the service station attendant's face when Linda asked him to do it. He had gotten quite a chuckle over that.

COL Hargity joined in his laughter. "You would think," he paused a wipe a tear from the corner of his eye, "that the very fact that they can drive would make them a little more cognizant of the maintenance, wouldn't you?"

MAJ Thomas suspected a trap.

"Of course now, you take Colin Chapman." The colonel had stopped laughing, and ground his cigar out in the ash tray. He looked at MAJ Thomas with a twinkle in his eye. "There he is building all those fine racing cars, but he never drives them."

MAJ Thomas sat silently for a few minutes, then leaned over and picked up the colonel's victorious white knight. He carried it over to the phone and dialed a number. He admired the grace and beauty of the piece while he waited for the phone to be answered at the other end of the line.

"Lieutenant Pretorious, this is MAJ Thomas. I've been thinking about that 671B, and I believe that he may be just what we are looking for."

"Yes sir," LT Pretorious answered from the other end. "Incidentally sir, what made you change your mind?"

"Lieutenant, would you believe a white knight?"

With all due respect colonel, I feel you may not understand the problems of the aviation commander

Hangar Flying!

why not?

Instructor Pilots

Branch II, Flight VI
Adv Inst Flt Div
Dept of Rotary Wing Tng
Ft. Rucker, Ala.

IN DAYS OF YESTERYEAR there was little written in the way of pilot handbooks or acquired data about the science of airfoil aerodynamics and the corresponding flight envelopes for the then existing flying machines. Those were the days when the "takeoff" was described as a direct defiance of the laws of nature, and a "landing" was accomplished in accordance with the laws of gravity. Those were the days of bronzed and wind-burned pilots who gained reputations as much by luck as by knowledge, skill and experience.

Hangar flying was a principle pastime in those days and pilots eagerly welcomed the opportunity to participate. During those bull sessions, ideas were avidly exchanged and a portion of the gap created by non-existent handbooks and technical publications was filled. The field open to discussion was unlimited and experiences were exchanged without fear of exposing an individual's ignorance. It was accepted that pilots who ask questions usually have a pertinent opinion of their own.

The art of flying has progressed vastly in the last half century, yet the field for discussion remains unlimited. Volumes of experiences and ideas unfortunately go unwritten and untold.

As a point of discussion . . . instructor pilots were recently asked to relate lessons learned from experience. The subject question was basic, though broad in scope: "How can aircraft accidents and resultant personal injury be averted?" The response was instantaneous and the replies certainly proved the field for discussion was unlimited. Some were verbose in their replies, others short and to the point; as if it may have been yesterday's moment of sheer terror

or perhaps tomorrrow's nightmare. All were thought provoking and deserving of being flown again . . . this time IN THE HANGAR.

Here is what our hangar flights consisted of:

—"The time was 0330 . . . the ceiling could not have been more than 400 feet . . . and the air was heavy with moisture. Trail was calling lead that his flight of 10 slicks was airborne in a loose trail formation. With a tired but crisp 'roger' the platoon leader turned the flight toward the staging airfield. Five minutes later lead spotted a break in the overcast and decided to go 'VFR on top' to avoid enemy fire. As we climbed upward, the hole began closing and the tops were not in sight. Suddenly the lights of the other aircraft were our only visible horizon. With my copilot on the controls, I kept my eyes on the other aircraft to avoid a possible mid-air collision. Suddenly, I sensed that something was wrong when the aircraft began to feel mushy. A quick glance at the instruments revealed we had decelerated to 20 knots and were ascending through 4,000 feet. Peering outside . . . the lights of the other aircraft were gone. Returning to the instruments, I decisively said 'I've got it' and gently nosed the aircraft forward regaining aircraft control. Establishing normal cruise flight, I returned to the home base radio beacon and let down to a safe landing.

"What had happened? Inadvertent IFR and a new pilot with inexperience had allowed the aircraft to slow to a near disastrous condition. But, what about me? With fixation on the other aircraft and my head well out of the cockpit, I had gone to sleep at the switch!"

—"Several times I have saved myself a potential accident by making a thorough preflight. Experience has shown that a searching preflight inspection is especially important during periods of extremely hot or cold weather; for it is during these periods that line crews usually overlook items in their haste to return to the comforts of a cooled or heated office. Had I not checked my aircraft completely, I may have become an accident statistic."

—"I experienced difficulty in lowering the collective during a practice autorotation due to items contained in the lower left pocket of my flight suit. A half lowered collective with decaying rotor rpm is hardly the time to try and free a recent copy of PLAYBOY from your pocket. Items wrongly placed in pockets or on the surface of a flight suit may not only present a potential flying hazard, but could additionally induce personal injury in the event of an accident."

—"I think a professional attitude is important and remaining current with the ever-changing regulations, publications and directives which influence my flying is a necessity. I will not indiscriminately exceed the operating limitations without regard to the urgency of the mission. When the situation deems it necessary to exceed known limitations or if I should do so inadvertently, I will so enter it in the aircraft log book. Not once have I been criticized for any such entry and as a result someone else may have been spared an accident. When it comes to flying, I consider myself my most conscientious critic; a consideration truly essential to being a professional aviator."

—"One of the most difficult questions which I have had to answer when encountering marginal weather is, 'Should I continue or turn back?' In this respect I have continually disciplined myself to observe a number of fundamental phrases, which I repeat often. (1) The weather moves faster than the reporting system. (2) The weather is liable to get worse before getting better. (3) Many a beautiful cloud has a rocky lining. (4) The safest and wisest flight maneuver is often the 180 degree turn. (5) Think of the gust spread, not just the wind velocity. (6) Large metropolitan areas mean smog and haze. (7) One pair of eyes looking outside the cockpit is worth two pair scanning the instrument panel during cruise; and four pair watching during climbout or descent. (8) Every pilot has the authority and is duty-bound to recall these phrases before and during each flight."

—"I consider planning and staying ahead of my aircraft a most crucial element of safe flight. Continually, I am ready with a course of action should I lose an engine during a flight. Don't rely on instinct; expect trouble and plan ahead. Not only do I have my reactions ready, I also maintain a constant awareness of my position and keep the radios tuned to the frequencies which can best afford assistance in time of emergency need."

—"You do not have to look at me very long to tell that I have experienced the horror of fire and can authoritatively offer many do's and don'ts. (1) Do not remove your helmet prior to exiting a crash involving fire. (2) Keep the helmet visor lowered to protect the eyes

A half lowered collective during an autorotation is hardly the time to try and free a copy of a magazine from your pocket

from being seared. (3) Do not wear synthetic clothing, such as nylon shorts, socks or the Vietnam style jungle boots. This material, when subjected to extreme heat, will melt and adhere to your skin and cause more serious burn injuries. (4) Wear your gloves with the gauntlets up, and free of rips or tears as protection against flash fire and hot metal. (5) Avoid breathing the superheated air when exiting through a fire as it may mean the difference between scarred or healthy lungs. (6) Wear a fire retardant or resistant flight suit. (7) Keep the sleeves of your flight suit rolled down. (8) Depart the aircraft upwind if possible to lessen your exposure time to heat, flames, smoke and fumes.

"I wish I had known all these points before I had my fire. Maybe you will!"

Well, as you may have already sensed; when it comes to HANGAR FLYING, the field is wide open. All pilots have acquired a tale or two to relate; usually an experience evolved which was new and which they would rather not duplicate.

Army aviation is a profession as demanding as any you will ever find and lest you forget, there is a Weekly Aircraft Accident Summary that is guaranteed to jolt your memory into focus.

You who wear the wings have the necessary ingredients . . . good judgment, balanced personality and nerves a great deal stronger than twine. Now that it is known you have what it takes, let's ask ourselves the age old questions. (1) Am I ready to react promptly and intelligently under pressure? (2) Do I have a reasonable course of action in mind if I encounter any unexpected situations?

The answer to the first question should be "yes" for any given flying day. However, if the answer is "no," you should not attempt a flight until the answer is resolved in the affirmative.

You can best answer question two and decrease the probability of disaster by adhering to the following: (1) Know your capabilities to fly in all situations including instrument flight and never exceed these capabilities. (2) Listen to the voices of experience and heed their good advice. (3) Learn all you can about your aircraft and weather. (4) Plan your flight carefully. (5) Keep a weather eye out. (6) Master temptation with good judgment, for avoidance of a potentially dangerous act may spare you from becoming an accident statistic.

HANGARS are where flying should start and end. Why not start your own hangar flying service today? Someone may plant a rose in fertile soil and all will be delighted by the result. The experience gained from the hangar flying is free.

What will your next experience cost?

Annual Minimums

Some aviators in waived areas return to CONUS with little or no concept of what is required of them to meet their semi-annual and annual minimums. By planning ahead, these aviators can avoid the last-minute-rush traffic and also a possible confrontation with a flight evaluation board

Lieutenant Colonel Roger D. Byrd

WELCOME! GLAD to see you back. Now that you've returned from Vietnam, one of the things you are probably interested in is where you stand with annual minimums. If you're not, you should be as you might have to make an appearance before an FEB (Flight Evaluation Board).

What seems to be such a simple thing on the surface sure does cause a lot of misunderstanding. So let's take a look at it.

Department of the Army has waived portions of annual minimums for certain areas of operations. These are the requirements for night (N), instrument or hood (I) and cross-country (X-C). The total time of 30 hours semi-annually and 80 hours annually is not waived. It is important to note that the requirements will be prorated.

Aviators fall into two groups for computation of minimums requirements. (NOTE: These groups are only intended to simplify this article and are not used elsewhere.) They are:

Group I—Those aviators who departed for a waived area in one fiscal year (FY) and return in another. For example: An aviator who arrives in the Republic of Vietnam on 1 Sep 67 and returns to CONUS signing in for duty 1 Oct 68.

Group II—Those aviators who depart and return in the same fiscal year as often happens when an aviator is wounded and returned to CONUS. For example: An aviator arrives in Vietnam 1 Oct 68, is returned to CONUS for some reason and signs in for duty 1 Apr 69. The key dates to keep in mind are:

One, the date of arrival in the waived area, as this begins the waived time.

Two, the date the aviator signs in at his new duty station in an unwaived area (CONUS, USAREUR, etc.) as this terminates the waived time.

After you have determined your minimums you want to know if you have accomplished them fully. Remember, all that has been waived is a portion of the *requirements*. Here we have two, possibly three, requirements to meet. These are:

- Those required for the first half of the FY. Unless, of course, the entire first half was spent in a waivered area.
- Those required for the second half of the FY.
- Those required to satisfy total annual minimums.

All flight time accomplished during the year, no matter where it is done, applies toward the annual requirement. *All* flight time accomplished during the appropriate half of the FY applies toward semi-annual requirements for that half. For example: All flight time flown during the period 1 July through 31 December will apply to satisfying requirements for annual minimums and for semi-annual minimums for the first half of the FY. This time cannot be applied towards satisfying semi-annual minimums for the second half of the FY. I know this sounds simple and basic but you'd be surprised at the number of aviators who don't realize this.

Now, after all this discussion, let's get down to using the chart. First, directions on how to use the chart and then some examples.

FOR GROUP I AVIATORS: Determine requirements as follows:

1. Determine date in Column 1 nearest to date subject person signed in for duty from waivered area.
2. Read across for appropriate semi-annual and annual flight minimum requirements.

Next apply flight time accomplished as follows:

1. Any time flown during the fiscal year will apply towards completion of annual requirements.
2. Any time flown during the *first* six months of the fiscal year will apply towards semi-annual minimums required during the *first* half.
3. Any time flown during the *second* six months of the fiscal year will apply towards semi-annual minimums required during the *second* half.

FOR GROUP II AVIATORS. Determine requirements as follows:

1. Determine *semi-annual* minimums by entering at date in first column nearest to date signed in for duty from waived area. Read across for *semi-annual* minimums remaining.
2. Determine *annual* minimums as follows:

a. Enter Column 1 at date nearest to date of arrival in waived area. Read across to annual

minimums. Subtract these figures from the figures in parenthesis at the top of the columns.

b. Enter at date in first column nearest to date signed in for duty from waived area. Read across for annual minimums requirement remaining.

c. Add the results of a and b above. These are the annual minimums required.

Apply flight time accomplished as in GROUP I.

Let's take three examples and follow them through. (NOTE: Since cross-country time figures work the same as instrument, they have been omitted to gain some clarity. Just remember to compute your X-C.)

Example 1 (GROUP I TYPE). Aviator A arrived in Vietnam on 1 Sep 67. He completed his tour, returned to CONUS and after leave signed in at his new duty station on 5 Oct 68. Requirements for first and second half semi-annual and annual minimums need to be determined. Entering on line *1 Oct* and proceeding across we see that Aviator A's requirements are:

• 2.5 hours of night and 3.5 hours of instrument/hood for first half semi-annual minimums.

• Second half semi-annual requirements are not changed from the normal.

• 11.3 hours of night and 15.0 hours of instrument/hood prior to 1 Jul 69.

Next applying the flight time he had flown in July and August (1.5 night and 1.2 hood) prior to returning to CONUS, we find that Aviator A must fly:

• At least 1.0 hours of night and 2.3 hours of instrument/hood prior to 1 Jan 69.

• Normal semi-annual minimums between 1 Jun 69 and 30 Jun 69.

• At least 9.8 hours of night and 13.8 hours of instrument/hood prior to 1 Jul 69.

• A total of at least 9.8 hours of night and 13.8 hours to satisfy all requirements.

Example 2 (GROUP II TYPE). Aviator B arrived in Vietnam on 6 Oct 68.

From 1 Jul 68 through 5 Oct 68 he had flown 2.5 hours of night and 3.5 hours of hood. From 6 Oct 68 up until the time he was wounded, he had flown 4.1 hours night and no time instrument/hood. In December he was wounded and was returned to CONUS. After several months in the hospital and leave, he reported in to his new duty station on 3 Apr 69. Requirements for second half semi-annual and annual mimimums need to be determined.

First entering on line *1 Apr* we see:

1. 2.5 hours of night and 3.5 hours of instrument/hood are required for second half semi-annual minimums.

2. 3.7 hours of night and 5.0 hours of instrument/hood are remaining for annual minimums.

Second, since he arrived in Vietnam on 6 Oct 68, there are some additional annual minimums to be computed. Entering on line *1 Oct* we find under ANNUAL REQUIREMENTS 11.3 night and 15.0 instrument/hood. Following the directions and subtracting these figures from those in parenthesis at the head of the column, we have 2.7 night and 5.0 instrument/hood. Adding these to the remaining annual minimums determined in 2 above, we determine Aviator B's annual minimum requirements are:

• 6.4 hours night and 10.0 hours instrument/hood.

Next applying the flight time flown from 1 Jul 68 until he was wounded (6.6 night and 3.5 hood) we find that Aviator B must fly:

1. 2.5 hours of night and 3.5 hours of instrument/hood to satisfy second half semi-annual minimums requirements.

2. No hours of night and 6.5 hours of instrument/hood to satisfy annual minimums requirements.

3. A total of at least 2.5 hours of night and 6.5 hours of instrument/hood to satisfy all requirements.

We also note that if Aviator B had continued in Vietnam and not flown any instrument/hood, he would *NOT* have accomplished his prorated annual minimums. He had satisfied first half semi-annual with his 3.5 hours of hood but for the annual minimums, 5.0 hours were required.

Example 3. Aviator C arrived in Vietnam 6 Mar 68. During the period 1 Jul 68 through 31 Dec 68, he flew 9.3 hours night and 1.5 hours instrument. From 1 Jan 69 through 6 Mar 69, he flew 0.6 hours night and 1.0 hours instrument. He completed his tour, was transferred to Germany, arriving there and signing in at his new duty station on 10 Apr 69. Requirements for the second half semi-annual and annual minimums need to be determined. Entering the chart on line *15 Apr,* we determine Aviator C's requirements to be:

• 2.1 hours night and 2.9 hours instrument/hood for semi-annual minimums.

• 3.1 hours night and 4.1 hours instrument/hood for annual minimums.

Applying the flight time flown from July 68 through March 69, we see that Aviator C must fly:

• 1.5 hours of night and 1.9 hours of instrument/hood to satisfy semi-annual minimums requirements.

• No hours of night and 1.6 hours of instrument/hood to satisfy annual minimums requirements.

• A total of at least 1.5 hours night and 1.9 hours instrument/hood to fulfill all requirements.

A lot of ground has been covered here. I suggest you pick out only your particular situation to follow through, it's less confusing. Above all there are several important points I would make.

Annual Minimums For Waived Area Returnees

	Semi-Annual Requirements				Annual Requirements	
	1st Half		2nd Half		N	I or X-C
DATE	N	I or X-C	N	I or X-C	(15)	(20)
15 Jul	4.6	6.4	5	7	14.4	19.2
1 Aug	4.2	5.8		do	13.8	18.3
15 Aug	3.8	5.3		do	13.2	17.5
1 Sep	3.4	4.7		do	12.5	16.6
15 Sep	3.0	4.1		do	11.9	15.8
1 Oct	2.5	3.5		do	11.3	15.0
15 Oct	2.1	2.9		do	10.7	14.1
1 Nov	1.7	2.3		do	10.1	13.3
15 Nov	1.3	1.7		do	9.4	12.4
1 Dec	0.9	1.1		do	8.8	11.6
15 Dec	0.5	0.6		do	8.2	10.8
1 Jan	None			do	7.5	10.0
15 Jan			4.6	6.4	6.9	9.1
1 Feb			4.2	5.8	6.3	8.3
15 Feb			3.8	5.3	5.6	7.4
1 Mar			3.4	4.7	5.0	6.6
15 Mar			3.0	4.1	4.4	5.8
1 Apr			2.5	3.5	3.7	5.0
15 Apr			2.1	2.9	3.1	4.1
1 May			1.7	2.3	2.5	3.3
15 May			1.3	1.7	1.8	2.4
1 Jun			0.9	1.1	1.2	1.6
15 Jun			0.5	0.6	0.6	0.8

N = Night

I = Inst, Hood or Synthetic Trainers (No attempt has been made to separate Synthetic Trainer time.)

X-C = Cross Country

• Compute your requirements well ahead of time either going to or coming from a waived area. Then get out and get the time. It could save you time, embarrassment, arguments, money and maybe a visit to your local FEB.

• While in a waived area try to get some of that night and instrument/hood time. Instrument rated aviators in Vietnam flying helicopters with instruments (UH-1s) on some of the administrative flights can get hood time. Of course, there are times when it is virtually impossible to do any of this. All I suggest is, get it when you can.

• Remember you have two requirements to satisfy, semi-annual and annual. And as you have seen, accomplishing the annual does not necessarily mean you have completed the semi-annual.

• And one final point which wasn't discussed above but which is quite important. That is to be sure you have taken the *latest* annual written examination. Having taken last year's writ in the current fiscal year is not satisfactory. In other words you must take the 1969 writ during FY 69.

Developments In Airmobility

Lieutenant Colonel Donald F. Harrison
Office, Chief of Military History

TRANSPORTATION throughout the ages has significantly affected the outcome of famous military campaigns. Victory has usually gone to the armies which have been able to move most swiftly and to get there "fustest with the mostest," as Nathan B. Forrest expressed it.

Consider the mobility afforded by Alexander's phalanx, Hannibal's elephants, and Genghis Khan's cavalry. Consider the great foot marches of the French Revolutionary Army, or Longstreet's now famous detachment from Lee's army to join Bragg at Chickamauga—by railroad. Consider the use of Paris taxicabs that brought two fresh regiments of French Infantry to General Maunoury. Consider those surprised Russian soldiers, knee deep in tundra mud, as ski-borne Finns swooped upon them with blinding speed. Consider General Guederian's panzers and General Maxwell Taylor's parachutists.

The dynamic consequences of ignoring the time and space factor have not been lost on the modern commander. The nature of the tactical atomic battlefield dictates widespread dispersion in the defense. But in the attack, the critical factor is the ability of an army to mass quickly for a maneuver, then revert to its former posture of dispersion. During such operations the side possessing the greater ability to cross obstacles has an enormous advantage.

Several methods of achieving this mobility advantage have been advanced. One is the parachute which can drop equipment with considerable accuracy, but spreads troops over large areas and leaves them woefully immobile.

Gliders were used in an effort to boost mobility in World War II, but suffered too many casualties. However, the helicopter soon was on the scene and proved infinitely more efficient. It did not require an airstrip for takeoff and landing or expensive and time-consuming parachute training. The troops it carried into battle needed little more orientation than it takes to teach a man to fasten his safety belt and leap out the side door. If a soldier is unfortunate enough to become a casualty, this remarkable machine can quickly evacuate him to a hospital and greatly increase his survival chances. The helicopter can introduce fresh supplies to the battlefield as easily as it had

In The United States Army

The 11th Air Assault Division demonstrated its potential when it was pitted against the crack 82nd Airborne Division in maneuvers

carried in the first troops. It is an aerial truck, an ambulance, a weapons platform, and it needs neither road nor bridge.

Relatively speaking, rotary wing aircraft are aviation youngsters. Their lineage runs back to the autogiro which was first successfully produced and flown by a Spanish inventor, Juan de la Cierva y Cordornia, in the 1920s.

Basically, Cierva's design resembled a standard biplane with the upper wing removed. In its stead was a large, rotating propeller-like wing, mounted vertically on a shaft just in front of the pilot's cockpit. Cierva added a clutch arrangement between the shaft of the front propeller and that of the rotating wing so that in taking off he could switch the power for a few seconds to the rotating wing, thus pulling the machine upward as well as forward and enabling it to be airborne within 5 to 10 feet of runway. Once in the air, with power applied to the forward propeller, the rotating wing turned with the air currents and complemented the lower wing with aeronautical lift.

Interest in Cierva's machine soon took root in the United States. Harold Pitcairn, a Cierva engineer, brought a model to America and secured rights to manufacture it. By 1930, three firms were producing models. Two of these firms, Kellett and Pitcairn, sold experimental models to the U. S. Army Air Corps for testing. Enthusiasm spread throughout the military over the dramatic possibilities of this new machine, particularly among artillerymen. The 108th Field Artillery, a Philadelphia National Guard unit, tested an autogiro at Indiantown Gap Military Reservation in the 1937 encampment and found it uniquely suited to adjusting and shifting artillery fire. But violent and unexplained in-flight vibrations forced the Army to cancel tests in 1942.

Although similar to the autogiro in appearance, the helicopter operates on a different principle. Autogiro engine power is transmitted to the forward propeller in level flight and air currents passing over the rotor act upon it as a gliding wing. In the helicopter, engine power is transmitted directly to the main rotor. There is no other wing or forward propeller.

The first successful helicopter was produced in 1937 in Germany. Piloted by the now famous Miss

An Air Force R-5 rescue helicopter evacuates a casualty from an Army unit at the front in Korea early in the war

Hanna Reitsch, the craft made a spectacular demonstration in the Berlin sports arena, a building comparable to New York's Madison Square Garden. Later it flew cross-country from Bremen to Berlin at an average speed of 75 miles per hour. In other tests, it reached an altitude of 11,700 feet.

The success of the German helicopter helped spark interest in the United States where Congress appropriated money to develop rotary wing technical know-how both during and after World War II. Manufacturers came up with several working models.

The Army Air Forces initially evaluated the R-1 (Platt-LePage); the R-2 and R-3 (both were made by Kellett and were modifications of autogiros); and the R-4 (Sikorsky). The Sikorsky proved most practical and the Army obtained over 400 (models R-4 through R-6) for war service.

Most of the Sikorsky helicopters were retained in the United States for testing, but some performed valuable service in air-sea rescue duty.

By a circuitous route, four Sikorsky R-4s eventually reached the China-Burma-India Theater, where the first known use of the helicopter for medical evacuation, certainly the first from behind enemy lines, occurred. In late 1942 or early 1943 a light airplane carrying three casualties was forced down behind enemy lines. An R-4 belonging to 1st Air Commando Group commanded by Colonel Philip D. Cochran, managed to rescue the men one by one. This triggered the regular use of the R-4 in the medical evacuation role.

Others R-4s found their way to the Philippines, where, in the latter stages of the campaign, the 38th Infantry Division used them to evacuate sick and wounded from inaccessible mountain positions, obviating the need for dangerous and tiring stretcher-bearing.

When the Korean War started, the U. S. Air Force had most of the helicopters; only a few models (Bell OH-13s) were organic to the Army. Terrain and tactics in Korea made helicopters particularly desirable. The landing strip problem was bypassed; choppers could land almost anywhere and anytime at the pleasure of the pilot. Regimental and battalion commanders found that they were able for the first time to move back and forth between their headquarters and the front lines several times a day. This enabled them to have accurate, firsthand knowledge of the fighting.

As early as July 1950, Air Force air-sea rescue helicopters assisted Army units with aeromedical evacuation of wounded soldiers. Before long, the air-sea rescue service was far busier with Army than with Air Force requests. It didn't take long for the U. S. Army Surgeon General in Washington to request, and get, Army H-13 helicopters in Korea for aeromedical evacuation missions.

It was the larger troop and cargo carrying machines that provided the cornerstone of the airmobile concept. Once in-country, the twelve-place H-19 helicopters soon began to fly cargo forward, much as trucks do, then return with wounded. Seventy-eight H-19s reached Korea by January 1953. Although too late to affect the outcome of the fighting, their record was nevertheless impressive enough to warrant the personal attention of the Eighth Army Commander, General Maxwell D. Taylor. At that time, H-19s were controlled by the U. S. Army Transportation Corps, and the current thinking was to use them in a logistical role. But General Taylor was particularly interested in the tactical implications of carrying infantrymen into the assault.

Two helicopter companies (the 6th and 13th Transportation Companies) marked an important milestone in aviation history in June 1953, when they replaced one frontline Republic of Korea infantry company with another, a technique a United States Marine heli-

copter squadron used with Marine infantrymen two years earlier.

The advantages of transporting troops by helicopter into combat became clearly apparent in the United States. As early as July 1952, Secretary of the Army, Frank Pace Jr., recognized the far-reaching and revolutionary concepts inherent in the application of the machine to the battlefield, and promoted research and development into plans for new models and new applications. One of his most important contributions was to encourage the aircraft industry to improve the state-of-the-art of the helicopter.

Another advocate of the helicopter was Major General James M. Gavin. In 1954 he pointed out that the cavalry started out on the back of an animal, and later switched to armored vehicles, and if Lieutenant General Walton H. Walker's Eighth Army cavalry in Korea could have been switched to helicopters, 30 Chinese divisions may not have been able to strike with such complete and overwhelming surprise in 1950.

General Matthew B. Ridgway, as Army Chief of Staff in January 1955, reorganized Army aviation, thus providing a sound foundation for expansion and future development of the airmobile concept. Prophetically, he chose as his first Director of Army Aviation, Major General Hamilton Howze, one of the leading exponents of this concept. General Ridgway also spoke to the public and had numerous writings published. He spoke to Congress; he briefed Army Secretary Wilbur M. Brucker on several occasions. General Ridgway's reorganization also included the establishment of the U. S. Army Aviation Center at Camp Rucker, Ala., which also housed the U. S. Army Aviation School.

Under General Howze's leadership, the airmobile concept surged forward. General Gavin's theories led General Howze to adopt the "sky cav" idea, really a reconnaissance unit mounted in helicopters. The concept was tested under several names, but all had the same objective: the eyes and ears of the commander were being extended farther and faster to do a better job.

Integrating the use of the helicopter into infantry operations was slower in taking shape. Operation Sagebrush, a joint Army-Air Force maneuver in 1955, tested many concepts, including aerial cavalry and a limited amount of infantry transport. But progress was slow in coming.

By the turn of the decade the United States changed from its previous defense posture of massive aerial retaliation to a more flexible response to the Soviet threat with beefed up conventional ground forces. To this end, Secretary of Defense Robert S. McNamara, almost immediately after taking office, ordered a study on the condition of Army mobility and asked for an estimate of the equipment needed to reach a satisfactory level.

Not satisfied with the answers he got from this study, Secretary McNamara convened a powerful group of officers, the Army Tactical Mobility Requirement Board which commonly has been called the Howze Board after its chairman, General Howze. The board consisted of 14 generals, 6 high ranking civilian research officials and more than 30 highly experienced but lower ranking Army officers.

Secretary McNamara gave General Howze the task of studying the entire role of Army aviation and its application to airmobility. The Secretary advised the board to give little regard to traditional military doctrine. General Howze was to study "new organizational and operational concepts, possibly including completely airmobile infantry, artillery, anti-tank and reconnaissance units. . . ."

General Howze's report to the Secretary of Defense, a masterpiece considering limitations of time and resources, recommended complete integration of airmobility into the Army field force struc-

H-19's of the 6th Transportation Company (Helicopter) leave a marshalling area in Korea in the spring of 1953 to transport troops to the front lines

General Hamilton H. Howze (right) headed the Army Tactical Mobility Requirement Board which spawned the 11th Air Assault Division (T) and eventually the 1st Cavalry Division (Airmobile), both of which were initially commanded by Lieutenant General Harry W. O. Kinnard (left)

ture, in balance with other tactical concepts. That is to say, General Howze wanted to enhance the ability of not only infantry units to move about the battlefield by air, but also cavalry units, artillery units and logistical units.

In addition to improving the airmobility of all Army units General Howze recommended that specialized, completely airmobile divisions be formed immediately. These divisions he called air assault divisions, their combat troops to be 100 percent air-transportable. He recommended light air-transportable weapons and aircraft-mounted rockets to substitute for heavy artillery. The recommendations had the effect of doubling the number of aircraft in the normal infantry division (from 50 to 101) and increasing this fourfold in the air assault division (459).

Secretary McNamara's reaction to this recommendation in the report was to order a complete field test of the new division. For this he selected Major General Harry W. O. Kinnard, an experienced and decorated parachute officer who had been interested from the beginning in the possible application of helicopters to infantry maneuver.

General Kinnard set up the skeleton of an air assault division at Ft. Benning, Ga.—about 3,000 men. Secretary McNamara requested an authorization from Congress for an additional 15,000 men in fiscal year 1964 to permit filling the division. General Kinnard worked diligently at Benning, training his officers and men from scratch. This involved familiarizing them with the aircraft. How much could it carry? How fast could it fly, how high and how far? What were the best routes to use in an attack to avoid anti-aircraft fire? To attain surprise? To maintain control?

By January 1964, General Kinnard built his organization into two airmobile brigades of three battalions each. He smoothed out the rudimentary tactical procedures and wanted to test them. He started maneuvering first with a battalion, then enlarged the test to accommodate a brigade. When he was satisfied that the concepts and techniques worked, he was ready to test the entire division.

The high cost of the helicopters being what it was, Army planners had to be satisfied that the air assault division's superior mobility would offset the taxpayers' investment. Air Assault II, the last and most important test, pitted General Kinnard's division against the Army's crack 82nd Airborne Division in a leased maneuver area of 4.5 million acres, stretching from Fayetteville, N. C., to Columbia, S. C. All concerned concluded that though the division was naturally hindered by bad weather and was vulnerable to tank attack, its mobility was characterized by a remarkable high tempo of operation and extremely short reaction time. It could fight in several directions at once, and over a unusually large area. Secretary McNamara was convinced.

After three years of study, experimentation, field testing and evaluation, the Secretary of Defense on 16 June 1965 gave approval for the Army to proceed with the organization of an airmobile division as part of the active combat Army forces. The division selected for this honor was the famed 1st Cavalry Division and the test unit was renamed the 1st Cavalry Division (Airmobile). Eager to prove a point, the Army sent the division on its way to combat in the Vietnam highlands by the middle of the following month.

Airmobility is the concept of today, although in the future it may not employ the helicopter. As aviation technology progresses, some other kind of aerial vehicle will wing our soldiers across rivers, tree tops and swamps, maybe only a few feet above the ground, maybe singly or in small groups. At any rate, the object is not airpower; it is not aerial combat. The object is to get our soldiers from one point on the ground to another. For that is where the soldier has always fought and always will fight and air travel will get him there first.

TRACO

Universal Engine Trainer Device

This trainer can simulate engine seizures, hot starts, engine surges and compressor stalls—in fact, it can do everything but fly

Major Richard H. Seignious

IN A CONTINUING effort to provide the commander with the best trained helicopter mechanics and aviators, the Army Aviation School uses many types of training aids to reinforce its instruction. One new type of training aid costs $270,000.

I hope this article will help you understand this training aid, and realize it is worth every penny spent for it.

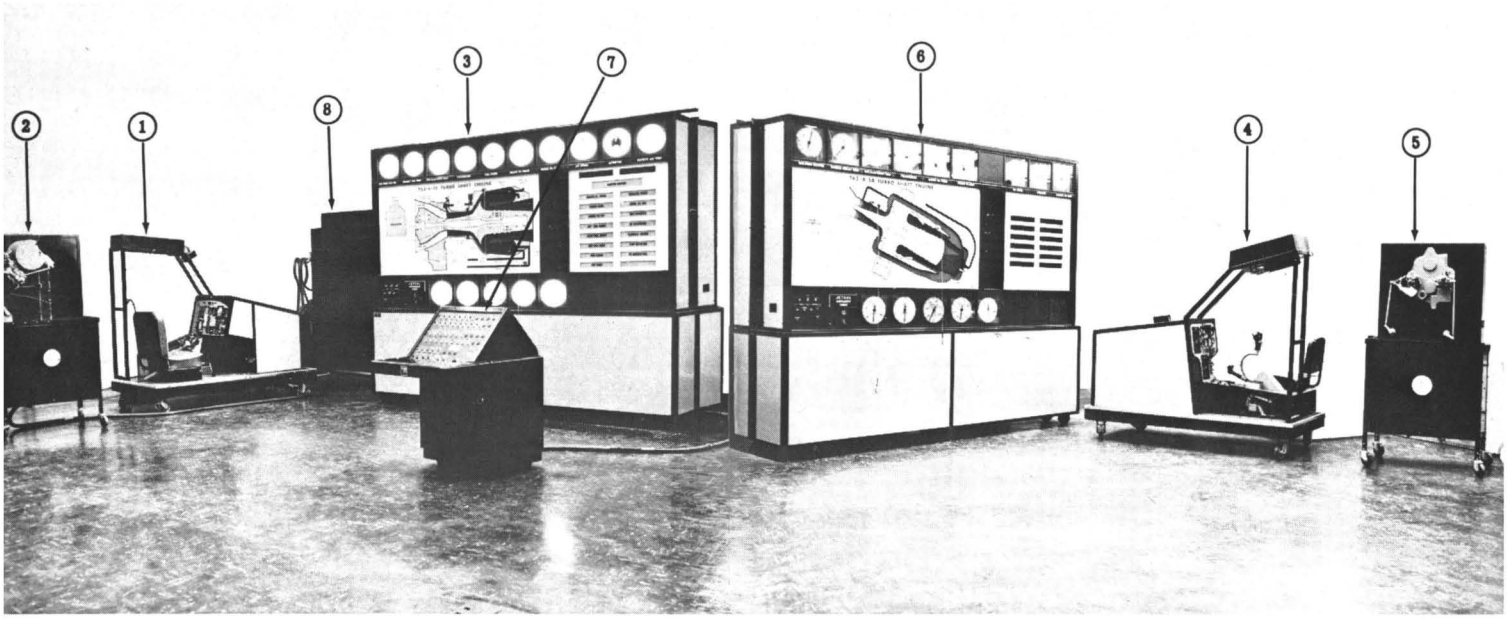
The training aid I refer to is the Universal Engine Trainer, Device 2A27B, commonly referred to as the TRACO. The TRACO is manufactured by the Trainer Corporation of America located in Buffalo, N. Y., and is presently being used by the Department of Maintenance Training at Ft. Rucker, Ala.

The original 2A27 engine simulator for the U. S. Army was placed on contract 26 June 1962 and also is presently in use at Ft. Rucker. It was originally designed for the T-53-L3 OV-1 Mohawk engine and has recently been updated to the T-53-L7 engine. There is a 2A27 engine simulator at Ft. Eustis, Va., used with the UH-1 and CH-47 for the T-53-L11 and T-55-L5 engines.

The 2A27B engine simulator is designed to familiarize flight and maintenance personnel with the operation of the T-53-L-13 gas turbine engine used on the AH-1G and UH-1H model helicopters and the T-63-A-5A gas turbine engine used on the OH-6A helicopter. The trainer provides instruction in the various procedures pertinent to the operation of either engine as installed in their respective aircraft. Provisions are also made to demonstrate the change in engine performance caused by changes in atmospheric conditions, malfunction of the engine or system components and improper operating procedures. The trainer is completely self-contained and consists of the seven components.

The trainer's cockpit station (1) and (4) is a replica of the actual cockpit in the UH-1D/H and OH-6A respectively. All controls relative to engine operation, including related flight indicators are functional. The switches and controls provide input data for the computer and result in visual and aural indications of engine operation.

The fuel control (2) consists of an actual fuel control subassembly casting with internal computing equipment. Adjustments on the fuel control are exact duplicates of the adjustments in the aircraft, and their use causes visual and aural responses on the display panel which simulate the responses



Universal Engine Trainer, Device 2427B

1. UH-1D Trainee's Cockpit Station
2. UH-1D Fuel Control
3. UH-1D Engine Display Panel
4. OH-6A Trainee's Cockpit Station
5. OH-6A Fuel Control
6. OH-6A Engine Display Panel
7. Instructor's Station
8. Analog Computer

of the actual engine. These adjustments permit the student to trim the engine performance and obtain actual practice in adjusting the fuel control unit. This also permits the instructor to demonstrate the effect of an improper adjustment on engine operation without fear of damaging any of the components.

The instructor's station (7) is a console containing switches and controls used to place various inputs and malfunctions into the trainer. The controls' effects are shown to the student on the engine display panel. The sound system produces aural effects consistent with the malfunction. The sound that a pilot or mechanic would hear during an actual malfunction is reproduced exactly.

There are some 39 various malfunctions, conditions and simulations that may be induced into the trainer through the instructor's station. Some typical examples are engine seizure, hot start, low side governor failure, engine surge and compressor stall. These switches must be used at the correct time or under specific engine operating conditions to produce the most realism for the student. Many of these malfunctions could not and would not be demonstrated on an actual aircraft because of safety considerations or damage to the engine. By proper programming, the instructor can provide the student with one of the most eventful "flights" of his career.

The engine display panels, (3) UH-1D, (6) OH-6, are mounted in separate fabricated steel cabinets connected to each other by hinges. The panel utilizes dynamically animated and lighted cross sectional views of the two engines together with facsimiles of the engine instruments across the top of the panel and controls on the engine panel to demonstrate engine operation. Engine sounds are realistically simulated for normal and abnormal operation. Flow areas, including the air inlet, compressor sections, combustion chamber, turbine section and the exhaust section are presented on the panels, suitably color coded to indicate function and are identified by printed nomenclatures.

A lighting system is provided in the rear of each engine display panel which creates an illusion of fuel and gas flow to the engine cross section areas of the panels. The lights are sequenced by the trainer computer so that the illumination appears as an accurate outline of engine operation. Back lighting shows air and fuel flow and flow rates as well as anti-icing air flow. Appropriate lights are sequenced by the computer to indicate flow when flow commences and the change in intensity of the lighting, controlled by the computer, indicates pressure and temperature changes. The spark igniter plug is shown and illuminated dur-

ing ignition cycles, while combustion is shown as an absorptive change in color. An ice formation display is provided for intake icing and is controlled by altitude and free air temperature. Various warning and caution lights are displayed on the engine panels. All nomenclature is enlarged so that it is legible from a distance of 30 feet.

The computer (8) is a general purpose analog computer used to program all engine instruments, flow lighting and engine sounds. The computer responds to inputs from the instructor's control station and the cockpit station. Actions by the student in the cockpit determine the computer's response under normal operating conditions. In this way realistic engine performance is obtained as a result of correct or incorrect usage of the controls in the cockpit. The instructor can select abnormal operating conditions from the various malfunction switches on the instructor's console and these override the cockpit controls to accomplish the instructor's selected malfunction.

The malfunction selected allows the student in the cockpit to overcome the malfunction by control manipulation or determine what other corrective action should be taken. The engine computer is housed in a metal cabinet. The various computer elements have been constructed in the form of modules arranged to achieve the desired engine simulation. Each computing element is a precision close-loop electro-mechanical servo assembly. Each element contains an indicating disc and test switch that permits a fast reliable check of proper performance.

At present, the Department of Maintenance Training is utilizing the trainer in support of the 67N20 Mechanics Course. The trainer provides the enlisted student mechanic with an inside look at the engine and how it functions. It also allows the student to use such test equipment as the vibration meter to check for internal engine malfunctions. The student can also calibrate the exhaust gas temperature thermocouples on the trainer. Enabling the student to perform these two tests on the trainer eliminates the need for actual aircraft and if a mistake is made, there is no worry of damaging the trainer.

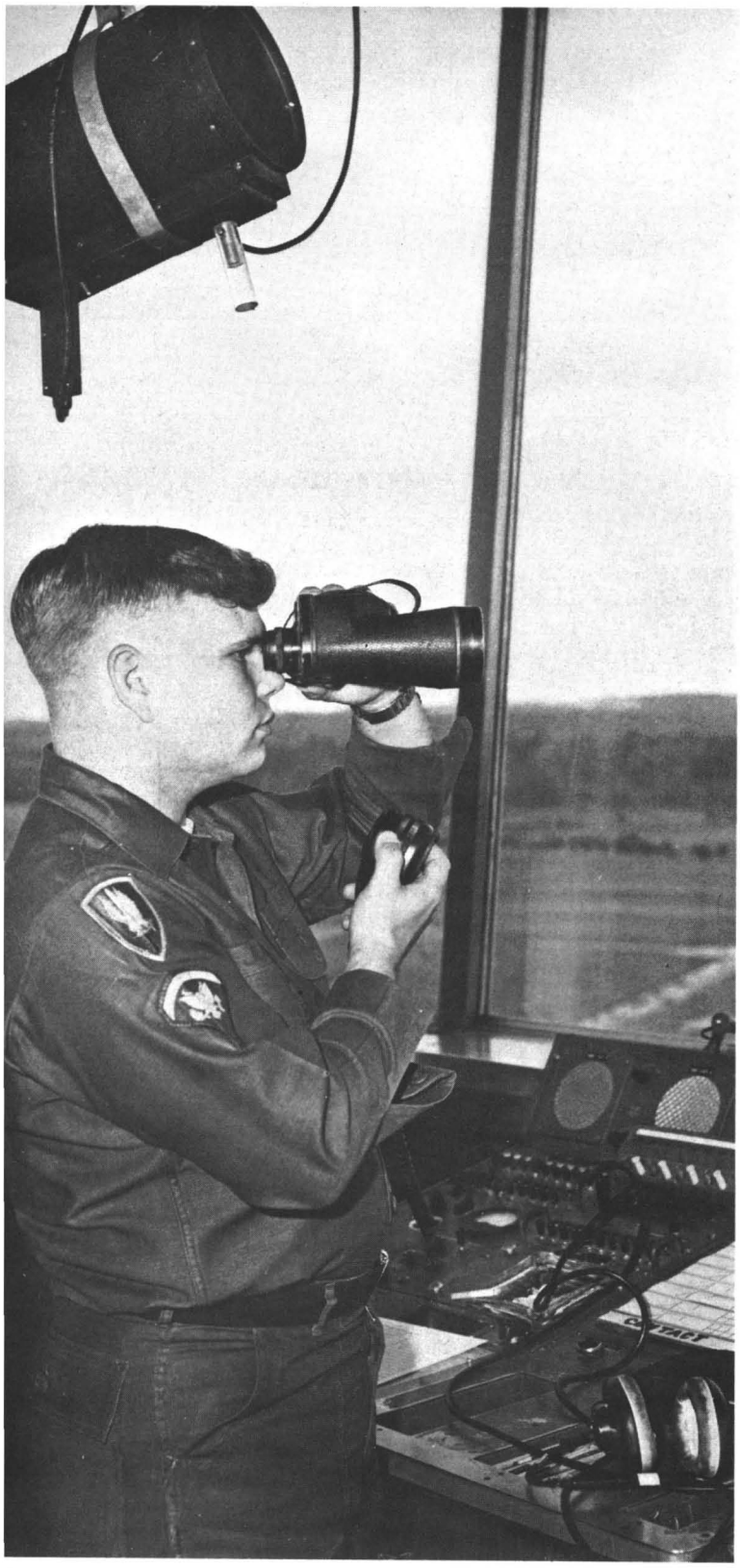
The instructor may induce various malfunctions into the trainer and allow the student to evaluate the indications to determine the cause. Then the student makes the proper adjustment on the trainer. The student immediately can see the results of his corrective action and determine if his analysis was correct. The use of the trainer provides the student with experience in engine troubleshooting which he would normally be unable to receive in a school, on an actual engine. An ease of understanding the operation of a gas turbine engine has been given to the student by using this training aid, never available before. Showing him malfunctions which could occur is of tremendous benefit to his training.

Student mechanics and pilots are allowed an inside look at the engine and how each control in the cockpit affects its operation. This eliminates the need for actual aircraft and if a mistake is made there is no worry of damaging the engine

The trainer is also being used to support the UH-1 Officer and Warrant Officer Rotary Wing Aviator Course, the Rotary Wing Qualification Course, the Instructor Pilot's Qualification Course and the General Officer Rotary Wing Aviator Course. The Department of Rotary Wing Training uses the trainer to teach its instructor pilots engine-related emergency procedures and functioning of aircraft engine controls. The trainer is used to provide the aviator with an understanding of the operation of the gas turbine engine and its supporting systems. With the aid of this trainer, we are better able to show the student aviator the internal functioning of the engine and how each control in the cockpit affects the operation of the engine.

The student aviator may be placed in the cockpit and told to fly a hypothetical flight. The instructor may then induce various malfunctions such as engine surge or high side governor failure into the trainer. The computer is then programmed, giving the proper indications on the display panel for the rest of the class to see. At the same time the identical indications are displayed on the cockpit instruments. Should the student make a mistake and choose the wrong corrective action, the instructor may allow him to pursue his course of action, or correct him. If the instructor allows the student to continue, he usually compounds the problem which has been induced into the trainer. Should the student continue on the wrong course of action, it will cause the illumination of a GOOF light displayed on the trainer. This light would indicate to the student he chose the wrong solution for overcoming the initial malfunction.

The trainer cannot be damaged by exceeding the limitations of the engine so the instructor can permit the student considerable latitude in selecting appropriate corrective action. Allowing the student to see what could happen if he were in an actual aircraft reinforces his need to learn. The use of the trainer in this manner provides the student aviator with experience in recognizing the various malfunctions he normally would not encounter until the real thing happened.



Air Traffic Control School

The task of producing top notch controllers was given to the new department of ATC training in Feb 1969

Until recently, Army air traffic controllers were trained by the Air Force and taught Air Force, rather than Army, procedures

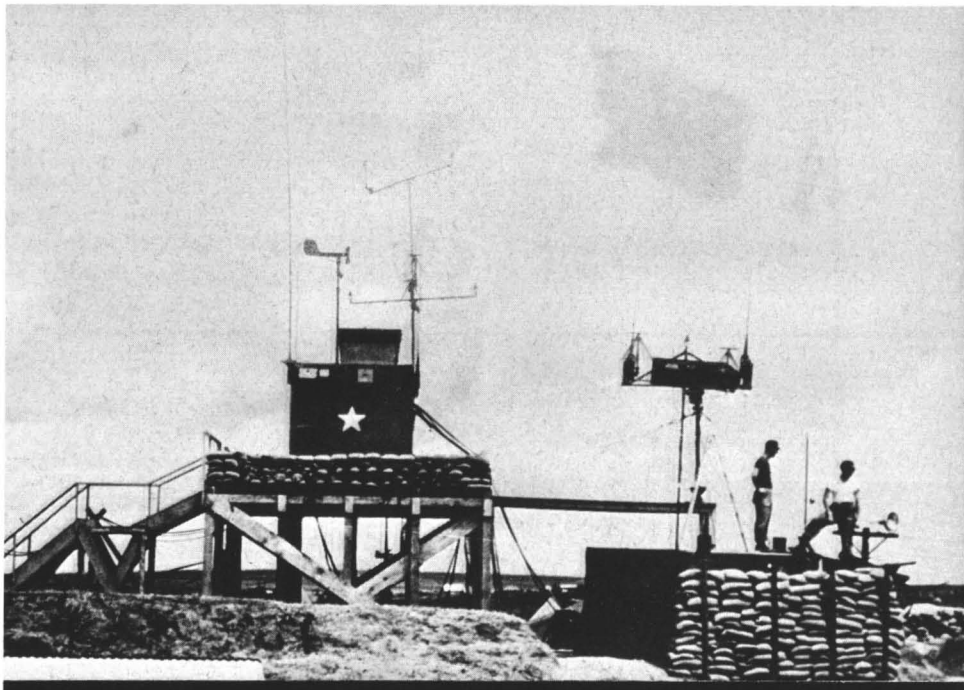
Major Peter H. Mitchell

AS TIME PROGRESSED in the Vietnam conflict, commanders of units having air traffic controllers continually indicated dissatisfaction because they felt the controllers were not adequately familiar with Army procedures. This was because ATC training—which was really quite good—was conducted by the U. S. Air Force and, consequently, Air Force oriented. This left the Army student

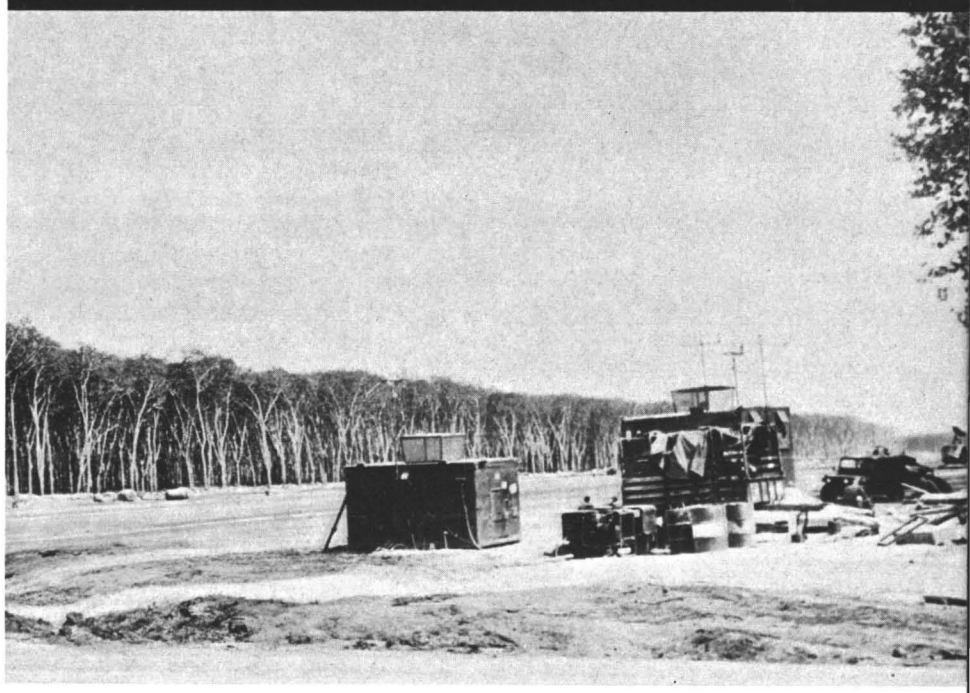
at a bit of a disadvantage in that he received Air Force procedures, on Air Force equipment and with no live tower, GCA or Army oriented radio training.

Thus in March 1967, the Assistant Commandant of USAAVNS directed that concepts be formulated with a goal of implementing ATC training at Ft. Rucker, Ala., contingent on USCONARC approval. A draft program of instruction was prepared by the Office of the Director of Instruction and was coordinated with USARV in order to insure the planned instruction would meet the requirements of the field commanders. The basic concept called for "live" and simulated GCA Training utilizing field sites/simulation and Army equipment. A training plan could not be implemented at Ft. Rucker at the time due to a lack of radar equipment. Also, it was not feasible to modify the Air Force training program to satisfy the need. Therefore, it was decided that a small percentage of the Air Force trained Army controllers would be further assigned to Ft. Rucker and provided OJT through existing facilities at USAAVNS. The first group of 12 graduates arrived at USAAVNS in May 1967 to receive Army oriented live training.

In April 1967 USAAVNS was directed to undertake a study to determine the feasibility of Army training for both officers and EM. These courses were to provide Army oriented training on Army equipment, and the handling of actual "live" traffic. This study would also determine what MOSs would be produced and would determine what resources would be required, i.e., equipment, facilities, personnel. All staff agencies and Departments at USAAVNS were directed to provide action officers to assist the group preparing this study. The group interviewed Vietnam returnees, ATC



After their training is completed at the Air Traffic Control School at Ft. Rucker, Ala., many students find themselves putting their newly acquired knowledge to the test by working from airfield towers as seen here in the Republic of Vietnam



Experienced instructors monitor the students as they apply their learning using "live" traffic at Lowe Army Heliport

personnel familiar with ATC problems, other service schools and the Federal Aviation Administration Academy. This study was conducted in June 1967. Recommendations from this study were as follows:

- The U.S. Army should conduct its own Air Traffic Controller Training and that the best location for this training would be at the Aviation School.
- Three MOSs would be proposed: 93H for tower specialists, 93J for GCA specialists and 93K for enroute specialists.
- Training could be initiated in FY 69 providing that time schedules developed by the study group could be followed.

The need for additional training of Army personnel graduated by the Air Force School continued, but available resources and facilities limited the number which could be handled.

In December 1967 CONARC directed USAAVNS to implement air traffic control training at Ft. Rucker and that all planning and funding should be oriented toward a start date of 1 Jul 69. The course of action chosen from the study provides basically for a course that begins with an eight week 3½ day basic series of subjects common to all three MOSs with necessary instruction required to obtain the Federal Aviation Administration Control Tower Operators Certificate of Grades. The planned input to this would be 36 students, 49 classes per year, one class entering each week. At the conclusion of this basic course the students will proceed to the advanced training stage—primarily 6 weeks of intensified field training with 20 students going to tower training (MOS 93H), 10 to GCA training (MOS 93J) and 6 to enroute training (MOS 93K).

In January 1968 it was directed that an ATC planning group be formed with instructions to do whatever was necessary to effect a 1 Jul 69 start date for ATC Training at USAAVNS. This group was to formulate programs of instruction, funding, facilities requirements, manning required for instruction and administration and concepts of training. For control purposes this planning group was placed under the Department of Advanced Fixed Wing Training.

One major problem uncovered at this time was that simulators for radar instruction were not available in sufficient quantities in either Air Force or Army channels to provide for the simulation required in the advanced phase of instruction. Subsequently, in February 1968 a letter was sent to the Naval Training Devices Center (NTDC), Orlando, Fla., outlining the requirements for radar simulation. Close coordination was continued from that point on between NTDC and members of the planning group in order to insure that the simulation would meet all requirements. Various designs were consequently submitted by several civilian firms that not only met the ATC requirements but exceeded them in many areas. In mid November 1968, USAAVNS received authority to obligate funds for procurement of a simulation system. Regardless of which manufacturer is finally awarded the contract the system installed at Ft. Rucker will be the most realistic radar simulation available for training at any ATC school, military or civilian.

In late February and early March meetings were held with Airfield Operations in order to define and attempt to solve the manifold problems that would be generated by assimilation of student ATC training into the existing training environment. That this would call for extremely close coordination, concept papers and "letters of agreement" was evident from the very start, as it was realized that an addition of a training

war, a rig known as the Brodie device was developed by Commander (then lieutenant) James Brodie. It was at first hoped that it would help combat the submarine menace, but was later modified for use in restricted land areas as well. Brodie's idea for a device for use on land consisted of four masts supporting a horizontal cable providing a smooth runway for takeoff and landing. A trolley with an attached sling underneath caught a hook mounted above the center of gravity of the aircraft. The trolley ran along the cable and allowed landing and takeoff runs. The airplane could be raised or lowered to the ground by tightening or slackening the runway cable.

The device for use on an LST (Landing Ship Tank) consisted of a cable which was held off the side of the vessel on two booms extending from two pylon-like towers near the bow and stern. A pulley with a reinforced nylon loop rode the cable along with a simple friction-brake. To "land," Army pilots simply approached the LST's rear boom, throttled back the engine and engaged a hook mounted on top of the aircraft to the loop on the cable. The aircraft then was braked to a stop, dangling over the sea. After that the pilot simply taxied, or was manually pulled, to the forward boom which then swung his ship inboard and down to the deck.

Taking off was just as simple, theoretically. The L-4 was swung out on the end of a boom and accelerated to takeoff speed. When the pilot was ready, he yanked a lanyard which disengaged his hook and freed him from his hanging runway.

The first LST used for the Brodie operations became the only ship of that classification to receive an official name—LST 776 was named the USS Brodie.

The land use concept envisioned the employment of a Brodie cable to be strung between trees in small closings where the terrain was unsuitable for an airstrip, thereby permitting L-4 operations.

It was first tested at New Orleans Moissant Airport and later on the ship "City of Dalhart" in the Gulf of Mexico.

Later in the war General Leslie J. McNair, chief of staff at GHQ, witnessed a demonstration of the Brodie device at Ft. Belvoir, Va. He immediately recognized its potential for use with artillery planes. On 31 October 1944, he directed that training in the use of the Brodie device be initiated at the Department of Air Training at Ft. Sill, Okla.

An application of the device occurred during the invasion of Okinawa when an urgent requirement developed to set up artillery units in the Kerama Retto Islands to shell the defenses on nearby Okinawa.

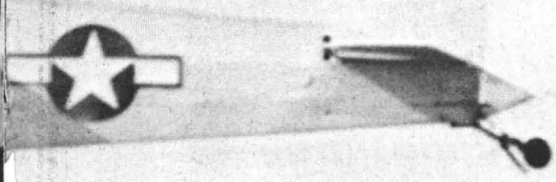
Photography and aerial observation were needed by the artillery batteries, but the Kerama Islands offered no suitable area for a landing strip.

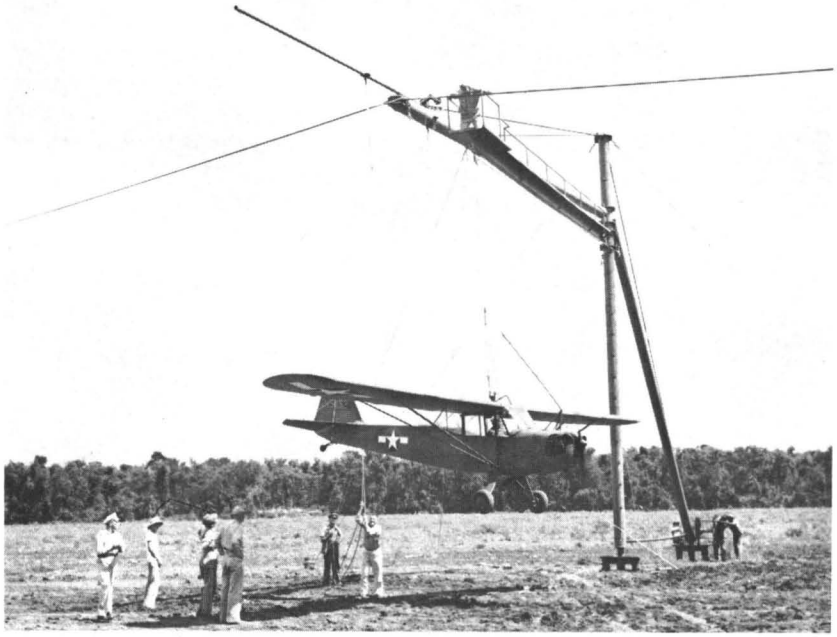
The USS Brodie came to the rescue and during the invasion of Okinawa L-4s used the Brodie device to fly numerous sorties. Not a pilot nor plane was lost.

This little-known sequence in Army aviation history came unexpectedly to light during retirement ceremonies for Lieutenant Colonel Earl B. Montgomery of the U. S. Army Combat Developments Command Materiel Directorate. Colonel "Monty," well known in the avionics trade and a key man in the Combat Developments Command AAFSS study, was an Army pioneer in World War II in using what the Navy called the "Brodie Gear." As a pilot with the 77th Infantry Division Artillery he had to simultaneously learn and teach the techniques of the Brodie system.

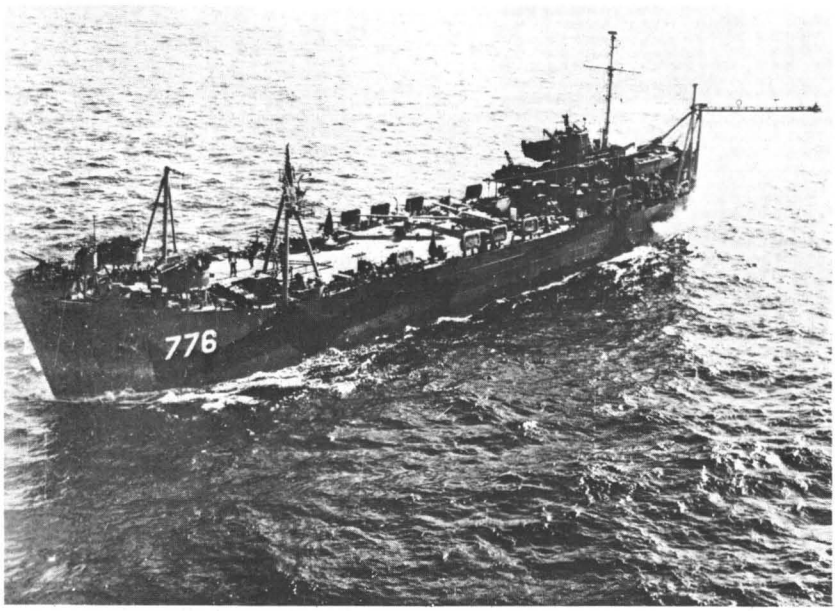
"I was at Tacloban AAF in 1945 when we first heard of the Brodie system. Then one day this hook-rig was delivered and mounted on my plane. I was told to watch for an LST with a cable-rig sticking over the side—and to try for a landing.

"After about three days, I spotted an LST rigged with cables





Above, the Brodie device is rigged for use on land while undergoing tests in Louisiana. Below, the booms hold the device's landing-cable outboard of the LST so Army L-4s can fly alongside and engage their hooks in the nylon pulley-loop for a "landing." The forward boom (left) is pointing into the camera and does not show its length as does the stern boom. The landing cable crosses the bridge and boat deck of the LST. Two planes have landed and been swung inboard and to the deck. "A vital part of the landing technique," contends Lieutenant Colonel Earl Montgomery, a pioneer and instructor in cable-dangling, "was to keep your stick forward after hooking on, or the cable'd trim your propblades off to the hub"



so I approached it, however, it showed me a red light and the deck began to swarm with activity.

"Finally they gave me a green light and signalled me in. With the ship steaming into the wind, I approached the stern end of the cable, lined up my hook with the loop—and missed it clean.

"My second try was a good one; I hung my plane on the pulley-loop and taxied to the other boom and was swung to the deck. Then a voice yelled, 'Well done, Lieutenant—you're now an instructor!' Just like that!"

Montgomery, joined by two more lieutenants as the "teaching faculty," refined the Brodie cable-landing technique and trained all the Brodie Gear pilots who participated in the Okinawa invasion. Their program of almost simultaneously learning and teaching trained enough pilots for six cable-rigged LSTs for invasion roles before the war ended.

"Actually," said Monty about his pioneer role, "Marine pilots flew off the Brodie cables on several campaigns about that time, but they landed ashore, when airstrips were captured or prepared. The Army however wanted us to get airborne before and during the battle, fly reconnaissance, liaison and spot artillery and get back to the ship. So we were sort of pioneering the *landing* part of the Brodie drill. And there were times when the old cable looked mighty good to us," he added.

"In effect, said Colonel Montgomery, who was with the group which flew war correspondent Ernie Pyle off a cable to his rendezvous on Ie Shima, "we were making a fixed-wing do the work of a rotary-wing aircraft. You might say the Brodie cable was the transition to the helicopter which replaced it—and just in time. Land-on-a-cable-between-two-trees . . .," he mumbled going to the CDC signout book for the last time.

Aviation WO Career Program

A brighter career outlook is in store for aviation warrant officers

Captain F. J. Lewels

7 JULY 1969 will mark the beginning of the only Career Course in existence for Army warrant officers as well as the start of a new era that will bring a brighter career outlook for some 11,000 Army aviation warrant officers.

For the Army it will hopefully result in a higher aviation warrant officer retention rate.

A proposed $1.3 million classroom and office facility will provide a permanent home for the new career course.

Until now, warrants in all branches have had little to look forward to in the way of career training.

The new program, which is designed to provide these officers with a working knowledge of the role of Army aviation and to prepare them to step into more responsible and varied jobs, stemmed from a general dissatisfaction in the warrant ranks over career opportunities. This dissatisfaction, demonstrated by a large number of aviation warrants leaving the service, prompted the Army to initiate the new program. The program will provide an intermediate course for grades W-2—W-3 and an advanced course for W-4s.

Although the first year will produce only 320 graduates from both the Intermediate and Advanced Courses, future plans envision a yearly total of 500 or more graduates, possibly increasing after three or four years.

Subjects planned for the course are organization of the Army, aircraft, airfields, aviation safety, aviation medicine, civil defense, armament systems, survival, unit administration, leadership, effective writing, military justice, map reading, tactical doctrine and methods of instruction.

Two subjects which will be given special emphasis will be air traffic control and aviation safety. Graduates of these courses will be qualified to step into jobs that have rarely been held by warrants in the past. They will be able to shoulder the responsibility of an assistant operations officer in an aviation unit, scheduling and planning missions and performing the multitude of associated functions.

Other duties for which they will be qualified will include assistant maintenance officer, assistant administrative officer, assistant supply officer, division staff officer and special staff assistant, division level.

The warrant officer will be especially effective as a liaison officer by combining his expertise as an aviator with his newly acquired knowledge of ground operations. A graduate will have a background of how the Army functions and exactly where aviation fits in. He will have an understanding of the Army organizations and functions which has not been required of him in the past.

In order to qualify for the Intermediate Course a warrant officer must spend three years as a rated aviator or an aircraft repair technician (non-rated). He must be a member of the Active Army or a reserve component with a Secret security clearance. Active Army warrants attending this course will incur an additional two year obligation.

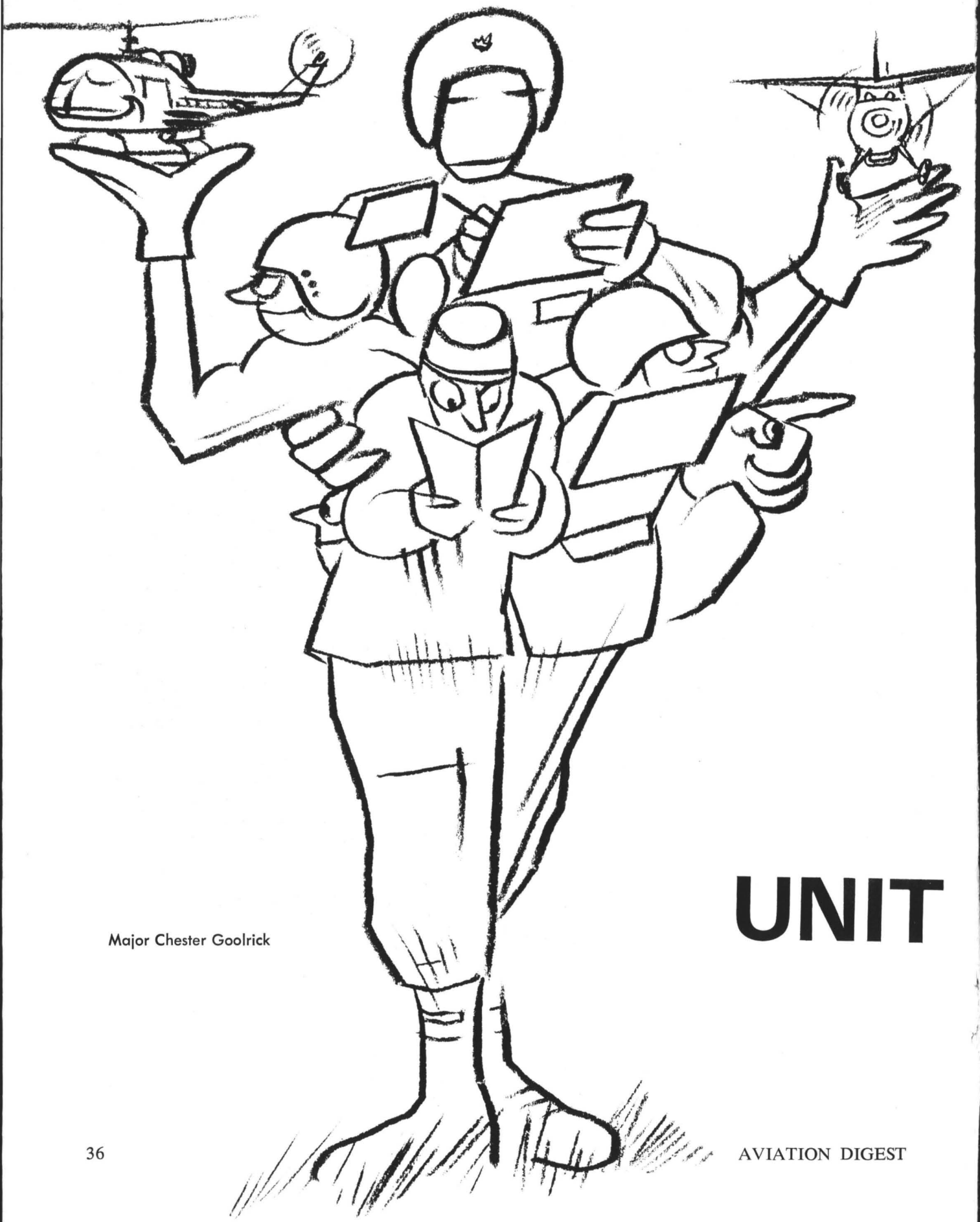
For the Advanced Course, an aviation warrant officer must be either a W-4 or be selected for W-4. He also incurs a two year obligation and must have a Secret security clearance.

The first two Intermediate courses begin 7 July 1969 and 19 January 1970 and will last for 22 weeks and 4 days with each having an enrollment of 100 students. The first two Advanced courses, with 60 students each, will last 27 weeks and 4 days and will begin on 20 Aug 69 and 25 Nov 69.

Warrant officers will be on orders to Ft. Rucker and many will attend such courses as the Instrument Examiners Course or one or more transition courses prior to or after completion of their particular program course. Others may attend the Aviation Officer Maintenance Course at Ft. Eustis, Va., enroute to Ft. Rucker.

Selection for both courses will be made by Department of the Army. A warrant officer may state his desire to attend either course on DA Form 483 (Officer's Preference Statement) however actual selection will be based on performance as reflected in the individual's 201 file.

Even though Career Program Course selection is competitive, it is hoped that eventually all warrant officers with four years of service will be able to attend the Intermediate Course. The Advanced Course will remain more selective.



UNIT

Major Chester Goolrick

the following 28 pages prepared by the U. S. Army Board for Aviation Accident Research

THE FIRST THING a budding salesman learns after he starts work for Mighty Mutual Insurance Company is that the beautifully engraved diploma (18" x 16", suitable for framing) he was handed by Old Siwash does not mean his education is over.

He will be going to school until the day they pack him off to the home for old insurance salesmen.

If he doesn't like the idea, he can always get a job digging ditches with the Streets and Sewers Department.

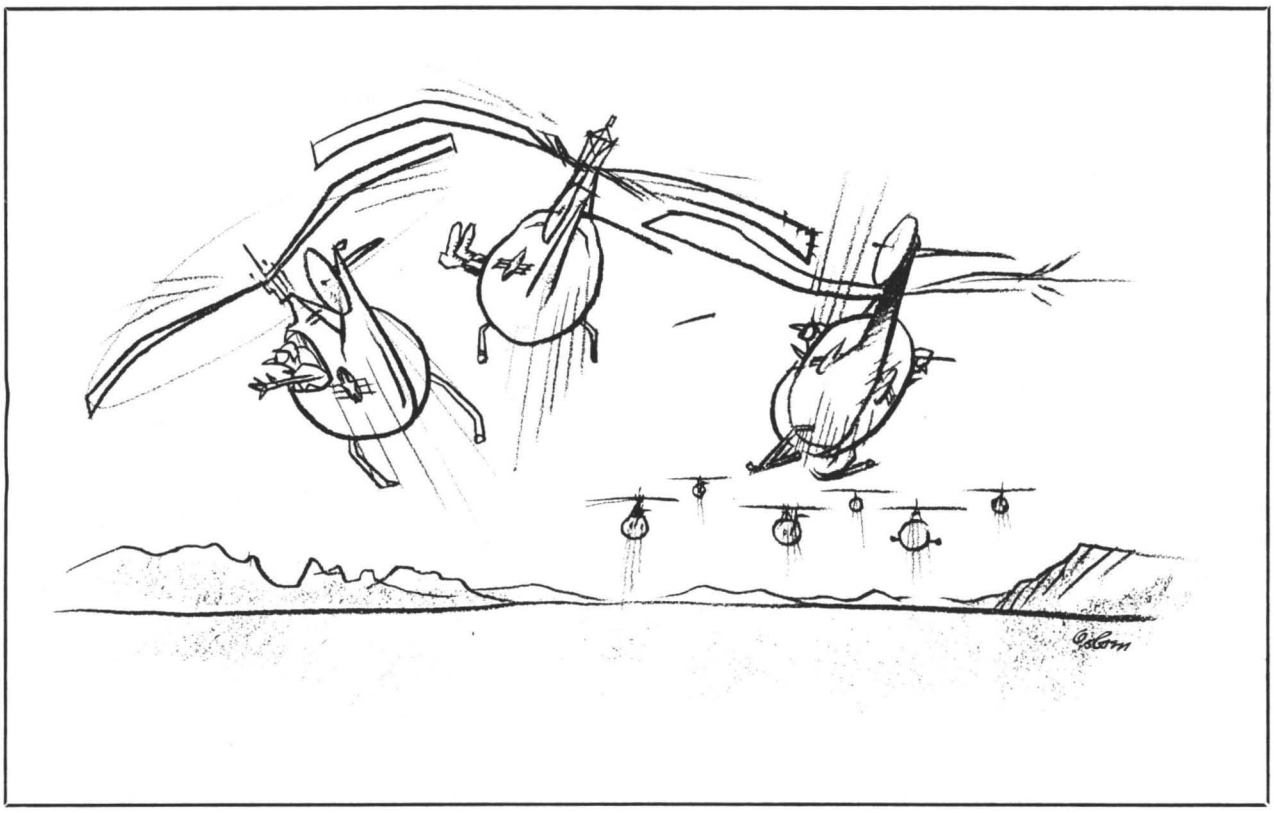
Mighty Mutual has definite ideas on the subject of education. It found out long ago that one way *not* to keep an insurance company solvent was to hire bright young economics majors, give them a friendly pat on the back and a pad of policy application forms and send them out to make their way in the world. Nowadays, good old M.M. runs its own school, about as tough as the Army's basic training, one in which new boys still a trifle damp behind the ears are turned into hardnosed insurance agents who can wheedle a prospect into taking out a $100,000 policy without even raising a mild sweat. What's more, 25-year veterans are pulled in from time to time to brush up on selling techniques, to learn new tricks of the trade.

One thing you can be sure of. Mighty Mutual doesn't let its men in the field develop rust and barnacles like a tramp steamer which has been too long at sea. They are put in drydock for a thorough overhaul *before* they go downhill.

Like every other business enterprise which manages never to skip a dividend, Mighty Mutual also has some ideas as to how the job is to get done. There is no room in the ranks for prima donnas. A salesman either follows his handbook and what he has learned at the company school, or it's back to Streets and Sewers. Most bright young men grasp the idea fairly early and never lose sight of it.

This is a point of view pro football players can appreciate. A club can start drills in July and be composed of super-stars who make Joe Namath look like a rank amateur. Unless it keeps up practice 5 days a week during the season, unless it functions as a team, its timing and execution on Sundays is going to be about as crisp and accurate as a 2-dollar watch with a bent mainspring. Only a rookie raw as an oyster on the half shell believes football games are won on Sundays. The oldtimers know it is the hard, relentless practice on weekdays that puts points on the board and brings in that extra $15,000 for winning the Super Bowl.

TRAINING SENSE



LOOK ALIVE

What has all this to do with Army aviation? A far cry, you say, from selling insurance and playing football, even for another $15,000, and piloting a Huey?

Not at all. It comes to just this. If there is an Army airman alive who thinks unit work is done by a group of friendly fellows each getting things done in his own style—chances are he won't be around much longer.

Nobody in Army aviation ever really believes this, of course. On reflection, all of us will agree that in an Army unit, timing and teamwork from every man jack from mechanics to pilots has to be as crisp as it was for the Jets in the Super Bowl. Anyone who has ever taken part in a helicopter scramble, or who has even watched one, has no trouble grasping the fact that it would take only one guy with two left feet to turn the whole affair into something resembling a full scale riot at the Big House.

So? If you don't want your scrambles to look like a plate of underdone eggs, you train.

And you keep on training on a fixed schedule, come hell or high water. Slack off, let down, or forget the whole thing and you're in trouble. It's as simple as that.

To be sure, unit training, like most chores which aren't in the same pleasant category as a picnic in the park with Miss Universe of 1969, is easy to overlook or forget or make excuses about. It is no trouble at all to sweep the dirt under the rug or put off fixing the roof. But don't worry. Another form of trouble will show up eventually just the same.

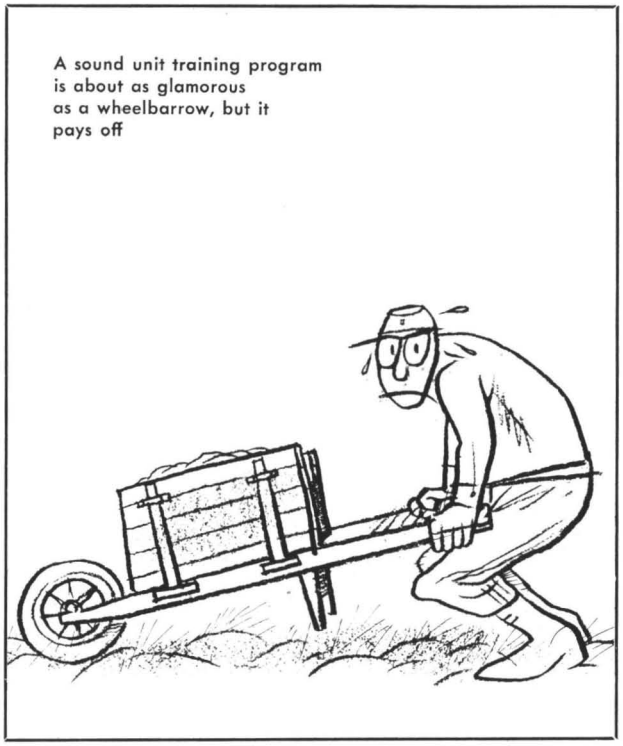
Take time, for example—lack of it, that is. Under the best of conditions, most Army units could use another 8 hours or so every day and still feel pushed. There never does seem to be enough time to go around. The chaps in Vietnam, already so bone-weary from overwork they could spot Rip Van Winkle a 10-year handicap in a sleeping contest, aren't just trying to goof off if they take the stand that

a unit training program, piled on everything else, would constitute an overload enough to blow every mental and physical fuse they still have in good working order.

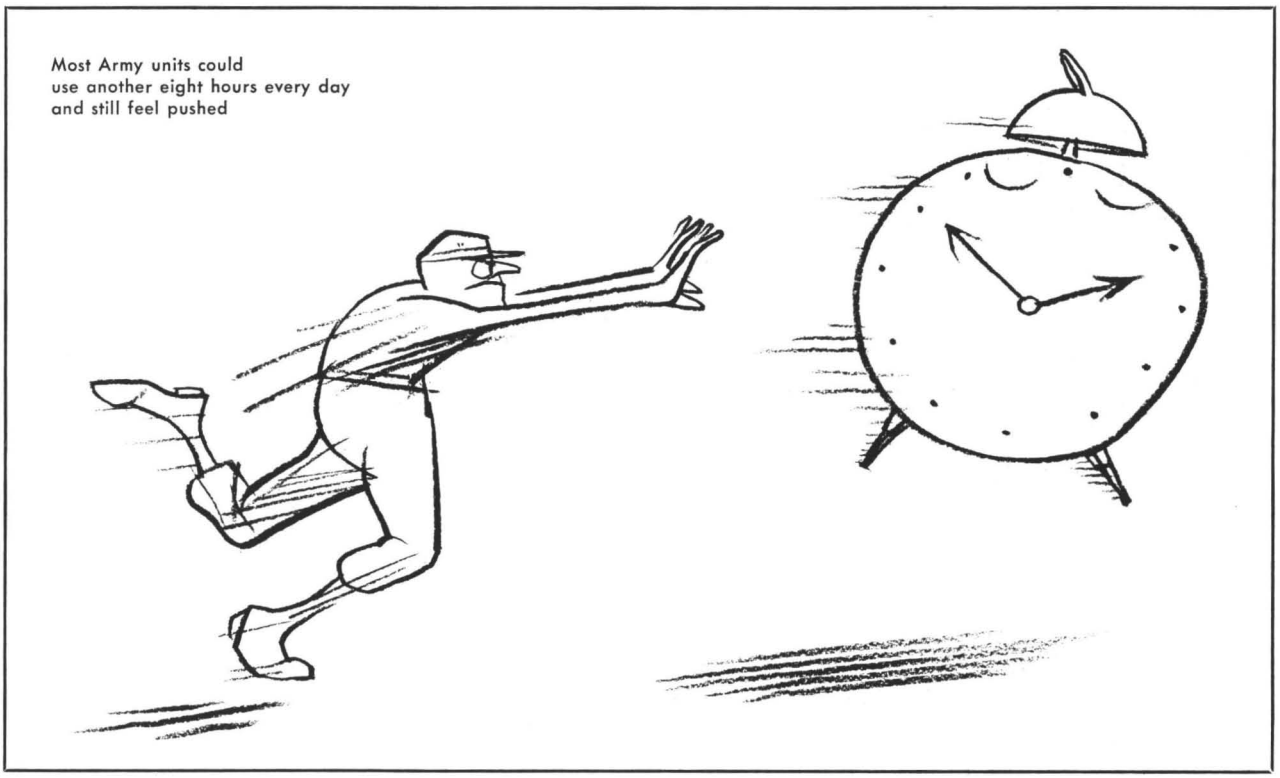
Fair enough. But hear this. A good number of units in Vietnam *do* have sound training programs. And hear this, too. *In every case where you run into a well-run training program you'll find a lower accident rate.* Not just *some* cases. *Every* case. These are the level-headed chaps who have rejected the hang dog philosophy that in combat you are going to have accidents so you might as well accept them. Stuff and nonsense, they stoutly aver. Accidents, most of them, are preventable whether a unit is operating in Vietnam or so far away the only action anyone ever sees is when the town drunk gets carted off to the pokey on Saturday night.

No matter where or when, a sound unit training program provides a fair share of the answers to the accident problem. Let's be honest while we are at it. It's also hard, not very exciting work, about as glamorous as a wheelbarrow.

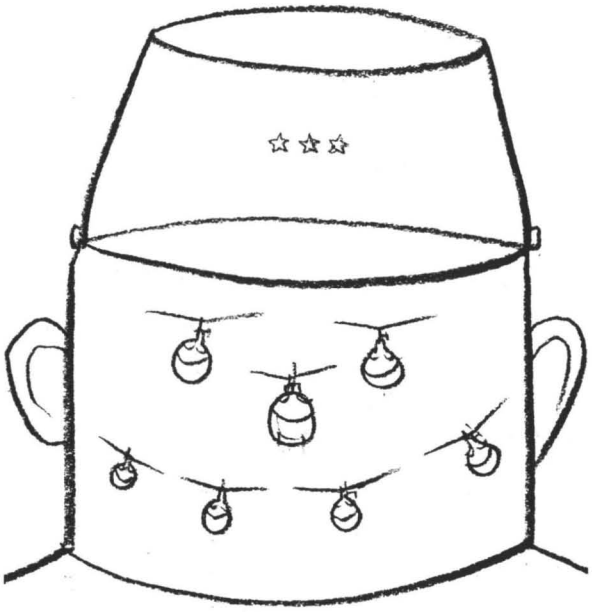
But it pays off. Every time, like a runaway slot machine.



A sound unit training program is about as glamorous as a wheelbarrow, but it pays off



Most Army units could use another eight hours every day and still feel pushed



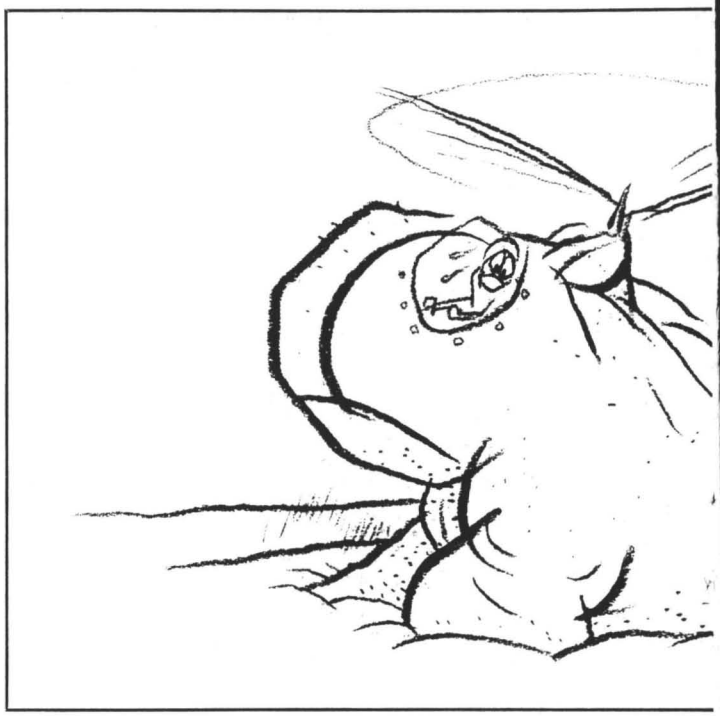
Where there is a program in operation, the unit's performance and operational efficiency is enough to bring joy to the flinty hearts of commanders all the way to the Pentagon

SOMETHING FOR EVERYBODY

Where there is a program in operation, everybody is a winner, the way some of those breakfast food box top contests are advertised. Blade strikes go down. Maintenance procedures become standardized. Techniques in every department improve. A healthy self-confidence blossoms in the unit like dandelions on a suburban lawn. Morale is higher than Nebraska corn at harvest time. Not the least of the rewards is that the unit's performance, its operational efficiency, is enough to bring joy to the hearts of commanders all the way to the Pentagon.

This is one poker game in which everybody shares in the pot, but it may be that some rake in a few more blue chips than the others. Younger pilots especially. Unit training takes the place of the transitional period they would go through if they happened to be flying for All World Airways. It gives them the firm support they need to get through those first difficult days when, if left to their own devices, they might begin to flounder around like a hippopotamus caught in a bed of quicksand. And if there is one thing the Army does not need it is one or two pilots who start to flounder at just the wrong times.

Nothing beats a helping hand at the right moment. A pilot fresh from Rucker has the technical skills he needs. He is proud of his ability. He is enthusiastic about his job, as eager to please as a speckled



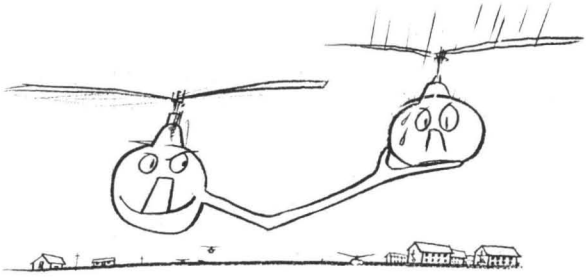
pup. Too eager, sometimes, if left to his own devices.

What he lacks is experience. Flying under the hood over the peaceful country around Rucker is one thing. Flying on instruments, unexpectedly, over the hostile terrain of Vietnam, the rolling hills of Germany, or Arctic terrain is another can of worms indeed. A while back a relatively inexperienced pilot in an overseas area ran into a sudden rainstorm at night, got vertigo, and crashed. He would be with us today if a careful training program in the early stages had given him the helping hand he needed.

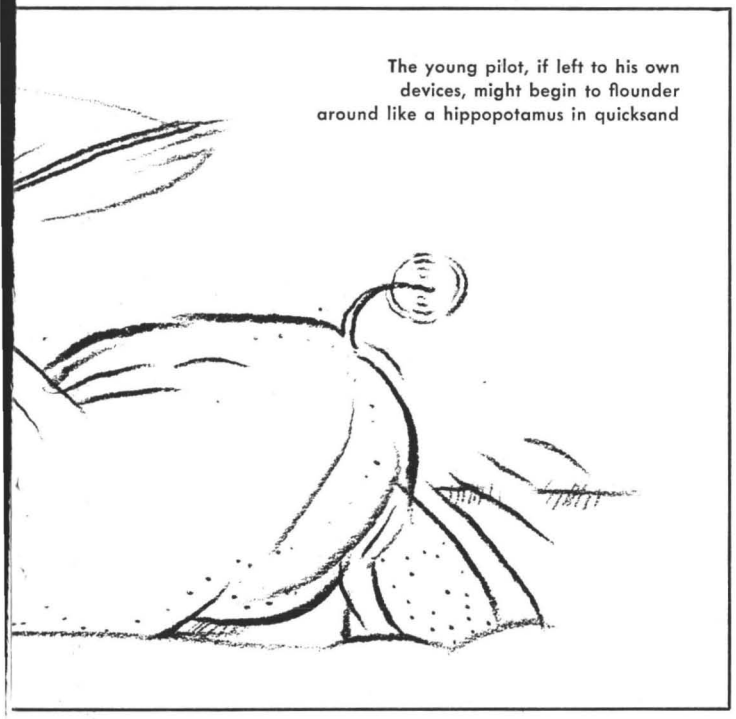
What makes things doubly tough for new pilots is that they are *already* used to a helping hand. Throughout their training there has always been an instructor somewhere in the neighborhood, ready to take over, or bail out the boat when the going got tough. When the helping hand is removed, an inexperienced aviator is in the same position as a man with a freshly healed broken leg who has discarded his crutch. It is a psychological handicap which can keep a man from using the skills he already has to their fullest extent.

A number of things can happen to an airman in this fix. If he's really lucky, he'll survive by learning in good old Hard Knocks University, with a major in lumps and bruises—and, incidentally, perhaps also picking up a lot of self-taught practices you'll never find in a dash 10 and which always mean trouble later. Somewhere along the way, he may acquire a dangerous overconfidence, a hard veneer which actually masks his own sense of insecurity. Or, as a result of a series of hairy episodes, he may develop such a lack of confidence in himself that his flying performance is a little like trying to start a Huey with the blade tied down. Whatever the case, he'll never become the all-around, properly confident professional pilot Army flying demands.

At Rucker, there was always an instructor ready to take over when the going got rough



The young pilot, if left to his own devices, might begin to flounder around like a hippopotamus in quicksand

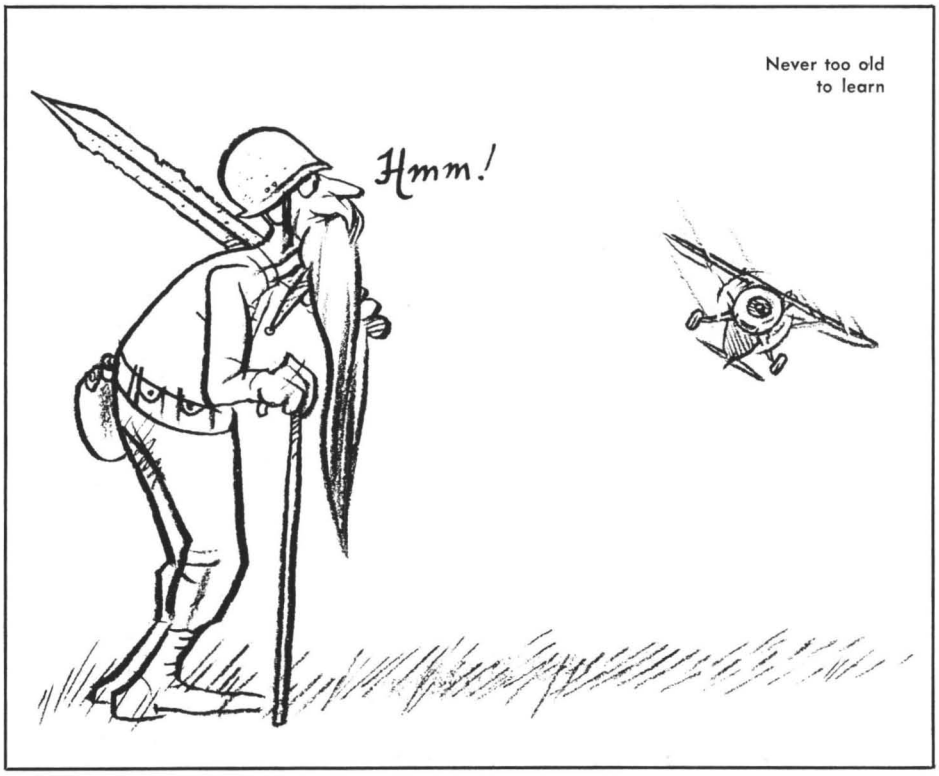


Throwing a chap into the deep end of the pool is one way of teaching him to swim. It sometimes works, even if most lifeguards don't recommend it. Rest assured on one point. It is no fun for the poor soul being taught. If he winds up with a galloping case of the heebie-jeebies and such an aversion to water he won't go out in the rain, it is not his fault.

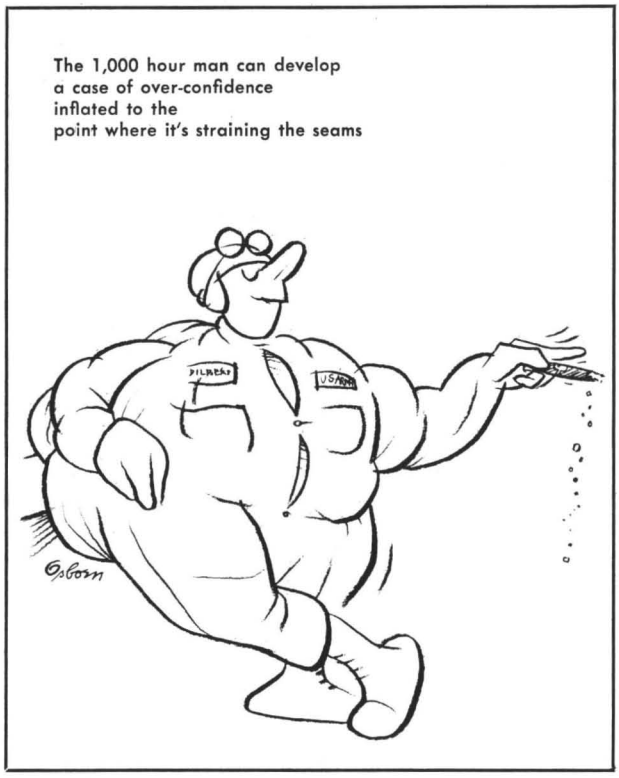
NEVER TOO LATE

When does the Army airman reach the point at which he can go it alone, when the helping hand is no longer needed?

Well, to put it in as few words as possible, roughly never.



Never too old to learn



The 1,000 hour man can develop a case of over-confidence inflated to the point where it's straining the seams

Sure, experience comes with time. Experience is a nice thing to have. Don't ever forget, though, that it can be a two-edged sword, in some ways more of a hindrance than a help. The 1,000-hour man, unless he is checked by a consistent unit standardization and training program, can develop a case of over-confidence inflated to the point where it is straining at the seams. In such a state, his techniques are likely to grow so sloppy you could stir them with a spoon.

Let's take, as one example, the interesting, if hairy, case of the aviator who develops the weird theory that he knows more than his dash 10 does. Or simply ignores it. One outfit lacking a training program in some way as yet unexplained managed to convince itself that the proper way to get a Beaver off the ground was at 2000 rpm, pulling 30 inches of manifold pressure. The idea was that this prolonged the life of the engine. Nobody knows whether the engines' lives were prolonged. The lives of the six men who were killed in the inevitable crash weren't.

There was the Huey pilot in another unit who came to the conclusion that the way to clear sizable obstacles was to get down low and build his speed up to 85 knots so that he could soar over like a pole

vaulter. Fortunately, wiser heads put him straight before it was too late. He would have wound up perching in a lonesome pine like an owl.

These are bad enough by themselves. The Army doesn't need pilots who haven't looked in their dash 10s since they joined their outfits. What piles injury on injury is that when experienced pilots become infected with a set of ideas just about as murky as a San Francisco fog on a bad day, they are likely to pass them on to new arrivals. Younger men are always willing to accept advice from those they think are solidly in the know. If a veteran goes around loudly proclaiming a Huey can be taught to stand on its hind legs and beg for fuel, like a cocker spaniel after a dog biscuit, sooner or later somebody is going to believe him. What is worse, to try to act on the advice.

We can't have that sort of thing going on, can we?

Make no mistake about it, it has happened before. It will again—in units lacking sound training programs.

In another area, consider the matter of instrument flying. You may have logged more time on instruments than Noah did at the wheel of the ark. That doesn't mean you can afford to get rusty. *If you don't fly instruments regularly, you are not safe* to *fly them unexpectedly*. What goes for instruments applies equally to any number of other areas of flying. If there is rust in the machinery you can look for pings.

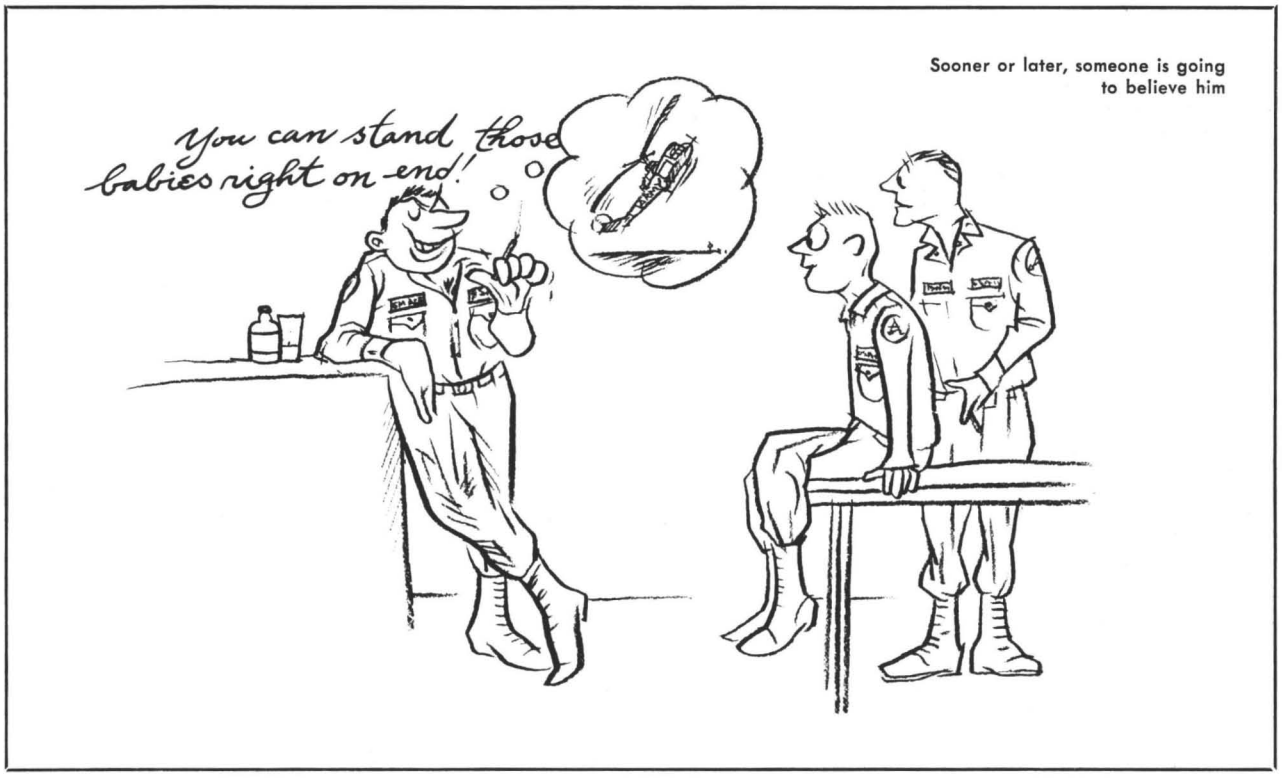
The solution? By now you should have begun to grasp the general idea that our basic theme is that unit training programs can be classified as Pretty Good Things, along with polio vaccine, baseball, and Raquel Welch.

You're right again.

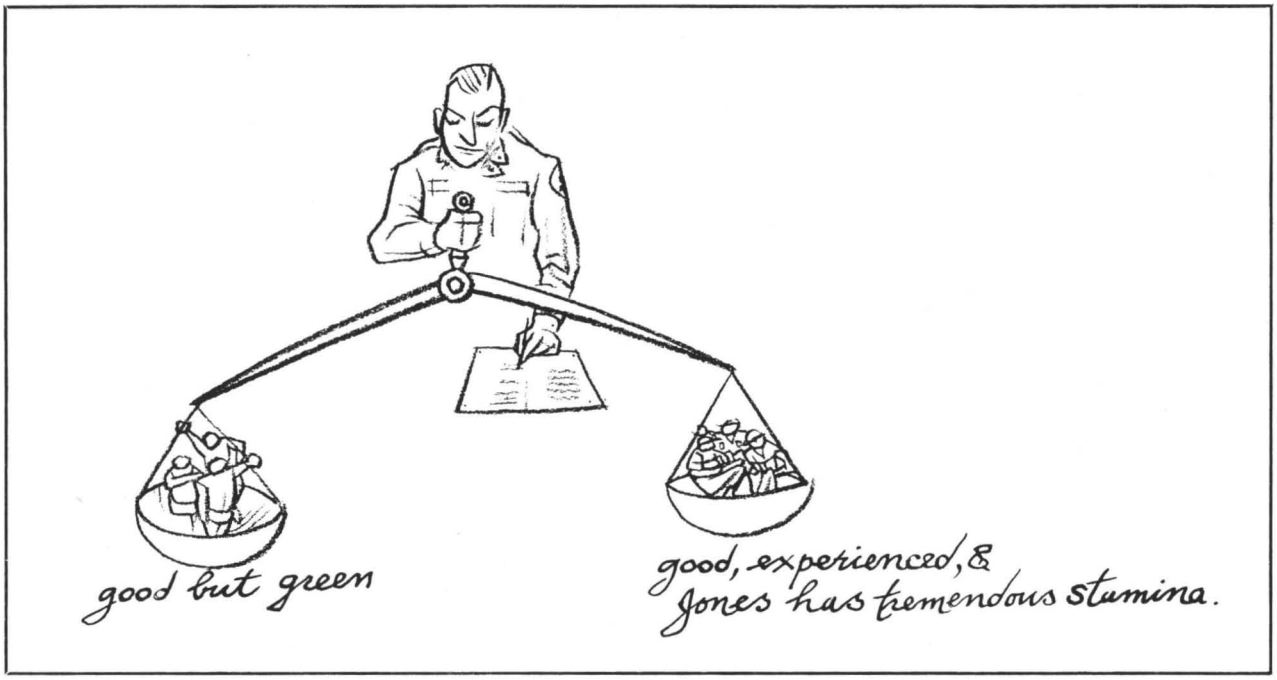
VIEW FROM THE TOP

If there is another airman who gets special benefits from unit training, it is the commander. The Jets pick up their snap and polish during head-knocking practice sessions. At the same time, Coach Ewbank has a chance to assess his players, to find out what each man can or can't do, how he can be improved, and where he fits in best. Ewbank wouldn't be pulling down a fat salary to pace the sidelines at Shea Stadium on Sunday afternoons if he didn't know the capabilities of each man on the squad better than the player does himself.

Army aviators come in a variety of shapes and sizes but manage, when in uniform, to look pretty



Sooner or later, someone is going to believe him



much alike. This doesn't mean that they *are* alike, not by a country mile. They differ in temperament, experience, ability, physical reactions, and a lot of other factors that don't show up on the surface like buck teeth or red hair. Each man has his own particular limits and when he is pushed beyond those limits, the trouble sets in.

One easy way to find out what a man's limits are is to wait until the accident happens, determine what he did wrong, chalk it up as another pilot error crash, and tell him sternly not to do it again—provided he is around to do the listening.

An easy but inefficient method, costly in men and aircraft and a wear and tear on everybody's nerves, not to mention the lumps and bruises involved. So what's a better way?

By George, you've guessed right again! Unit training. If a CO has a well-planned program in operation all the time and keeps book on how things are going, he soon learns exactly what each aviator can do. More important, he knows what a man *can't* do —not at this stage of his development. He may not be aware of it, but he is in the business of preventing accidents caused by (a) inexperience and (b) creeping sloppiness.

Here again we run into the problems of a young pilot, perhaps 3 months out of Rucker, sometimes already an aircraft commander and under all the pressure he can reasonably be expected to handle. The CO has his own share of pressure—so does everybody—and our eager youngster might find himself handed a task beyond his capabilities simply because, lacking a thorough knowledge of his man, the CO makes the assumption the pilot has acquired the necessary experience. Asked to do something, few pilots are likely to turn it down on the grounds that they are not up to it. When the crash occurs and another pilot error goes into the books, whose error was it?

CO's don't enjoy nightmares any more than the next man. A sound unit training program is a lot better guarantee of 8 dreamless hours in the sack than those pills you keep hearing about on television.

NUTS AND BOLTS DIVISION

If a pilot can fall into sloppy practices or make a mistake simply because he doesn't know any better, it follows that the same goes for maintenance men. Where there is a letdown in training, you are likely to find a considerably higher incidence of the application of Murphy's Law than you will in a unit where everybody is kept on his toes by training, standardization and supervision.

One large area here is in the use, care and feeding of tools. If a pilot is capable of ignoring his dash 10 when left to his own devices, a maintenance man

can allow his toolbox to reach a state where it could qualify for a government grant as a disaster area. This is bad enough by itself—a mechanic in a hurry can pick up the wrong tool if nothing is where it ought to be—but it is likely to be a symptom of other ailments. When you see a chap whose usual style of dress is a cut below that of the scarecrow in *The Wizard of Oz,* you can usually make a safe bet that he is just as badly organized when it comes to anything else he is involved with.

One thing people like this are prone to do is take what they think are time-saving shortcuts, ignoring

Where there is a letdown in training, there is usually a higher incidence of Murphy's Law

prescribed techniques the way pilots can forget their dash 10s. And, shucks, as everybody knows, shortcuts *do* save time. The trouble is that time is just about all they save.

It's a sad truth that sometimes in the field, equipment shortages can cause changes in prescribed techniques. The point to be made is that changes are okay only if they are thoroughly tested, understood by all, and supervised. A mechanic who has been kept on his toes by training and supervision will never attempt a change in technique on his own. Not only that, if somebody else—no matter *who* else—changes something, your alert maintenance man will want to know *why,* and if he doesn't get a good answer, he sticks by the book.

Fine and dandy. Would it were always so. But when you add together a unit with an inadequate training program and a bunch of tired men operating under enough pressure to flatten a suit of steel armor, you come up with some results which make the kind of story you wouldn't want to read to the kiddies at bedtime.

Would you like to hear the sad story about the rocket fuse which went off outside a fuselage because somebody had lost, or failed to properly use, his fuse wrench?

It shouldn't have happened to a dog, you say?

How true, how true.

But be assured, friend. It did, and not to a dog, either. It could again.

THE NITTY GRITTY

Even Jedediah McPoolball, the official village idiot of Back-of-Beyond, Okla., wouldn't have much trouble deciding after hearing the arguments for the defense that sound unit training is a joy and a blessing for all.

Everybody can agree on the why of the subject. The *hows* and the *whens* come a little harder, even for aviators with mental horsepower ratings far above poor Jedediah's.

How in tunket can a unit undertake a training program when it is already in the red on its time allotment and the airmen are loaded to the gunwhales with workloads sufficient to make any self-respecting worker throw down his tools and walk off the job?

It ain't easy, as the circus sword-swallower said when asked about his trade. But it can be done and it *is being* done, even under the toughest conditions. Always with that gratifying drop we've noted in the accident rate, which makes the whole thing seem worthwhile, no matter what the extra effort required.

One sound procedure for the man undertaking a project is to copy somebody who is already doing the same thing successfully. As a starter, then, let's peer in on a unit which has a training program going full steam ahead without having had to pass any major miracles, wave magic wands, or call in a team of high-priced efficiency experts.

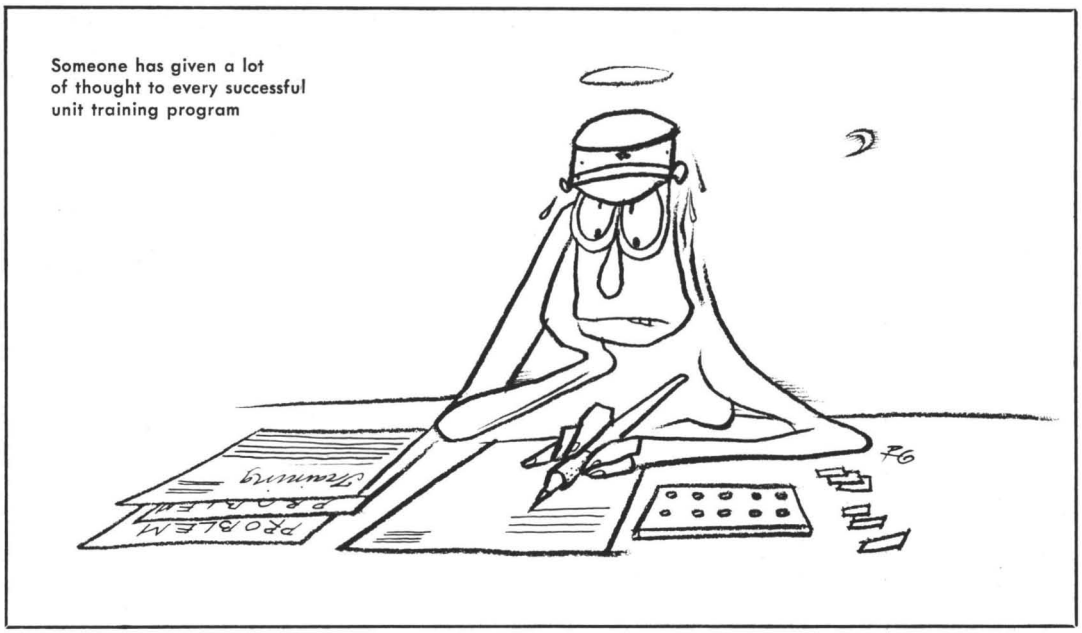
The first thing you will note is that somebody—the commander, maybe, or the safety officer—has given a lot of thought to the program. He has considered the particular terrain, weather and operational conditions the outfit finds itself in *at the moment*. He has taken a hard look at the mishaps of the past few months, noting any changes in pattern, any particular type of mishap the unit seems to be in the habit of making more than others. He has evaluated the personnel. He has considered the operational workload.

Once he knows what the program ought to aim for, the next problem is getting on target. There are about as many ways to hit it as there are to get rid of the weekly paycheck. Here are just a few of the items on the agenda of a training-conscious unit which likes to boast about its bright, shiny A-1 accident rating.

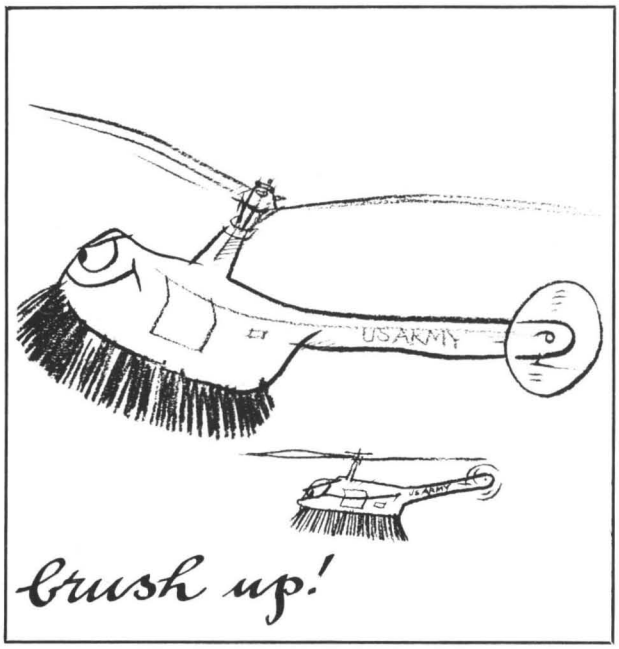
1. They keep one Huey set aside at all times for training purposes. This, again, ain't easy. The normal temptation to anyone who spots a Huey napping in the shade while everybody else is working is to find a job for it. These lads keep their's surrounded by barbed wire and plastered over with No Hunting Allowed signs.

2. They require a 90-day proficiency instrument check for all aviators, no matter whether they have been flying 1 year or 20.

3. They encourage their airmen to take advantage of every opportunity to train. On the way back



Someone has given a lot of thought to every successful unit training program



from a mission, for instance, pilots take turns flying instruments and looking out for other aircraft.

4. They insist on high standards of performance. This means that in addition to top-notch flying and maintenance techniques, personal equipment, such as first aid kits and survival gear, is always handy and in apple-pie order.

5. Whenever possible they hold informal safety get-togethers at which aviators and maintenance personnel sit down and talk over their problems. They have learned that a mechanic who has noticed something wrong—improper writeups for instance—will speak up in an open meeting when he might not want to tell the pilots themselves. They have learned, too, that once pilots develop a full appreciation of the fact that maintenance men have as many problems as they do, and sometimes more, they develop an understanding spirit which can make things easier for all concerned.

6. Standard procedures are a must. Pilots know and respect their dash 10s the way young mothers do their books on baby care. Mechanics' toolboxes are as orderly as West Point's Baker Company, First Battalion, on parade. Everybody goes by the book and when an emergency or an equipment shortage forces a change, all hands feel their way along with the caution of Admiral Perry crossing the ice to the North Pole.

7. New men in all categories are given special attention by those who have been around for a while and know the ropes. Nobody is asked to do something unless it is dead certain he *can* do it. Nobody gets pushed or overextended.

8. They are picky about the little details which can cause big trouble if overlooked. Aviators would no more go without their Nomex flight clothes, helmets, and gloves than they would be caught at high noon on Main Street wearing nothing but a fig leaf and a foolish grin. Everybody is aware of the importance of the survival kit, of the proper use of tools, and of keeping all equipment hale and healthy. They are not only aware of it, they are not allowed to forget it. The training program sees to that.

9. They have a program to meet new conditions. When they are transferred from the lowlands to a base high in the hills, brushing up on new approach techniques gets top priority for awhile.

It wouldn't be hard to go on to add a few items. In fact, you could probably keep at it for a day or so and still not cover all the special areas a particular unit's training program might cover. A training program is like a $250 suit. It has to be tailored if it is to fit properly and not pinch at the waistline. No two programs will ever be exactly alike. The one a unit has thought out will be different from the one another unit has in operation a half mile or so down the road. And they are constantly being adjusted, the way our friends the Jets set their defense to meet an off-tackle slant. If the defensive captain is calling them correctly, nobody ever gets mousetrapped.

ON THEIR TOES

Alertness is one of the prime requisites of a training program, too. When you run across a unit which has no program worthy of the name, you'll discover one which is suffering from a severe attack of Creeping Complacency, an ailment which can be fatal if not diagnosed in time. Army aviation, in or out of combat, is a risky enough trade without making things worse. Sure, we all know that nothing we can do will probably ever result in *all* accidents being eliminated. We can at least give it a whirl.

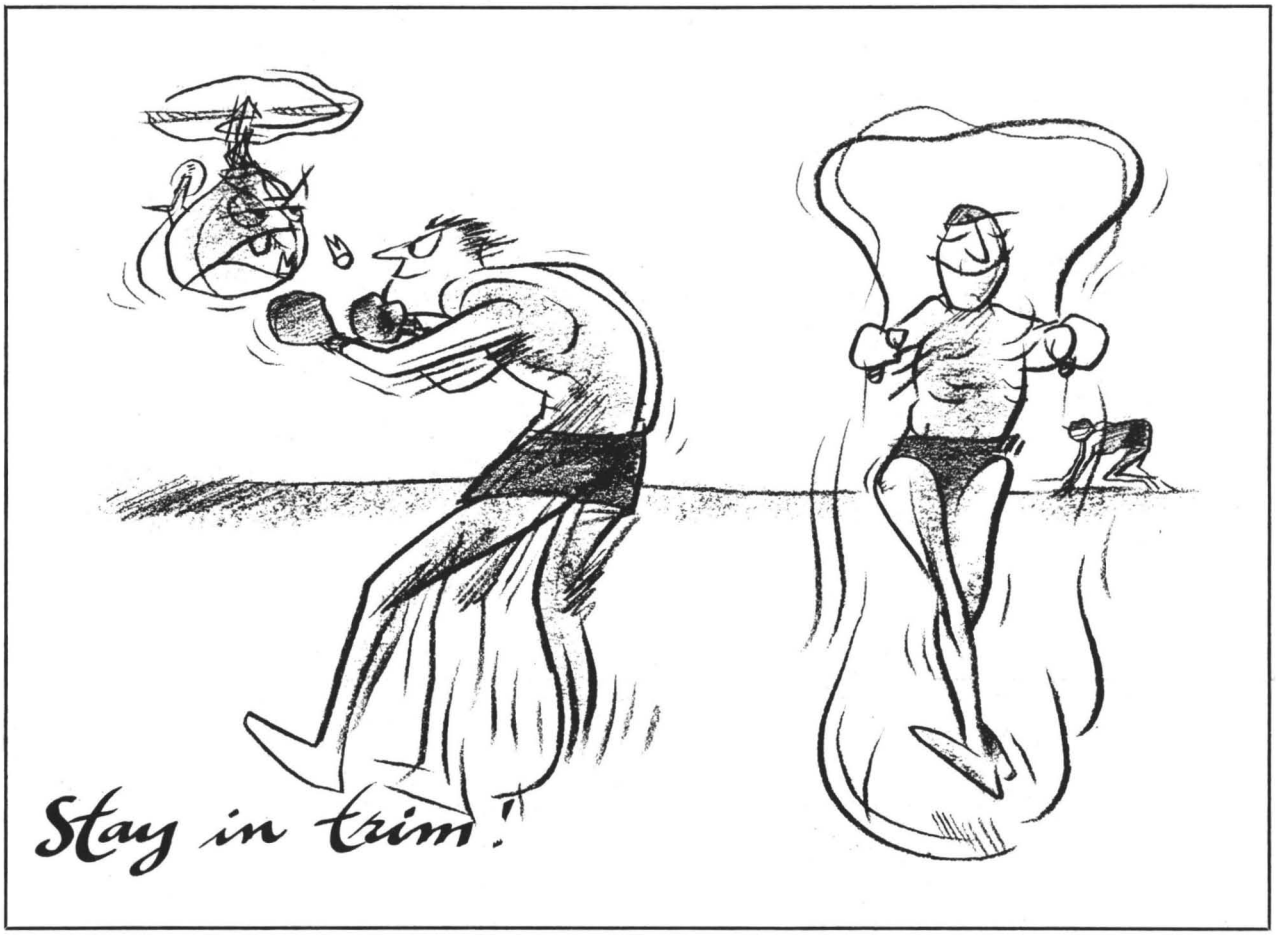
A sound training program is about the most effective instrument yet devised to keep airmen and mechanics on their toes, their performance up to, but not beyond the level of, their capabilities. Left entirely on your own, you would have to be superhuman not to let down bit-by-bit, to slack off in some areas, to resort to dangerous shortcuts, and to develop a few lefthanded notions about techniques you'll never find in any TM. We all need a little prodding now and then to get along in life. A training program does just that.

Safety depends on efficiency. A man is efficient in Army aviation only when his reflexes, procedures and techniques have been honed to a sharpness that would turn blade manufacturers green with envy. When accidents happen, they happen in a hurry. The poor soul whose reflexes are covered with barnacles is the one who gets it in the neck.

Hard work? Sure. What isn't these days? But necessary! Is there a dissenting vote in the house? If you do happen to have a few lingering doubts, all you need is a little imagination. Just imagine your unit's next accident and then put yourself in the cockpit. Or imagine it and then imagine that it was caused because you used the wrong tool or failed to follow the book on some maintenance procedure.

Now start imagining how that accident can be prevented.

You won't have to imagine very long.



Colonel Robert M. Hamilton

COL Hamilton. Chief, Aviation Division, Military Operations and Reserve Forces, USCONARC, was director of USABAAR from June 1962 to June 1965. He is a dual rated master Army aviator and his past assignments include assistant commandant of the Army Aviation School, Ft. Sill, and aviation officer for the 7th and 8th U.S. Armies.

TELL IT LIKE IT IS

a hard look at Army safety

LET'S TAKE ANOTHER hard look at Army aviation safety! It seems, unfortunately, that most of us associated with the Army aviation business become complacent from time to time, although accident cause factors, safety tips, fatality rates and other words of wisdom expostulating the *safe way* punctuate many of our official publications. Of growing concern is the fact that excellent articles, briefings, technical papers and similar vehicles designed to disseminate the word are being partially ignored. This outlook is distressing at best, has no place in a professional community, and undoubtedly contributes to loss of life and equipment. This suggests it might be time once again to frankly discuss the real problems facing us in aviation safety. With that in mind, let's consider a few facts:

Table 1 shows the aircraft accident rate on a worldwide basis. As you can see, while the rate has decreased since FY 1964, it has remained fairly constant for the past 4 years, but the average cost

TABLE 1
Worldwide Army Aviation Accident Experience
(From the USABAAR Files)

FISCAL YEAR	RATE (per 100,000 flying hours)	AVERAGE COST PER ACCIDENT (less injury cost)	FATALITIES	PILOTS	OTHERS	TOTAL
1964	26.0	$ 70,103	FW	23	29	52
			RW	22	41	63
			TOTAL	45	70	115
1965	21.6	$ 77,125	FW	10	4	14
			RW	24	42	66
			TOTAL	34	46	80
1966	20.0	$105,908	FW	19	13	32
			RW	36	109	145
			TOTAL	55	122	177
1967	22.1	$120,069	FW	13	9	22
			RW	60	159	219
			TOTAL	73	168	241
1968	20.4	$113,310	FW	24	25	49
			RW	118	261	379
			TOTAL	142	286	428

TABLE 2
USCONARC Army Aviation Accident Experience
(From the USABAAR Files)

FISCAL YEAR	RATE (per 100,000 flying hours)	AVERAGE COST PER ACCIDENT (less injury cost)	FATALITIES	
1964	24.5	$73,812	FW	21
			RW	26
			TOTAL	47
1965	20.8	$67,994	FW	6
			RW	32
			TOTAL	38
1966	13.8	$64,285	FW	8
			RW	10
			TOTAL	18
1967	10.8	$57,330	FW	9
			RW	49
			TOTAL	58
1968	10.3	$48,385	FW	13
			RW	36
			TOTAL	49

per accident and the number of fatalities have risen. Table 2 shows CONARC experience. Here, the rate and average cost per accident show a downward trend. Of course, the reason for this is that most of the costlier aircraft are overseas. Also, in CONUS, we enjoy a more controlled environment.

On the fatality side, there is a continuing upward trend on the worldwide basis, with a staggered pattern in CONUS, due again to exposure, supervision and environment.

It might be well to comment on the manner in which we analyze what we do and how we do it by using a rate based on a number of accidents per 100,000 flying hours. It is questionable whether we are not kidding ourselves into believing that when the rate is low we are doing well and when the rate is high we are not doing so well. I wonder if this is really true. As many readers will agree, the Army aircraft accident rate at one time was much higher than either the Air Force or the Navy. This was due to a difference in criteria. It was extremely noticeable in those type aircraft common to all three services.

Using the U-6 as an example, any crash that required over 50 man-hours to repair constituted a major accident in the Army. In the other services, it required 400 man-hours of repair before it became a major accident. By tri-service action, it was agreed that standards for comparison on like type aircraft should be the same to present a true picture. As a result, the Army rate for that particular aircraft was reduced considerably.

So a rate based on variable criteria can be manipulated to show almost anything you want. This poses the question: "What does it tell the commander?" Are we comparing superior performance between units? Are we comparing mediocrity? Or are we comparing unsatisfactory performance? And does a low rate really tell a commander that he is doing OK? Wouldn't it be better if we told the commander that aircraft accidents this month cost his command this many thousands of dollars, that so many people in his command were killed, and that his combat readiness posture was reduced a certain percentage? Quite possibly, more emphasis on the effects of accidents in terms of money, lives, and combat readiness, rather than on rate, is in order.

Now a little about the cost of modern Army aircraft. Table 3 shows only the modern fleet. Obviously, costs are going nowhere but up. One of these days—it started about a year ago—we are going to have to live with fewer dollars, and, according to popular military opinion, we cannot afford to lose one single modern helicopter at the going rate of well over a million dollars per copy.

Let's take a look at the cost of all Army accidents on a worldwide basis and on a CONARC basis. Table 4 shows the total Army costs from accidents, the aircraft losses, and the percentage of the total attributed to aircraft losses. Thinking should not be confined to the fact that these losses might be less than the Air Force or the Navy, but we should face the fact that we, in the flying business, contributed 84 percent of the total cost and 66 percent of the

TABLE 3
1968 Total Cost of Army Aircraft
(Less Armament)

AIRCRAFT	COST	ADDITIONAL ARMAMENT COST
OH-6A	$ 79,420	
OH-58A	81,204	
CH-54	1,843,461	
CH-47C	1,537,200	
OV-1C	1,058,540	
UH-1D	249,285	
AH-1G	365,254	$133,052 (XM-28)

TABLE 4
Direct Federal Costs of Army Accidents
(Less Injury Costs)
Worldwide

FISCAL YEAR	TOTAL ARMY LOSS	AIRCRAFT LOSS (REPAIR AND REPLACEMENT)	AIRCRAFT % OF TOTAL ARMY LOSS
*1964	$ 62,171,000	$ 24,757,000	40%
*1965	$ 39,447,000	$ 24,402,000	62%
1966	$ 98,644,000	$ 52,636,000	53%
1967	$109,242,000	$ 96,415,000	88%
1968	$137,942,000	$118,523,000	86%
USCONARC			
1964	$ 20,412,000	$ 17,416,000	85%
1965	$ 19,535,000	$ 15,236,000	78%
1966	$ 13,586,000	$ 10,958,000	81%
1967	$ 11,852,000	$ 7,800,000	66%
1968	$ 15,721,000	$ 10,315,000	66%

*Less RVN Accidents

CONARC cost last year. It would appear extremely difficult for any of us to answer the question, should it be posed by some congressman: "What are we in the Army doing about this loss?"

In the interest of honesty, we would have to say that we aren't doing enough. It is revealing to note that what we have really lost in the way of assets could have been used very effectively in the aviation program in various places. As shown by table 5, the 118 million dollars lost last year would buy 412 UH-1B's, equivalent to 16 airmobile light companies; 67 CH-47's, equivalent to four medium helicopter companies; or 56 CH-54's, equivalent to six heavy lift companies. The Army could do a much better airmobility training job if these assets could be turned to a more productive area.

The real problem is to analyze the reasons for accidents. Table 6 shows the main areas of concern. We must start to look at a nebulous and unpredictable area known as people. Apparently, we have never learned how to manage aviation people successfully. These comments are not aimed at the personnel types, because it is recognized there are congressional restraints, there are do-gooders, there are Army regulations, there are hardship cases and they all contribute. But the fact remains that out of 112 aviation units deployed to RVN in the last 3 years, not a single one met its POSD, which is the starting date for meaningful training.

While on the subject of people, I think there are a few other areas that could be looked into. Why is it that if you rack up a vehicle through careless operation, you get an opportunity to buy a part of it? Yet, in aviation, we can hover a helicopter into a lightpole free of charge. I feel we should also take a look at our so-called privileged information which is tied up in accident reports, and ask ourselves whether or not the testimony of a pilot given on the basis of preventing other accidents could not be used in any other form of action against him. Is this a fact, or is it not a fact? Part of the people problem is the attitude taken by too many people.

There is no question that the aggressive attitude of a recent graduate aviator is a great asset. But, at the same time, another question comes into focus. Have we overdone this indoctrination? And if we have, what can we do about it? In the Vietnam operation, from an aviation viewpoint, as far as fatalities and accidents are concerned, the VC have not been the principal enemy. In short, we have killed more of each other than Charlie has ever managed to do, and somehow we have got to stop it.

As aviators, we are normally the proponent of what is to be done in the aviation safety program. Consequently, it might be deduced that if we don't police ourselves, somebody else will do it. And this is not a satisfactory solution to the problem. The accident record in Vietnam, and reference is made only to the nondivisional units, has been under the cognizance of Army aviators. Unfortunately, it has remained fairly constant for the last 3 to 4 years. There is no question that command emphasis plays an important role in the safety program, and it must be consistent if desired results are to be attained.

TABLE 5

FY 1968 Army Aviation Accidents Resulting in a Loss of $118,523,010 Represents:

412 UH-1D's = 16+ Airmobile Light Companies

OR

67 CH-47's = 4+ Medium Helicopter Companies

OR

56 CH-54's = 6+ Heavy Helicopter Companies

TABLE 6

Worldwide Established Army Aviation Accident Cause Factors (From the USABAAR Files)

Cause Factor	FY 1967	ACCUMULATIVE AVERAGE
Crew Error	68.4%	63.0%
Materiel Failure/Malfunction	15.3%	25.0%
Maintenance Error	2.7%	4.0%
*Other	10.6%	8.0%

*Other cause factors include: psychological, physiological, design, facilities, personal equipment, weather, acts of God, etc.

Let's devote a few minutes to addressing organization for safety in the Army. The present structure/responsibility poses a number of questions. How responsive is it to the commander? Is it a program that restricts operations or does it enhance operations? Is it a preventive matter, or is it in fact bookkeeping? Is it a total management program of resources? Maybe we need a different command line for greater emphasis in this area. We can learn a lot by taking a look at the safety organizations of all three services. A question worth some study is why is safety in personnel? Why isn't it in Ops or Log? Better yet, why is it in any of them? Figure 1 gives an idea of how the Navy is organized for safety. And I might add that their recent reorganization has pulled something together that the Army might well emulate. The Navy has recently placed safety at the Assistant Vice Chief of Naval Operations level, with the Naval Safety Center operating directly under that office.

The Air Force, figure 2, has its safety program under the Inspector General. Whether this is the right place for it or not is subject to question. The Tactical Air Command Safety Division reports directly to the Chief of Staff. Nevertheless, there is a minimum amount of staff coordination required to get to the top level.

Figure 3 illustrates the Army setup for safety. The important fact is how far from the commander it really is. History reveals that it takes anywhere from 1 to 3 years to get action in certain areas before positive corrective measures are initiated. As the Office of the Assistant Vice Chief of Staff is one of management of resources, consideration should be given to placing the entire Army safety program at that level and combining separate general, air, industrial and nuclear safety programs. AMC has taken the lead in this area by combining these programs and placing them under the Chief of Staff.

Another area which merits study, can stand improvement, and will no doubt enhance the safety record is an Army-wide flight standardization program. This program is not the answer to all safety problems, but the lack of standardization evidenced by accident experience is a manifestation of the need for a quality control program. In 1963, USABAAR developed a study on Army aviation standardization that hardly got off the ground. In 1965, USCONARC

FIGURE 1
UNITED STATES NAVY SAFETY ORGANIZATION

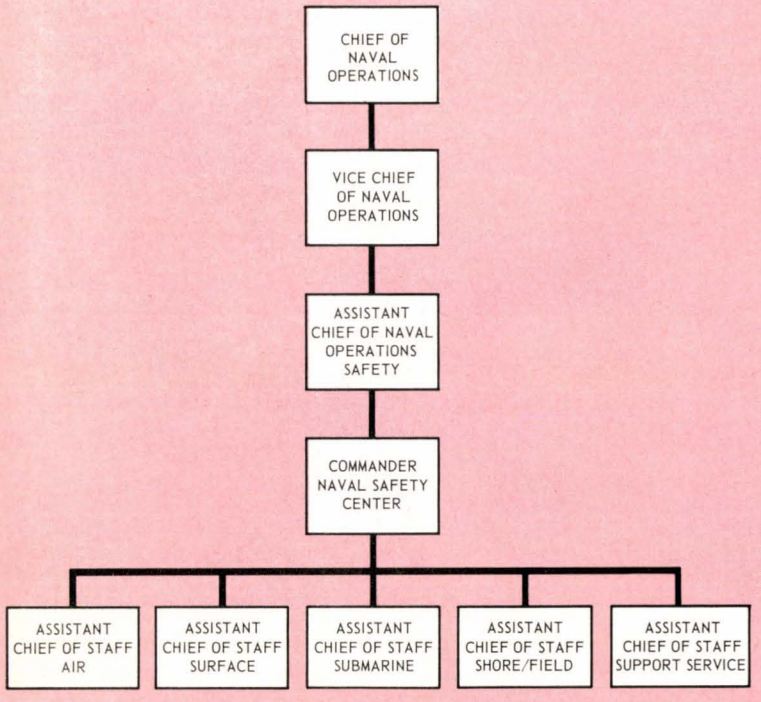
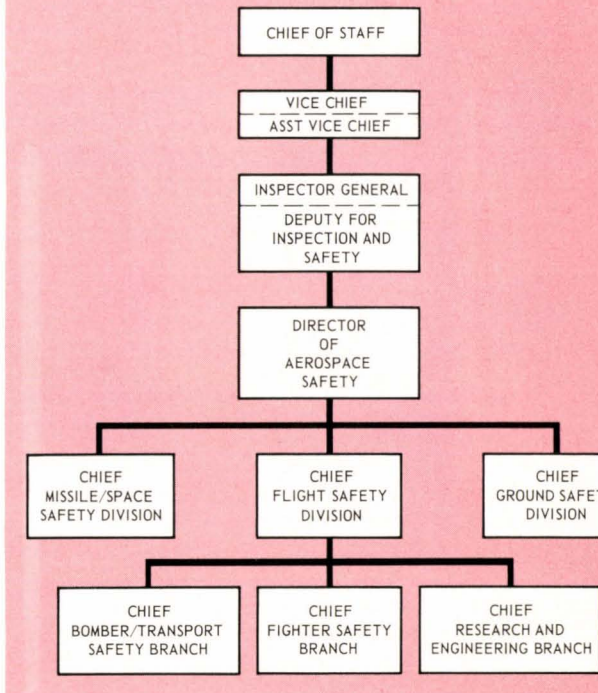


FIGURE 2
UNITED STATES AIR FORCE SAFETY ORGANIZATION



submitted a draft AR entitled, "Transition Training, Instructor Pilot Qualification And Designation." This was turned down on the basis that it was considered inopportune to implement the regulation due to aviator personnel turbulence. This brings up the question: "When do you need a quality control program more than when you have extreme personnel turbulence?" This is the time when it will really pay off. Four years later, a realistic standardization program is still under consideration. Hopefully, this most important program will be placed in effect in the near future.

The "Naval Air Training and Operating Procedures Standardization Program," NATOPS, could well be an excellent base line for such a program in the Army. In addition, we could well look at the operational readiness inspection of units conducted by the Air Force, which uses precise and specific safety criteria which readily identify weak commanders and unacceptable practices.

Figure 4 gives a feel for an area where we must really expend some effort. Again, rate is not the whole story. The increase in fatalities is alarming. This upward trend must not only be checked, but reduced. The cost in dollars, which represents depleted assets, must be lowered, or someone might decide they can't afford Army air as a means of mobility.

I recommend that we in Army aviation collectively take a hard look at these real problem areas:

We must get tough with our people on a "shape up or ship out" basis and demand professionalism.

We must "tell it like it is" and not confuse the facts with figures.

We must institute safety management wherever we can.

We must analyze our organization for safety to insure that the command emphasis it requires is built in at the top.

We must have a program that enhances our operational capabilities and which can be accomplished by training and standardization.

Most of all, we must take a positive and firm approach to a problem that becomes more serious every year. There has never been a payoff from negative safety.

FIGURE 3
UNITED STATES ARMY SAFETY ORGANIZATION

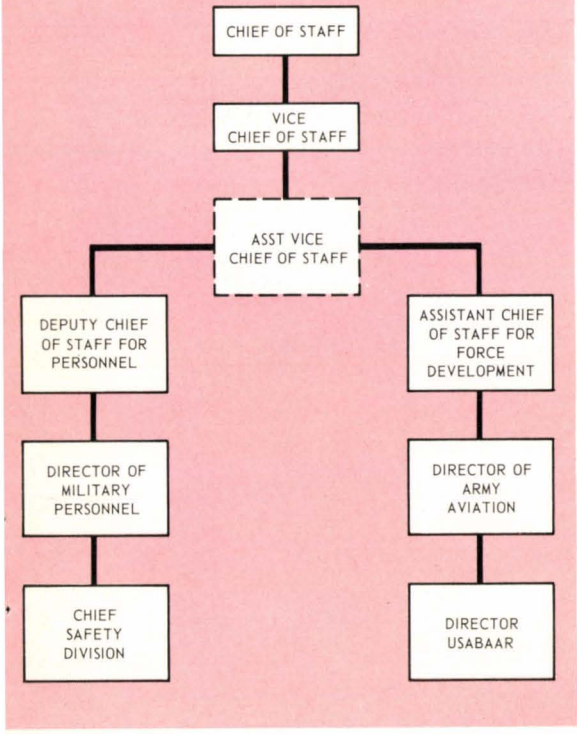
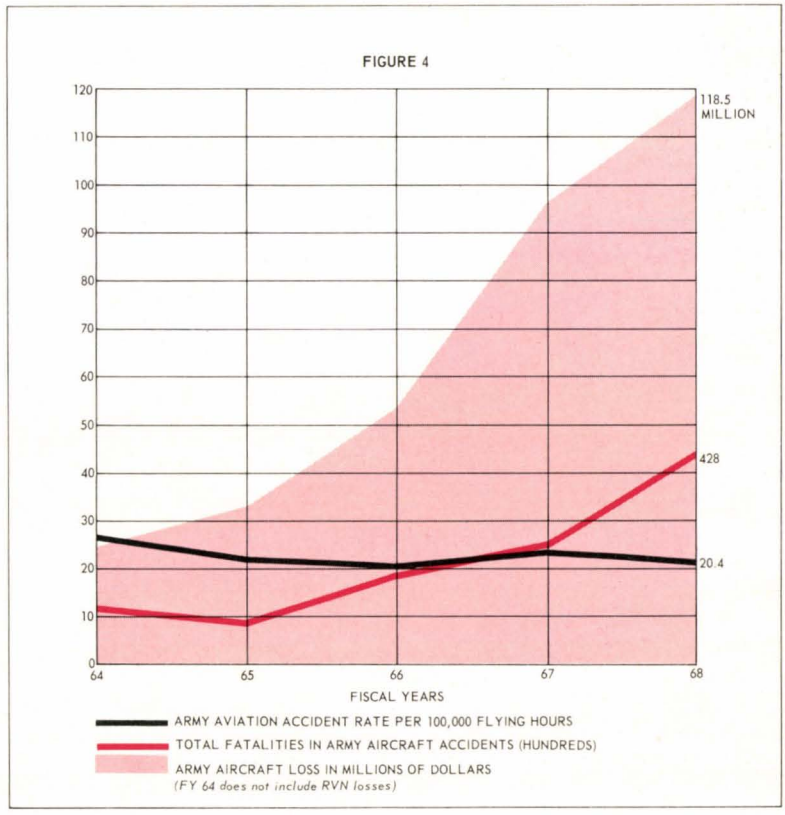


FIGURE 4



Unbelievable!

Pierce Wiggin

TWO FACTS WERE unbelievable. First, someone pushed the wrong computer button and Major Horatio Frozzleforth's name dropped into the replacement slot for helicopter unit commanders. Orders were cut and reached the self-acknowledged world's greatest aviator late one summer afternoon.

Second, for the first time since the family doctor slapped him into life, Frozzleforth was silent. He did not question his orders; he did not join the 3-day celebration that was to mark his departure from a remote stateside post; he did not flirt with the stewardii during the long flight over; he made no attempt to influence the DC-8 captain's flying; and his only comment at division headquarters had been, "Very good, sir!"

Sick? Mentally depressed? Not Horatio Frozzleforth! His pace had never been more brisk. The years and trails of empty cups had been kind. He had the military bearing and frame of a sophomore cadet. His fierce eyes challenged the elements and his smile sparkled whitely under his handlebar mustache.

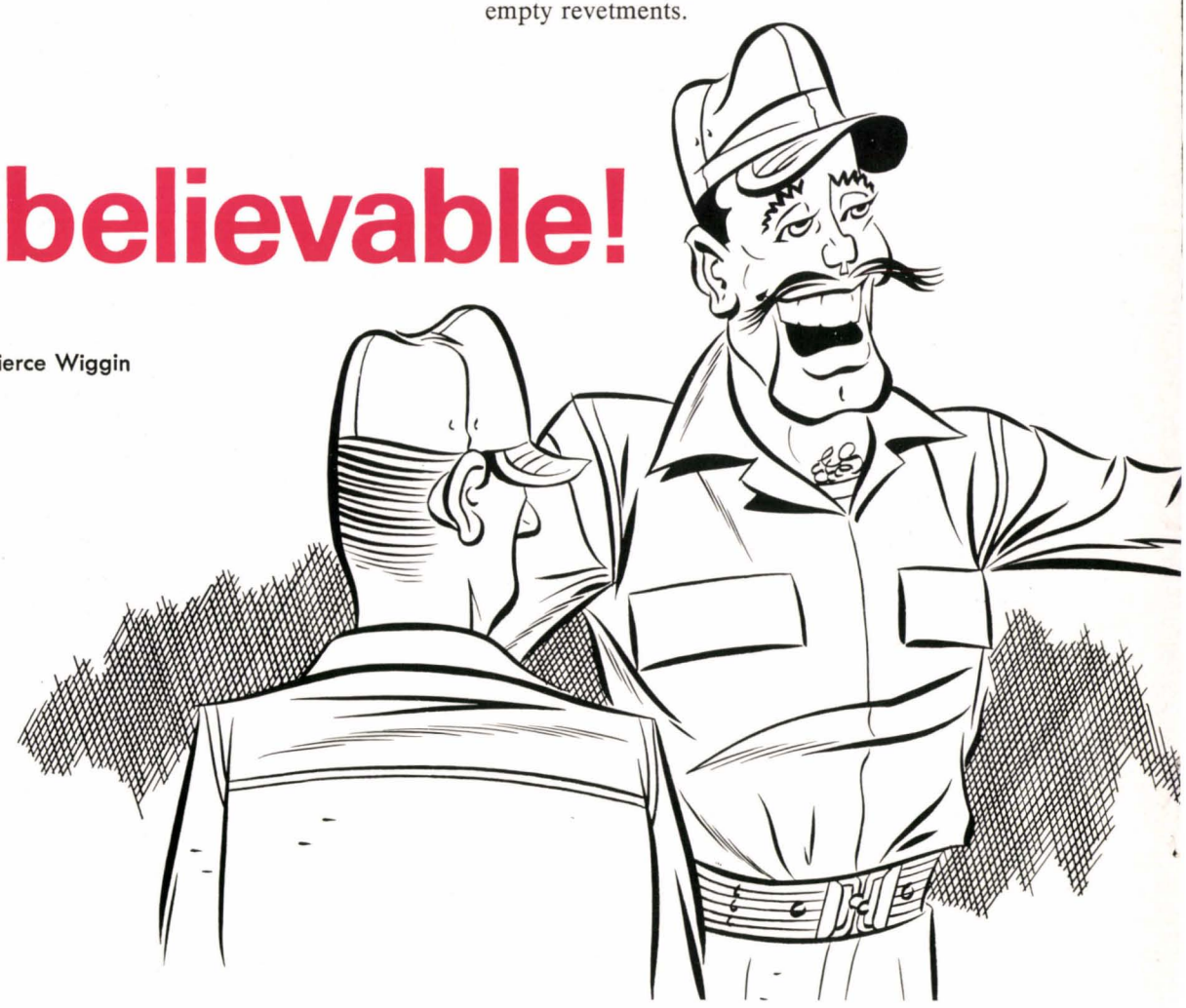
Frozzleforth had never felt better. Truth was, he had a secret and in true cloak-and-dagger style, it was going to remain his secret, his alone. On the night his orders came, he stood several rounds at the bar for some recent RVN returnees, also treating them to many colorful accounts of his aerial exploits. When he casually let drop the fact that he was on orders, a nodding captain snapped awake. "Where to?"

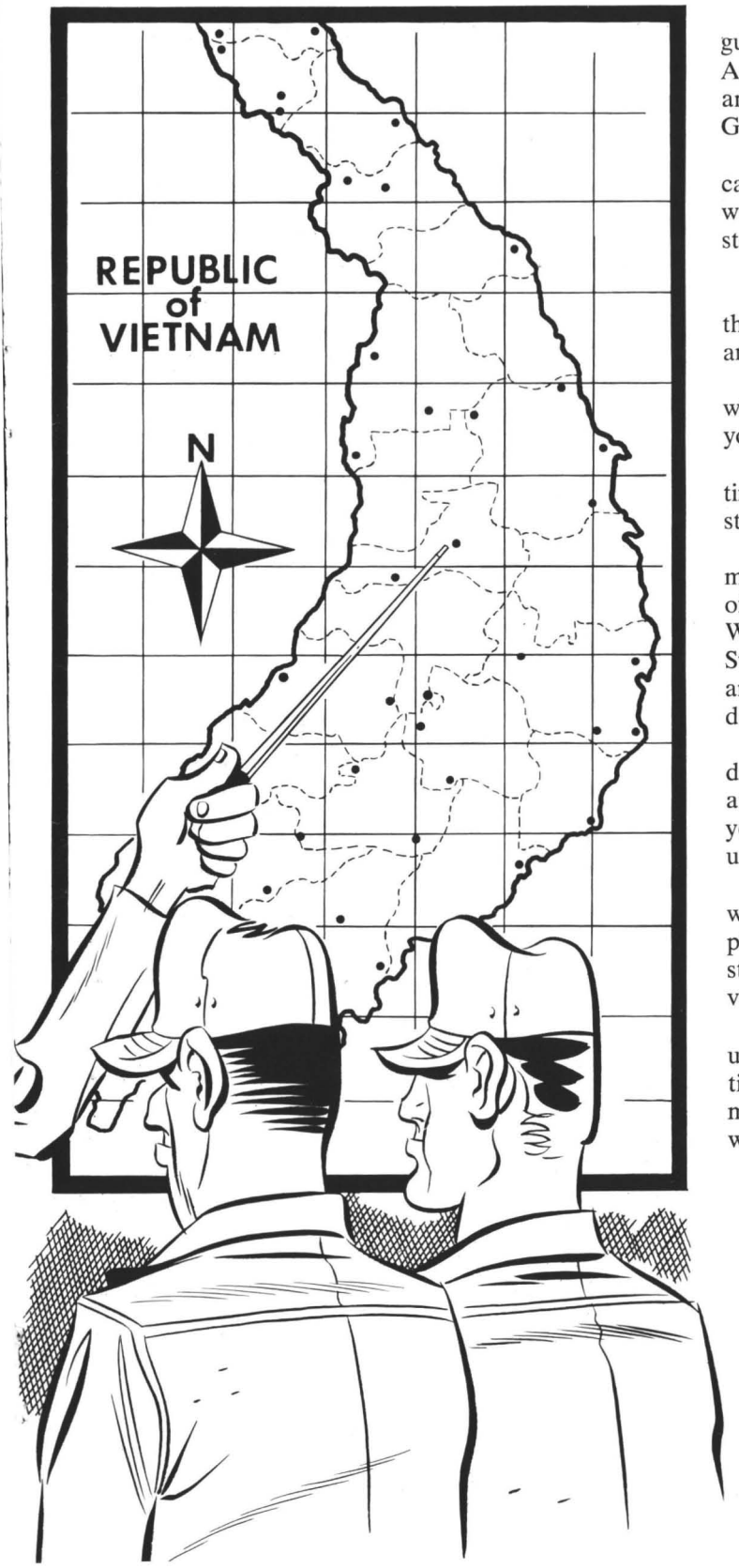
Horatio named the division. "I believe they're in the Delta."

"Not for long. I just came from headquarters and they're slated to move to the highlands."

"Excellent! Excellent! Nothing like a spot of mountain flying to test the old mettle! Here, your glass is empty. Bartender, I say, bartender . . ."

As the Huey started to descend, Frozzleforth sat erect and looked down at the flat green terrain, a checkerboard of rice paddies, criss-crossed with streams and dikes. They passed over a canal, flared, and hovered along a PSP taxiway between rows of empty revetments.





As they neared a group of flat buildings, a ground guide appeared and signalled for the pilot to land. As the skids touched, the pilot lowered collective and turned to his passenger. "Here's your new home. Good luck!"

Frozzleforh stepped out and returned a waiting captain's salute. He passed his bag to the guide, waved to the pilot and walked to where the captain stood.

"Major Frozzleforth?"

"Indeed it is, captain, indeed it is!" He stared at the officer's chest. "And I see you're Captain Stewart. What might your job be?"

"I'm your operations officer, sir. If you'll come with me, I'll show you your quarters. I'm afraid you'll find them a little primitive . . ."

"Have no fear, Stewart. I've roughed it many times in my vast experience. Is our unit up to strength?"

"Afraid not, sir. We're three pilots short and the maintenance officer told me this morning that four of his mechanics are due to ship out this week. We've had no word on replacements." Captain Stewart stopped. "Major, there's a rumor going around about us moving. Did you hear anything at division headquarters?"

Frozzleforth came to an abrupt halt and glared down at the captain. "Stewart, I don't want to hear any more of that kind of loose talk! As an officer, you should know that any information regarding unit deployment is strictly classified."

"Yes, sir, but if we are going into the highlands, we need to start training right away. None of our pilots have any mountain experience and I understand the weather's stinking up there. We've had very little instrument flying."

"Nonsense, Stewart. Are we running a combat unit or a nursery? This is war, man! We don't have time for all the little niceties. As long as I'm in command, this unit will give top performance anywhere we're ordered. Is that understood?"

"Yes, sir! Are the maintenance and safety officers

also to be kept in the dark about the move?"

"I said I didn't want to hear a word about it from anyone." Frozzleforth stared down at the captain and slowly shook his head. "It's amazing how you got to be a captain and operations officer of a combat unit with no more understanding of management than you display. Hasn't anyone ever told you that top echelon planning should always be concealed from subordinates until it becomes policy and is placed in effect? Don't you realize that's the only way to prevent rumors and avoid a lot of nonsensical advice from every junior officer and noncom in the outfit? Think, man, think!"

"Sir, some of your junior officers, as you call them, myself included, and several of your noncoms are here for a second tour. With their experience and knowledge, it just might be that their advice is more factual and pertinent than nonsense.

"Here is your hut and operations is just across the way. Chow will be served at noon. Is there anything more I can do for you?"

"No thank you, Stewart. I'll be over after I stow my gear."

Captain Stewart snapped a salute, about faced and marched through the dust of the operations hut.

Several weeks later, Frozzleforth, resplendent in a new Nomex flight suit, boots polished to mirror brightness and nonissue pigskin gloves, stood before the operations hut at dawn to address his assembled unit. In true World War I movie style, he tapped his swagger stick against his leg, then dramatically pointed it at the large map tacked to the bulletin board. "All right, men, this is it! Let's synchronize our watches.

"We move out sharply at 0800. I'll be flying lead, of course. I want the aircrews aboard, with all their gear, at 0730. The Chinooks will be here to load ground personnel and gear at 0900.

"We'll refuel here," he said, tapping the map again, "pick up troops at LZ Lowe in this position, fly through this pass and deliver them to the fire support base atop this mountain." The tip of his swagger stick came to rest against a brown spot on the map. "Any questions?"

Captain Stewart stepped forward. "What's the elevation, sir?"

Frozzleforth peered at the map. "I make it to be about 2,800 feet, Stewart. Why?"

"It appears we'll be arriving about midafternoon. I imagine the temperature and pressure altitude will have risen considerably by then. Have you established a load limit?"

Frozzleforth's face reddened. He pounded the swagger stick into his palm. "Captain Stewart, we'll carry whatever is required by our move and by the supported unit! Now, are there any other questions? I think we've wasted enough time . . ."

"How about a weather briefing, sir?"

Frozzleforth dropped his arms and gazed heavenward, then brought his eyes back to the captain. "If you'll rub the sleep out of your eyes, Stewart, you'll see there isn't a cloud in the sky! All right men, break it up and get cracking!"

Frozzleforth watched the rice paddies and streams move past beneath his Huey, then turned to stare back at the following helicopters. He keyed his mike. "Pelican leader to all Pelican aircraft. Let's close it up! We're supposed to be flying formation!"

As they reached the refueling point, the sky remained mostly clear, with only a few small puffs of cumulus on the horizon. It was hot on the ground and the crews, sweating in their flight suits, hurried the refueling, eager to get back into the cooler air aloft.

It was approaching noon when they landed in the dust of LZ Lowe and shut down to step out into the blistering heat and make their way to the mess line in the shade of the trees bordering the large open area. The cumulus clouds to the northwest had grown into solid masses as the heated air, blown inland from the sea, rose and its moisture condensed.

After they had eaten, the helicopters were refueled and the waiting troops were loaded aboard with their gear. Frozzleforth gave the starting signal and the turbines whined into life. He watched the engine rpm climb to 6600, then gave a thumbs-up signal to his pilot. As he pulled collective, dust swirled around them and the heavily loaded Huey lurched from the ground. The rpm promptly dropped to 6300.

"Beep it up, man, beep it up!" shouted Frozzleforth into the intercom. "Let's get out of here!"

They moved forward out of the dust and began to pick up speed. Frozzleforth raised his visor, wiped the sweat from his face with a gloved hand and turned to stare back at the dust-covered LZ. A voice crackled in his earphone, "Pelican leader, this is Pelican six. We're pulling all we have to hover. I'm sitting down to drop some of this load. Over."

"Negative, Pelican six!" shouted Frozzleforth. "We made it with power to spare. Move out!"

The aircraft commander of Pelican six swore into his visor, recalling his commander's ancestry in pungent and forceful terms.

Ten of the first 12 helicopters made it into the air. Pelican six and Pelican nine, losing rpm and caught in the turbulence of swirling rotorwash, dropped and smacked into the ground, spreading their skids. Flexing rotor blades chopped through

tail booms and the formation was reduced by two.

Captain Stewart, leading the last element of three, held on the ground until the dust partially cleared and the rotorwash from the preceding helicopters settled. He then picked up and moved forward, holding his breath until they reached translational. Frozzleforth's voice drummed into his ears as they passed the wreckage of Pelican six and nine.

"Stewart, what in blazes is holding you up!? Get a move on, man! You're holding up the whole show!"

"Sorry, sir. We were waiting for the wreckage and dust to settle. Are you aware that you've lost two aircraft?"

Frozzleforth's reply scorched the airwaves as he delivered his opinion of incompetent airmen, ending with, "I'll deal with them later, Stewart! Hurry and get in formation! My patience is wearing a trifle thin with you!"

Once again in formation, the helicopters flapped their way northward toward rising terrain and towering clouds. Frozzleforth glowered at the jungle below and the mountains ahead, his thoughts on the two wrecked helicopters. Where, he wondered, was the Army getting pilots who couldn't get airborne with a little load?

As they passed into the shadow of the clouds, a light drizzle began to fall. The taller mountains ahead extended into the overcast. Frozzleforth unfolded his map, studied the terrain and nudged the pilot. "Over there." He pointed to a break in the mountains. "That's the pass we want. You may have to go down some."

The pilot nodded and began a slow turn and descent. Frozzleforth keyed his mike. "Pelican aircraft, close in. We're heading into the pass."

The light drizzle became a steady downpour as they approached the mountains. The sky darkened and wisps of fog began to appear at their level and below. Visibility dropped to less than a mile and the mountainside rose sharply before them.

"Pelican leader, this is Pelican ten. I just contacted weather on another frequency and they advised the pass is IFR. I suggest we turn around and land until it clears. Over."

"Pelican ten, get off the air! When I want your advice, I'll ask for it! All Pelican aircraft close in and keep your eyes open. We're going through!"

The hammering rain lessened as they approached the opening between the mountains, but the fog thickened. Too late to turn, Frozzleforth saw a solid gray wall ahead. "Pelican aircraft, 180 right! 180 right and climb!" he shouted, grabbing the controls. "I've got it! I've got it—"

His voice stopped suddenly as he felt a smashing jolt to his head and blacked out.

Frozzleforth came to slowly, with a pounding headache. He opened his eyes, fully expecting to find himself in the smashed wreckage of a UH-1 on a mountaintop. What he saw instead was his bedroom slippers 6 inches from his nose and the blanket he'd dragged to the floor when he fell out of bed. He placed his palms on the floor and pushed himself painfully to a sitting position, staring down at his red pajamas.

Awareness came slowly. A vile taste, not unlike the odor of dirty socks, reminded him of the many rounds he'd consumed the night before. Vaguely, he remembered a captain telling him his unit was to move to the highlands. It had been very late when he returned to his room. Suddenly, he remembered the envelope he'd found under the door. He pulled himself erect, staggered to the desk and reached for the envelope with trembling fingers. He tore it open, unfolded the single sheet and read: "Frozzleforth, Horatio Z., III, Major . . . transfer orders rescinded . . . Major Frozzleforth is to remain in present assignment indefinitely . . . BY ORDER OF . . ."

PEARL's personal equipment and rescue / survival lowdown

Dear Pearl:

This letter is to request further information on the PSK-2 personal kit and the SEEK survival kit which are discussed in ST 1-100-1, "Reference Data for Army Aviation in the Field Army."

Captain William D. Frew, MSC
Instructor
General Subjects Department
U.S. Army Armor School
Ft. Knox, Ky.

Dear Captain Frew:

The PSK-2 and SEEK-1 kits referred to in your letter are no longer items of issue. If issued, however, they may still be in use.

The survival kit, lightweight, individual, replaces the SEEK-1 kit. The contents of each kit certainly must be a consideration for developing a class on first aid and survival procedures.

Some other publications that may be of use to you are:

FM 21-76
Survival
TM 55-8465-208-10
Survival, Kit, Leg Holster, Individual
TM 55-8465-212-10
Survival, Kit, Cold Climate, Individual
TM 55-8465-213-10
Survival, Kit, Hot Climate, Individual
TM 55-8465-214-10
Survival, Kit, Overwater, Individual

PEARL

Dear Pearl:

Recently I submitted a requisition for Nomex flight suits. It was rejected at the Clothing and Textile Material Office (ACMA). I am very interested in obtaining these flight suits, since I am a test pilot in an aircraft maintenance company (GS).

Request guidance in obtaining these flight suits, and information about when they will be available for issue to flight crewmembers in CONUS, and oversea areas, other than RVN.

CW4 Robert H. Iwamasa
922nd Trans Co (GS)
APO SF 96557

Dear Mr. Iwamasa:

I regret that I cannot give you much encouragement on provision of Nomex flight suits to other than Southeast Asia and the training bases for which they are presently authorized.

A double layered Nomex uniform was tested in 1968 by the Test and Evaluation Command for adoption as standard A for the entire Army. Test results were unsatisfactory because the uniform was too heavy and hot. If a lighter weight uniform is designed and tested, I estimate it will not get into the supply system earlier than late 1970 or 1971. If the uniform authorized in SEA is accepted without test (proposed), it may become available during the second quarter of FY 1970.

PEARL

Dear Pearl:

I am safety officer for the 15th Medical Battalion, Air Ambulance Platoon, 1st Cav Div (AM), APO San Francisco 96490. I have a question on survival radios. Our platoon is authorized by T.O.E. to have survival radios, but our S-4 section has had no success in getting any.

We usually fly single ship missions and are very much in need of survival radios. We do have other needed survival equipment, and I would appreciate any information you could send me on where and how we could obtain radios.

1LT James Perrine
HSC, 15th Medical Bn (AAP)
1st Cavalry Division (Airmobile)
APO SF 96490

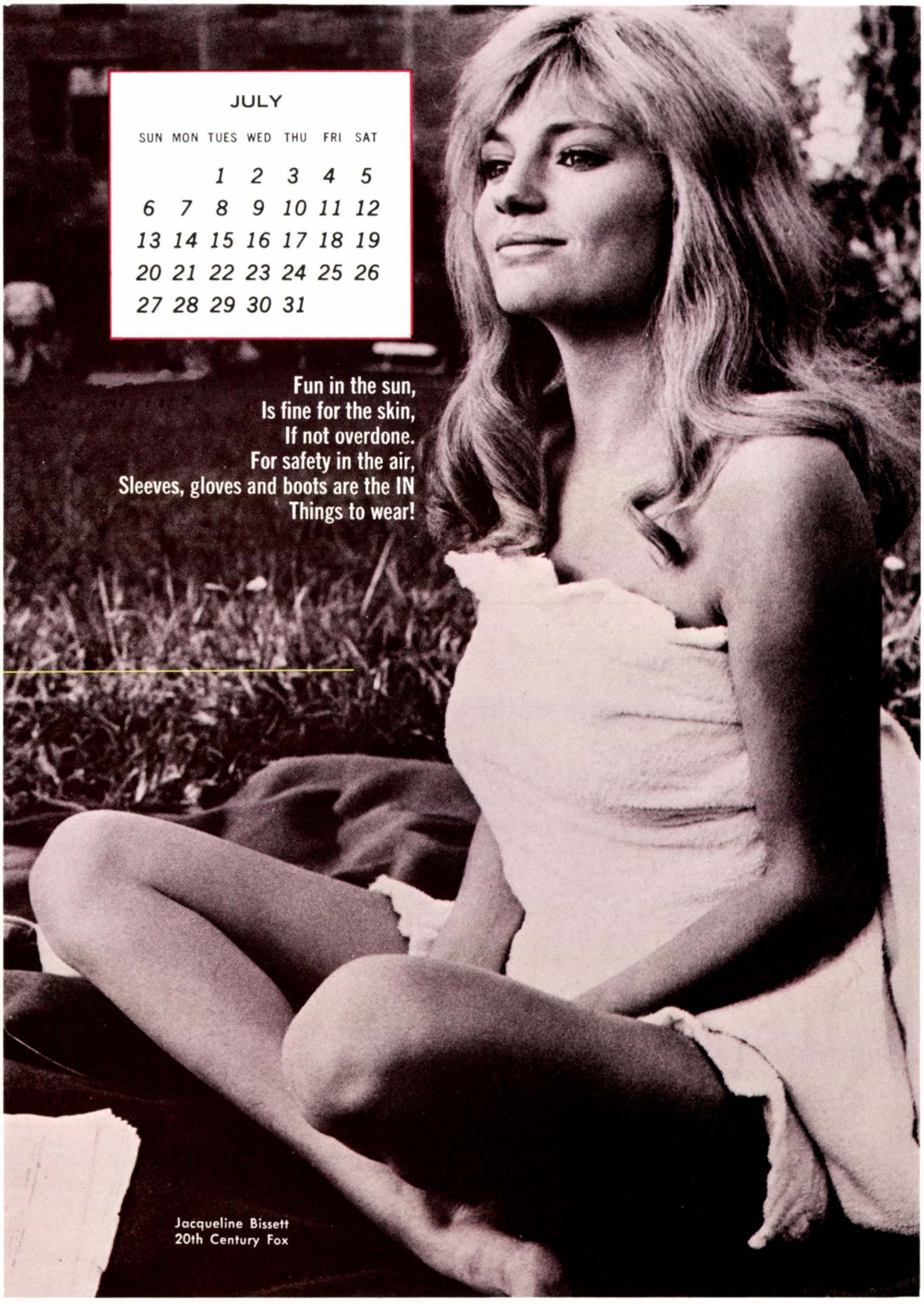
Dear Lt Perrine:

Survival radios were out of production for a short period of time, waiting for the new URC-68. This new radio, however, did not satisfactorily meet its test schedule. As a gap-filler measure, until the URC-68 has been perfected, the Army is negotiating a contract for 2,000 additional RT-10 radios. They are also rebuilding and placing in service a considerable number of Air Force surplus URC-10 radios.

I don't know how familiar you are with these radios, but the URC-10 has a separate battery pack, with a short cable connecting it to the radio, while both the RT-10 and URC-68 have self-contained batteries. The URC-10 (FSN 5820-858-5721) is the best bet since it is supposed to be in the system and available. The RT-10 is handier, but it may be some time before the new contract is let and it becomes available. The basis of issue of all radios is one for each rotary wing aircraft.

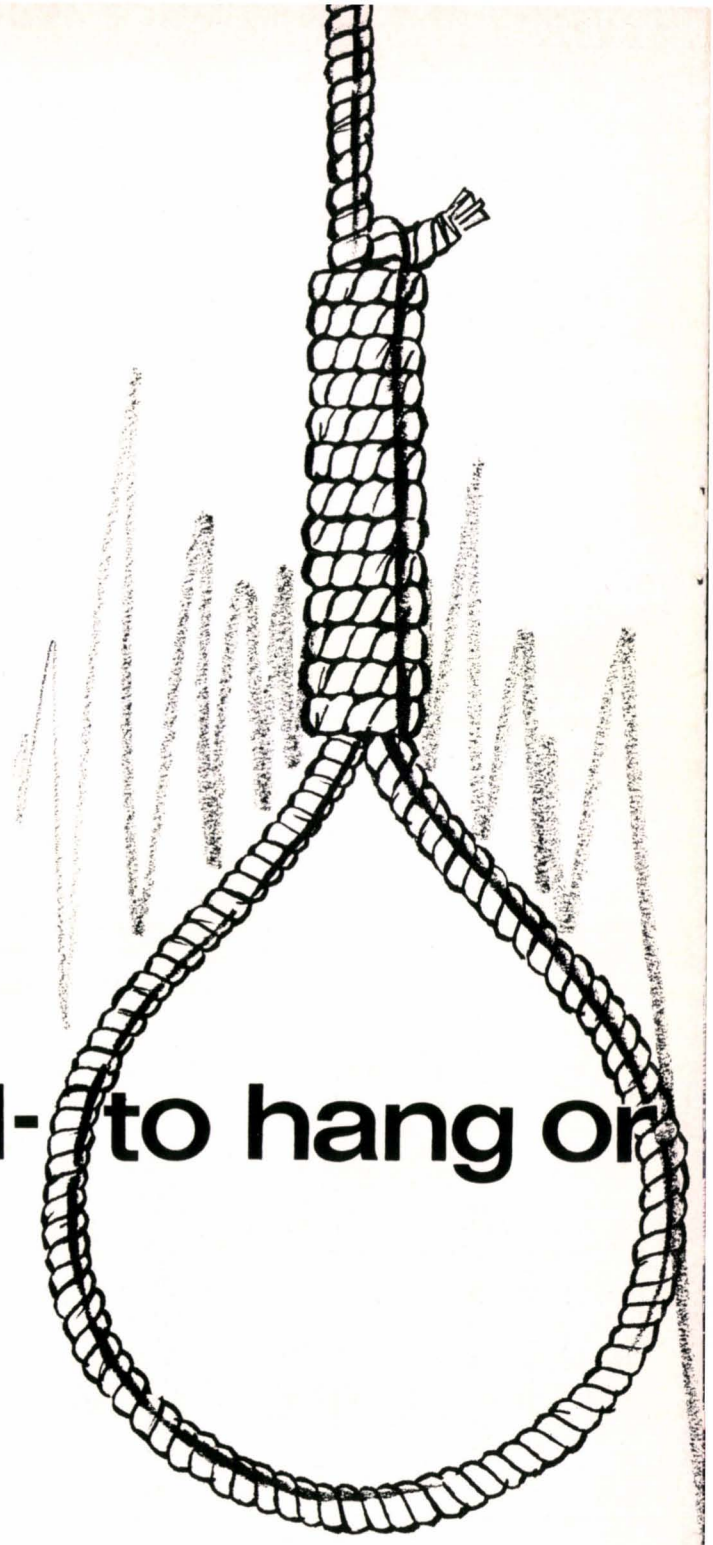
I recommend you immediately requisition the URC-10 and try later for the RT-10 (FSN 5820-912-4480).

PEARL


JULY
SUN MON TUES WED THU FRI SAT
1 2 3 4 5
6 7 8 9 10 11 12
13 14 15 16 17 18 19
20 21 22 23 24 25 26
27 28 29 30 31
Fun in the sun,
Is fine for the skin,
If not overdone.
For safety in the air,
Sleeves, gloves and boots are the IN
Things to wear!
Jacqueline Bissett
20th Century Fox

Collateral—to hang on

Lieutenant Colonel H. L. "Rip" Collins



CONSIDERABLE FOG apparently shrouds this dark and ugly term *collateral*. It is appropriate to spend a few words to clear away this fog and create a new outlook concerning the *collateral investigation*.

Let's first discuss investigations common to aircraft accidents within the military services. Each service has its own responsibilities relative to aircraft accidents. They may be called by different names, but they can be separated into two distinct categories, according to purpose:

1. Accident prevention and safety.
2. Determination of all facts and circumstances for reasons other than accident prevention and safety.

The accident prevention and safety investigation is usually called the aircraft accident safety investigation. It is a thorough and systematic examination and analysis to disclose all relevant facts, conditions, and circumstances associated with or surrounding each aircraft accident. It is conducted for the sole purpose of accident prevention (paragraph 7b, AR 95-30).

When an investigation is conducted for any reason

other than accident prevention, we apply the general term *collateral* to describe this action being taken.

Collateral means side by side or parallel. Therefore, these investigations, conducted for other reasons, and at the same time as the safety investigation, are parallel to the aircraft accident safety in-investigation. This is the origin of the general and accepted use of *collateral investigation.*

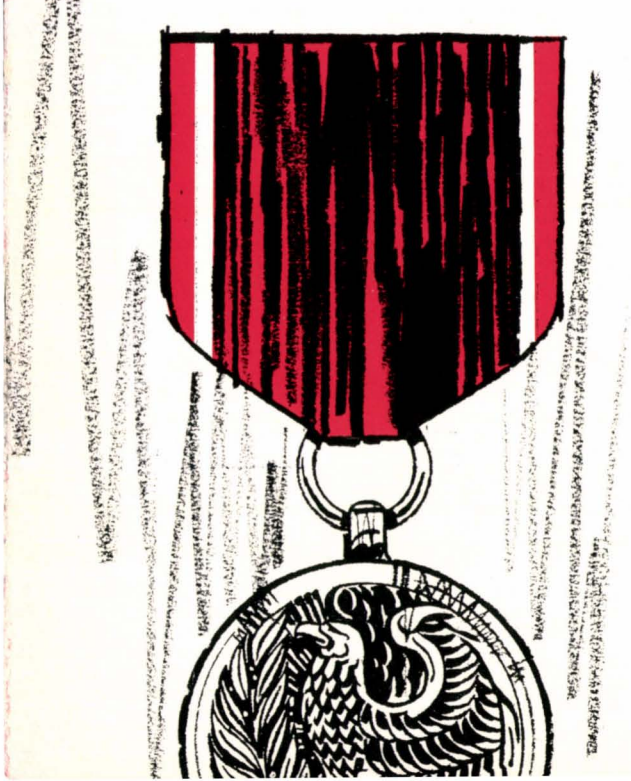
What other reasons might there be to require an investigation paralleling the safety investigation? To answer this question, we must understand the conduct of and restrictions placed upon safety investigations. The ultimate goal of each safety investigation is to uncover all cause factors surrounding a particular accident. Appropriate steps may then be taken to eliminate these factors and reduce the probability of recurrence of identical or similar accidents.

Quite a task, you say? Yes, but not beyond reason. With proper training of board members, command emphasis on the importance of finding accurate cause factors, and the timely and appropriate use of facilities and specialists at our disposal, a safety investigation can reveal all cause factors involved in an aircraft accident.

The factors causing an accident can be determined only if certain guidance is established concerning the manner in which this information is to be used. Paragraph 4, AR 385-40, explains the nature of information contained in a report of an aircraft accident investigation. It says, in effect, that the report is to be considered privileged, and its contents will not be released to the general public. It will be seen only by those persons needing the information for accident prevention purposes. It is for official use only. Claims for or against the government cannot be based on this report. The investigation report can in no way be used to determine negligence or culpability on the part of any individual directly or indirectly involved. It cannot become the basis of administrative or punitive action.

Why is it necessary to be so tight lipped about the causes of an accident? Are we trying to protect our aviators or cover a goof-up? Not on your life! The answers become apparent if you imagine yourself in the position of a crewmember in, or a witness to, an aircraft accident. Consider how you would describe the series of events leading to an accident if you knew that your testimony could be used against

decorate?



you for administrative or punitive action.

Did you goof in any way? Heck no! While no sane person would come right out and lie about the situation, his testimony probably will become slanted, and certain relevant facts might well be overlooked under these circumstances.

Would you reveal improper techniques used by a fellow soldier, knowing this information might be used against him? Perhaps, but only with genuine reluctance. It would probably appear to the board as though they were pulling teeth to get any useful information from you.

Do you see the point now? Remember, the intent is to determine the facts surrounding the cause of the accident during the safety investigation. This is necessary to determine accident prevention measures which will prevent the recurrence of similar type accidents. And that's all we want to do!

Now, back to the original question about the reasons for other types of investigations. The first is to have information available about every accident which can be released to the public. As mentioned, information gained by the accident safety investigation cannot be released. The only information which can be released must come from other type investigations. This report should be completed prior to the safety investigation report and submitted through channels to the Judge Advocate General Section for consideration prior to release.

Any aircraft accident can cause damage to private property. The possibility always exists that a claim for damages may be filed against the government. All facts and circumstances concerning damage to private property must be documented for possible future use in a claims court. This other type of *collateral investigation* is conducted in accordance with AR 27-20 for claims investigation. A similar requirement exists when an accident results in death or serious injury. Documentation is necessary for use in claims for or against the government. This is another type of *collateral investigation,* with the report going to JAG.

Suppose an accident occurs in which it appears the pilot willfully violated regulations or was negligent in the performance of his duty. This sometimes happens. Some corrective action is necessary if we are to maintain standards of conduct within which we are to operate. Again, the *collateral investigation* must be the only basis upon which such action can be taken without compromising the contents of the safety investigation report.

AR 95-30 indicates such an investigation may be required when there is a need to provide official factual documentation of all matters pertaining to the accident which can be used in connection with any legal or administrative action. This just about sums up the position that all accidents need some documentation which can be used for purposes other than safety.

How about the conduct of these *collateral* or other types of investigations? Are there differences? Will the result be the same as in the safety investigation? AR 95-30 defines the limitations of *collateral investigations.* These are to be completely independent of and separate from the safety investigation. The report of any other investigation *can* be used for various administrative, disciplinary, and litigation purposes. It *can* be used as a basis for fixing pecuniary liability, and may adversely affect individuals concerned. Since it can cause concern to the individuals involved, certain restrictions must be placed on the manner in which information is gathered.

First, the report of a safety investigation cannot be used in any other investigation. Witnesses who appeared before the safety investigation board may also be called by the collateral board. They cannot, however, be questioned concerning their statements or other matters presented during the safety investigation. Persons appointed to the safety investigation board cannot serve as members of a board conducting a *collateral investigation* of the same accident.

Although a member of the safety investigation board may be called before another board as a witness, he cannot be asked or required to divulge privileged testimony or his opinion based upon that testimony. Actually, any testimony gathered by the safety investigation board, in the interest of accident prevention, which could be detrimental to any person involved, is considered privileged testimony and cannot be divulged by any member of this board.

Under no circumstances can any person having knowledge of the substance of the safety investigation report be required to divulge the findings or recommendations to any other investigation board.

It is not the intent to try to penalize every person who makes an error. Certainly, errors must be expected from human beings. Aviators, though human, are expected to exhibit the characteristics of normal, prudent individuals. When one fails to exhibit these characteristics through flagrant violation of policies and regulations, or complete disregard for safe operational practices and procedures, he can certainly expect a collateral board to point out such weaknesses and recommend appropriate corrective action.

Remember—the collateral board will always serve to protect the report of the aircraft accident safety investigation board. It will also serve to protect your interest when your interest deserves protection.

AN OH-13E PILOT landed in a farmer's field and told local residents that he had flown into continuously deteriorating weather, became disoriented, and landed to determine his location. He used a local telephone to close his flight plan. The residents drove him approximately 12 miles to determine if weather conditions were improving toward his destination. They offered to drive him to an airport, have him stay for dinner, or have him spend the night with them. All offers were refused.

The pilot stayed on the ground approximately 1½ hours, then took off. Witnesses saw the helicopter disappear into the overcast. It crashed in a nose down attitude approximately 5 minutes after takeoff. The pilot was killed and the OH-13 destroyed.

The final phase of this flight was conducted with no flight plan filed and without current weather information. The pilot did not request a weather briefing when he closed his initial flight plan by telephone. He filed his original flight plan, knowing that his destination was IFR and forecast to remain IFR for 2½ hours after his intended ETA. He left with the apparent intent of further checking destination weather during his enroute fuel stops.

Accident report: "Command supervision should have been exercised to refuse to allow departure of this flight to an IFR destination. This does not relieve the pilot of the responsibility of being immediately responsible for his own actions, but proper command supervision would have prevented the flight from ever leaving the ground."

USAASO Sez

The U. S. Army Aeronautical Service Office discusses

New fixed wing special IFR (FW/ATC) refresher training units

ATC refresher training units

On Fixed Wing Special VFR: The FAA has recently revised procedures reducing restrictions, imposed in April 1968, against Fixed Wing Special VFR (FW/SVFR) flights in control zones.

A new type of operation, Fixed Wing Special IFR (FW/SIFR), is being permitted in the 33 control zones specified in FAR Part 93.113. These are preplanned operations which will be permitted in less than basic VFR conditions subject to the following:

- Operations must be conducted under the terms of a letter of agreement* obtainable in conjunction with waivers to FAR 91 and are limited to certain fixed wing aircraft having a frequently recurring need to operate there in less than basic VFR conditions.
- Operations must be conducted by IFR qualified pilots in IFR equipped aircraft.

*NOTE: The control zones within which letters of agreement are required for FW/SIFR operations are listed in the DOD FLIP IFR Supplement under Special Visual Flight Rules referencing FAR Part 93.113. Commands desiring to establish FW/SIFR operations should:

- Contact the local FAA Area Office for waiver to FAR 91.
- Contact the air traffic control tower chief to develop a letter of agreement for FW/SIFR operations in the control zone concerned.

In general, these special operations will be handled the same as IFR operations expect that a fixed altitude will not be applied, ground contact must be maintained and visibility must be at least 1 mile.

Restrictions against Fixed Wing Special IFR (FW/SVFR) operations in control zones other than those specified in FAR Part 93.113 have been eliminated except that VFR (FW/SVFR) traffic may not cause delay to IFR traffic.

On ATC Refresher Units: Air traffic controllers, like everyone else, tend to forget what they have learned if this knowledge is not used regularly. To refresh their memories USAASO has, during the past two years, distributed FAA Air Traffic Training, Refresher Training Units on the basis of one set per Army ATC facility. We recommend that these "Refresher Units" be discussed periodically with all air traffic controllers at your facility. In order to obtain the best results, the discussion groups should be kept small and be led by the most qualified controller on duty. The examinations which follow the discussion material should be used to review the material covered in that particular unit. By using these units, controllers will not only refresh their memories but also gain some additional knowledge. Has your facility chief held such a session lately?

COLONEL FORD E. ALLCORN

First Army aviator to fly in combat

During the invasion of North Africa (see front cover) the late Colonel Ford E. Allcorn (then a captain) led a flight of three L-4s in Army aviation's initial entry into combat. Near the shore Lieutenant William Butler flying one aircraft (with Captain Brenton Devol riding as observer) and Lieutenant John R. Shell flying the other separated from CPT Allcorn who later was shot down (See AVIATION DIGEST November 1962). CPT Allcorn then became the first Army aviator in combat, the first to fly a Cub from an aircraft carrier and the first to be wounded in combat

the U. S. Army Board for Aviation Accident Research

Accident investigations, to determine accurate cause factors and develop effective prevention measures, have been a part of military aviation since its earliest days. Lieutenant Thomas E. Selfridge, the first Army officer to make a solo flight in a powered airplane, was killed in this accident 17 September 1908. Orville Wright, the pilot, survived. The accident was caused by one of the two propellers striking a brace wire attached to the rudder.