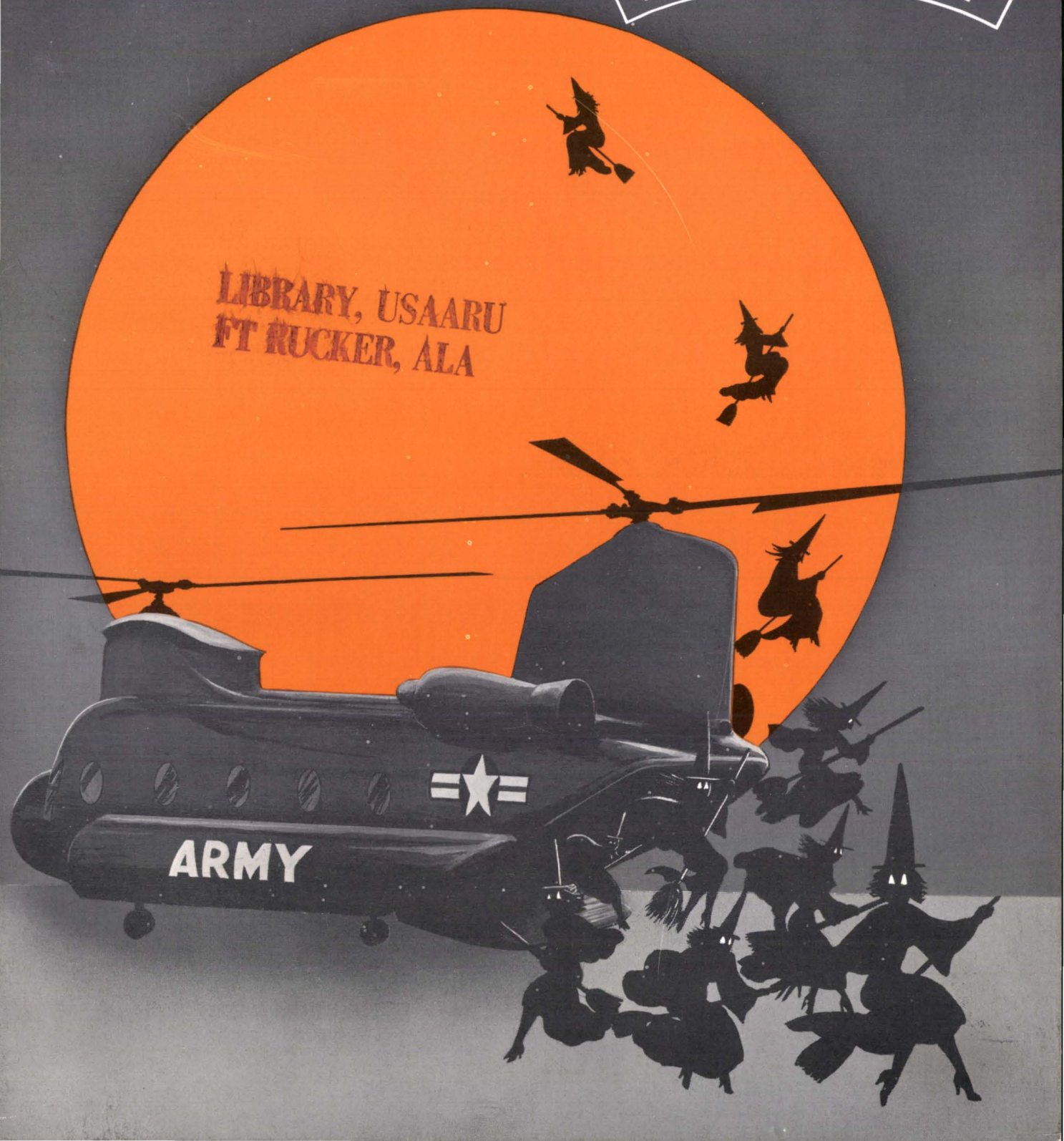
OCTOBER 1963

UNITED STATES ARMY AVIATION DIGEST



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UNITED STATES ARMY AVIATION DIGEST

OCTOBER 1963 VOLUME 9 NUMBER 10

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

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LETTERS

Sir:

Recently, a group of about 20 aviators were sitting around a conference table in Saigon discussing a long list of aviation needs. Their experience ranged from a couple of fairly recent lieutenant 3-2's to three Master Army Aviators. The discussion drifted to the new "transistorized" E6B type computer.

Now I know this next is going to draw howls of anguish from many of the professional circles, particularly teachers in the instrument schools, but I asked the group for a show of hands on the following question, "How many of you, except in the annual written examination, regularly use the wind face of your E6B?" Not one hand went up!

Another subject of the day was the requirement for the development of a kneepad or clipboard for inflight paperwork, etc. Should it have: a pencil sharpener, a light attachment, or maybe a warning buzzer for minimum altitude?

Realizing that there are those "old timers" who rely simply on a half dozen sharpened pencils, a small plain tablet, and a miniature watchchain computer, I lead into my presentation of *another* mousetrap. I didn't say better, as to my knowledge I am the only one who has used it to any extent, and all aviators possess personalities. You will note, however, that on the present DA approved flight progress card, which we were told a few years ago to standardize upon and shut up, space is provided for only one ATC clearance. Now who has ever fired off down the runway and gained a thousand feet with only one clearance?

This mousetrap started in 1957 when a visiting Army Aviator from HumRRO, Fort Rucker, sent me one of those metal clipboards from the book store. I fooled around with that thing for about 3 months. It wouldn't fit under the yoke of an U-6, was built to mount fore and aft on your leg, and finally, it was just a plain metal clipboard 12 inches long and 6 inches wide with a full length, tough spring flap.

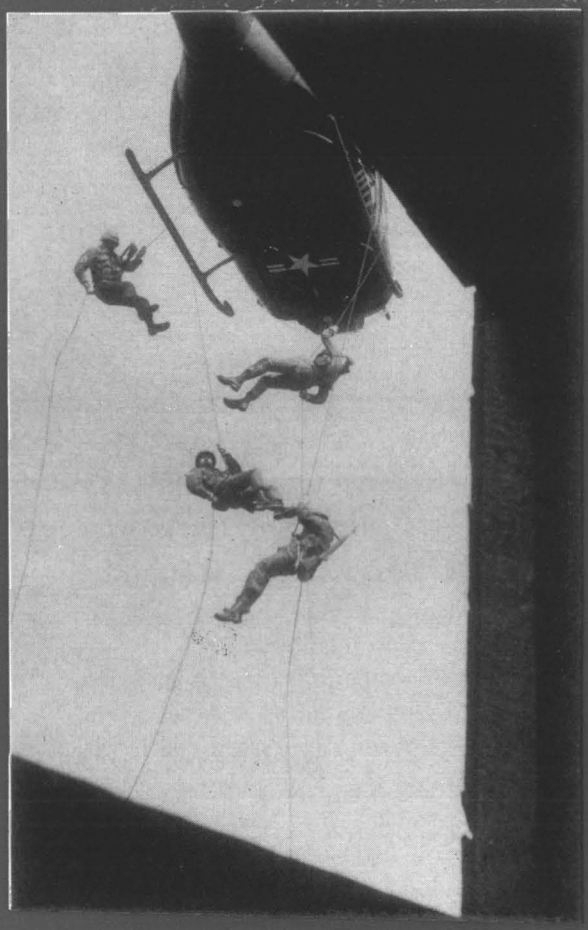
In disgust I threw it into the bottom right-hand drawer of my desk along with the shoe polish, brush, and Brasso—but I didn't quit worrying about it.

After about 6 months of this, I hauled the culprit out, headed for the machine shop and: a. Rotated the leg base so it rested on my leg, port and starboard, with a little offset for my right-handed writing comfort. b. Lopped off about three inches of the bottom segment. c. Shortened the top flap down to E6B computer face size and rounded the edges. d. A few well placed rivets did the rest.

Checking in various knuckle busting cockpits disclosed that I had something workable. Now to . . . shhh! . . . design a new progress card.

First, we need a section for the 175 sequences in flight planning, plus a change in destination, then there is the inevitable, going IFR from VFR with the accompanying computation of an alternate. Of course it is nice to have the above items in the same sequence that the FAA radio operators record them. A

Continued on page 48



COMBAT EFFECTIVENESS DEPENDS TO A LARGE EXTENT ON THE DOCTRINE AND FUNCTIONS WE CRANK INTO ORGANIZATION, THE MILITARY COMBINATIONS OF EQUIPMENT AND TRAINING. OUR OPERATIONS ARE THE CRUCIAL TEST OF COMBAT EFFECTIVENESS. I BELIEVE THERE ARE SOME OPPORTUNITIES IN CERTAIN OPERATIONAL CONCEPTS THAT NEED TO BE SEIZED AND EXPLOITED.

AIRMOBILITY

GEN EARLE G. WHEELER
CHIEF OF STAFF, UNITED STATES ARMY

A CLEAR AND distinct need exists to get airmobility in the right conceptual perspective, both within the Army and out.

As I see it, airmobility fits into our continuing and overriding aim of progressive improvement in our combat effectiveness. In pursuing this objective, everything we buy, use, and do has to contribute directly to the success of the soldier in battle.

Accordingly, our moves in airmobility should be kept in this context both conceptually and equipmentwise. The statutory Army mission is to perform prompt and sustained combat on land. All Army organizations and equipment must be tested by those two qualifiers, prompt and sustained. This means in turn that our view of airmobility has to reflect these qualifications. We see airmobility as the use of Army aircraft to move people and things in the combat zone and to furnish aerial platforms for our weapons and fire support systems. We are seeking to do this along two general lines:

First, by improving the effectiveness of particular activities and weapons systems involved in ground operations by specific applications using aircraft.

Second, by developing an integrated concept for the use of aircraft of various types in lieu of ground vehicles to improve the battlefield mobility, and thus the effectiveness in certain operational environments of entire Army units.

Specific aircraft applications include primarily command and control, observation, reconnaissance, and target acquisition together with some battlefield logistic support applications. These uses derive from the faster pace of ground operations and the greater ranges of Army weapons systems. Ground commanders must make more rapid decisions, based on more accurate, wider-range, more current information. Visual observation from the ground or from light aircraft operating at or behind the line of contact no longer serves many of these purposes. For example, the divisions need and have developed improved aircraft and sensors to provide surveillance throughout their area of influence. This does not mean that the Army seeks to invade the Air Force role of tactical air reconnaissance. If the light artillery observation airplane constituted no such invasion, then neither should the more advanced aircraft "observing" for improved weapons. Service roles and missions are not really at issue. What we are seeking is to attain full effectiveness of Army combat means.

The airmobility concept, while including the specific applications I just mentioned, also combines aircraft for battlefield transport, aircraft for immediate and continuous fire support, and aircraft for battlefield logistic support into an integrated concept of operations. In this integrated concept, surface means of transport, and some surface means of fire delivery are replaced by aerial means. This would give us

an order of magnitude increase in the mobility of ground combat units, which is not only unmatched in any other army, but which could prove decisive in certain operational environments.

Basically, mobility is achieved by the use of organic helicopters as troop carriers on the battlefield. These carriers must be accompanied by the kind of organic fire reconnaissance elements and support which are always an integral part of maneuver units in all armies—scout vehicles, machineguns, mortars, antitank weapons—and which the Army intends to provide primarily in the form of armed helicopters. They must also operate with the kind of logistic support which is always an integral part of maneuver units—light vehicles and trucks—which the Army intends to replace with appropriate aircraft.

The key thought in airmobility is prompt and sustained combat operations on the ground. This is how and where we fight. Our ideas and concepts for airmobility should, I think, be kept in a clear and direct ground battle relationship. Otherwise, they are not concepts of Army airmobility at all.

Let me make one more point here. Our airmobility doctrine, organizations, and equipment have all got to be responsive to the need for sustained combat. This is not only a matter of airmobile units being able to stay operational for days and weeks at a time, it is a matter of being able to perform their missions in the hourly and daily context of the ground battle, regardless of conditions of terrain and weather, always in terms of the combat effectiveness of the soldier on the ground and his operational structure.

You see, then, the difference between visualization and actuality. You see why it is that we want an exhaustive, thoroughly evaluated series of tests. The Secretary of the Army and I are convinced that our recommendations in the airmobility field can significantly increase the Army's capabilities. At the same

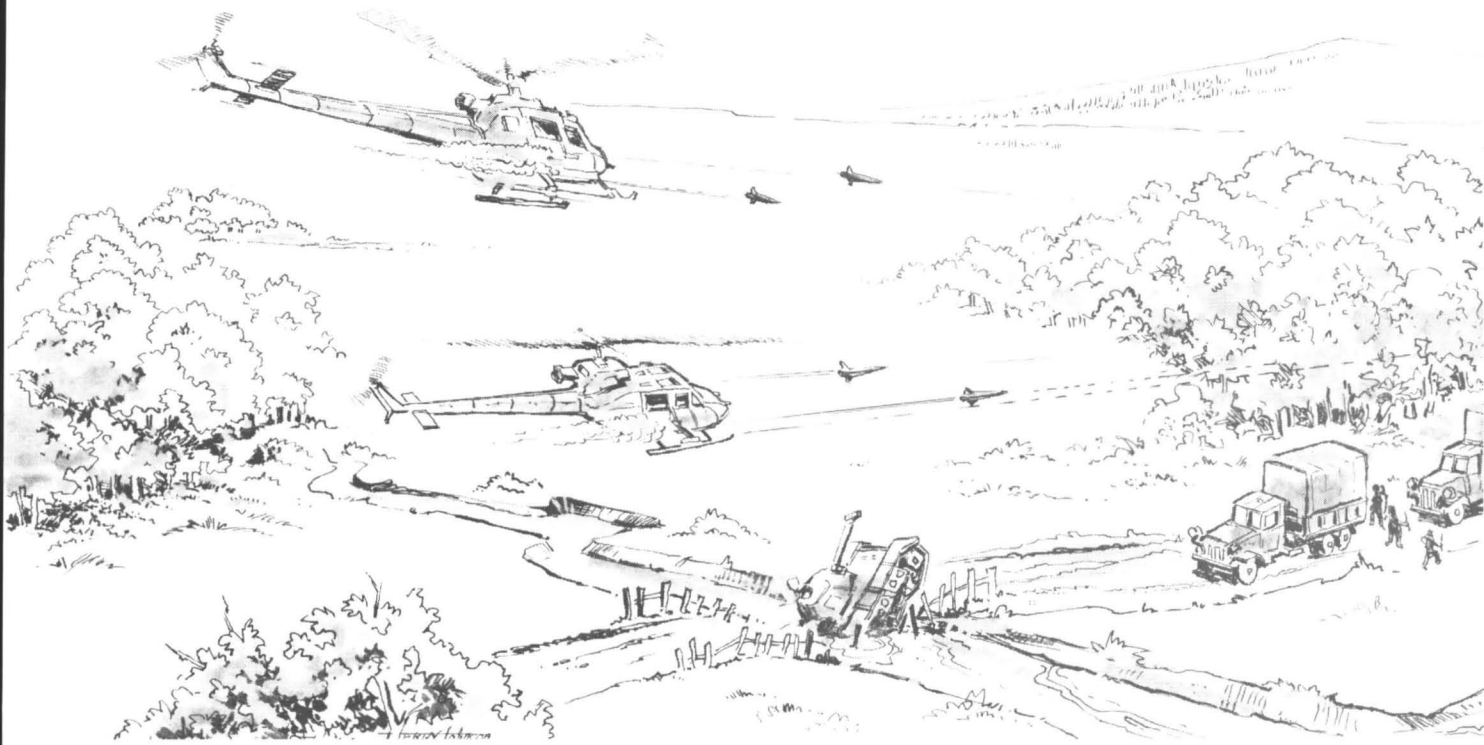
time, it is prudent to test the concepts thoroughly before proposing their full-scale implementation. This is essentially the approach we took with the ROAD reorganization plan. Accordingly, we expect the 11th Air Assault test program, as conducted by the Army and by Strike Command, to be a fair, unbiased, thoroughly professional examination of concepts, organization, and equipment that appear to offer very great promise for increasing our Army's combat effectiveness.

This is why I insist that the doctrinal and field tests keep airmobility in a ground combat context. As I see it, the decision in any combat action still depends on exploiting firepower and mobility in proper combination and relationship. Mobility, as such, can make only minor contribution to the decision if its relationship to firepower is unbalanced.

The air cavalry combat brigade proposed within our airmobile organization concepts deserves close scrutiny particularly, and of course the proposed applications of the armed helicopter signify great potential. For example, think of the helicopter - tank - infantry - artillery team.

While it is true that new ideas catch on slowly in any army, it is also true that any idea that advances combat effectiveness materializes in spite of all opposition. As incredible as it sounds today, there was a time when the breech-loading rifle was considered unacceptable by the Army because it would encourage soldiers to waste ammunition.

My point is that as the Army develops in this decade, I am anxious to keep practical aspects foremost. The demands upon us are many. Our resources, as generous as they may appear to be, are in fact limited. Our many commitments to the present and to the future compete continually for these resources. This competition is frustrating, but it is nevertheless a healthy thing, because it forces us to put first things first. This is why I insist that combat effectiveness and our mission of prompt and sustained combat on land receive our priority attention.



Column Support by

Captain William P. Griffin

CHARRED remains of nine vehicles blocking the road made Captain Jones, the new company commander, wince as he looked out at the ambush site that had caused the death of his predecessor.

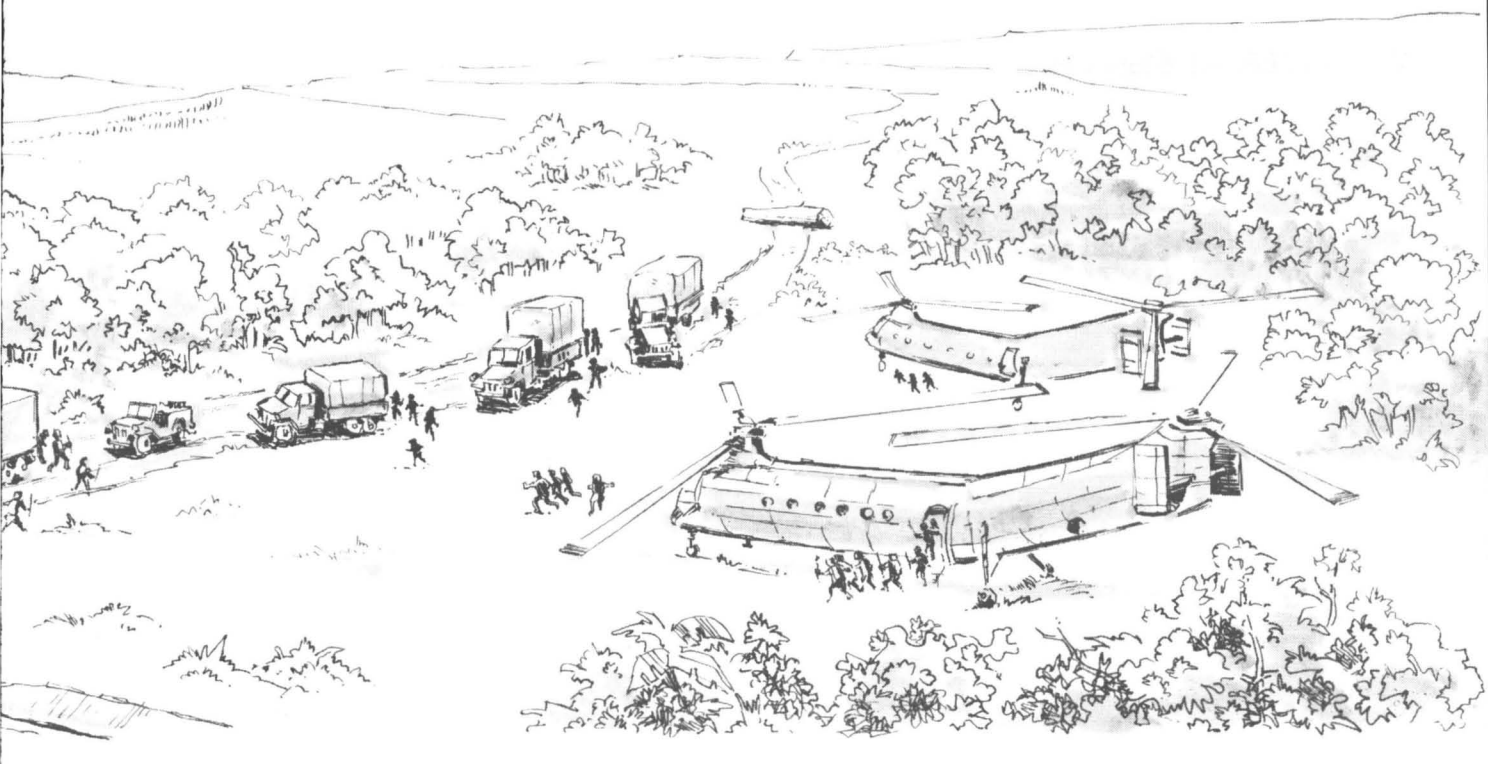
One swift, violent engagement had changed Alpha Company from a full strength organization of fine fighting men to a unit of reduced strength and low morale.

The need for better planning and training to meet any future combat of this type was plainly indicated. Captain Jones was trying to absorb all the details—the area, the type of terrain, the firing positions, the plan of ambush, and all the other fine points of this attack.

He had talked to the officers and men who had been in this action amd made them repeat all of the details they could recall. He was trying to dissect this ambush for all of the learning points he could gather, and then if it happened again while he was in command, the company could deal with this enemy in a way that would end their attacks once and for all.

Captain Jones was boiling. He cursed inwardly at the mistakes made by the former company commander. Yet he realized that any commander could have suffered the same defeat if he were not fully prepared for this type of combat.

Capt Griffin is assigned to U. S. Forces, Korea. He was a winning author in the Second Annual Digest Writing Awards.



Armed Helicopter

In his mind he could picture the smirking, smug faces of the guerrillas now safely hidden some distance away. The thought of those silent butchers feasting on American rations and boasting of their easy kill turned his stomach.

This was not the work of bandits and overnight raiders but a tactical attack, well planned and well executed by a trained, disciplined force. The guerrillas in this area deserved a lot more consideration than he had previously given them.

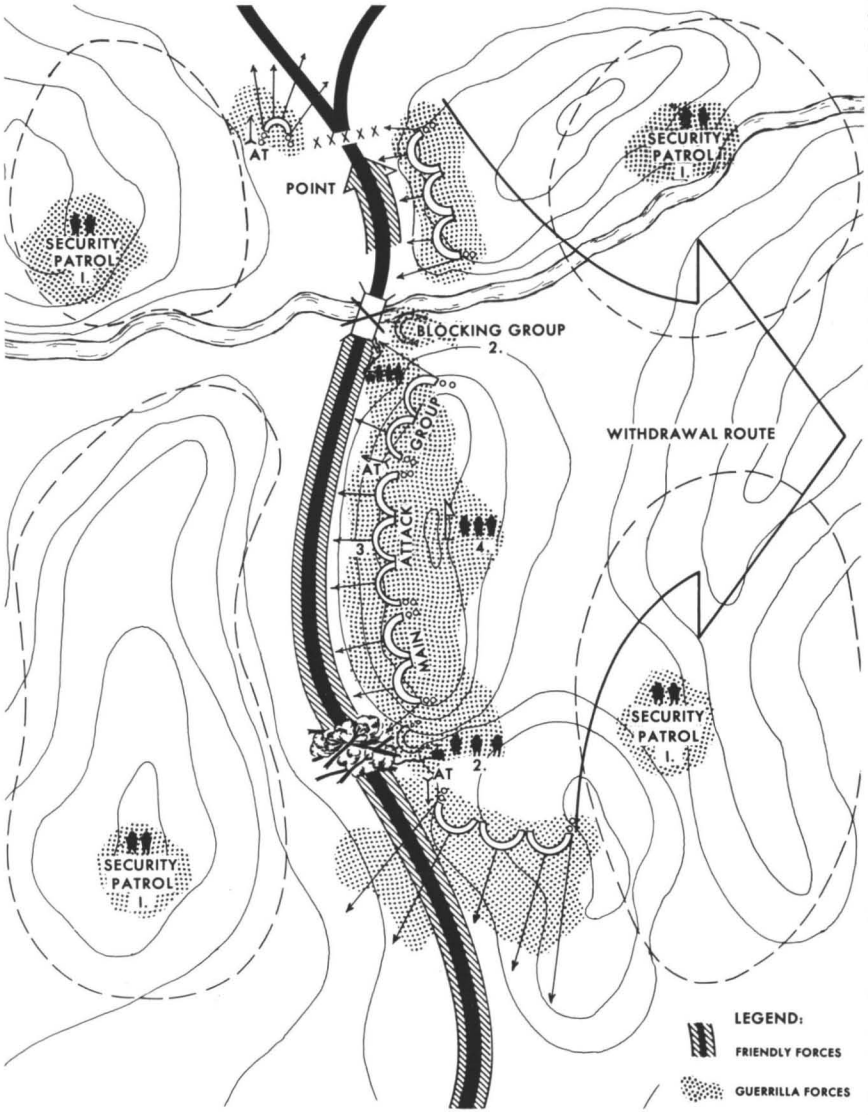
After inspecting the area, thoroughly interviewing his men, and interrogating the local natives, he was able to visualize what had happened.

The site had been a narrow road with a half-mile downgrade. At the bottom of this downgrade a bridge spanned a small stream. The hills to the right and left of the road were not jungle, but vegetation was thick enough to conceal a large body of men.

The ambush had begun when the bridge was detonated under a tank in the advance guard. The point had been allowed to pass over the bridge and then had been taken under fire by a containing group farther up the road.

The main body of guerrillas had opened fire on the 20 vehicles closed in the trap. The guerrillas had dropped an abatis across the road at the rear of the main body of the convoy to seal in the trapped vehicles and to block the rest of the convoy.

But the guerrillas had underestimated the strength and ag-



Basic unit: 1. security party, 2. blocking group, 3. main group, 4. command group

gressiveness of the point and this, plus the indirect fire weapons within the convoy, had finally forced them to withdraw.

After the explosion signaled the destruction of the bridge, the point had immediately opened fire along the sides of the road. This fire had dispersed the guerrillas who were assigned to destroy them. The point then had returned to the bridge and taken all possible targets under fire. These fires enabled the noncoms in the lead vehicles to gain control of their men and begin laying down a base of fire. The additional fires from the 81mm mortar established fire superiority, and the guerrillas withdrew.

Upon returning to battalion, Captain Jones again studied the ambush minutely to correct any similar trouble in the future. He had inspected the terrain; analyzed the conduct of the attack and the tactics employed, the conduct and disposition of the company in this action, its organization, and all the details his officers and noncoms could recall. He realized that every action of this type would be different, yet similar. The guerrillas would probably organize an ambush along definite set tactics, only varying organization and disposition according to target, terrain, and available weapons. Their basic unit would probably always contain a security party to seal off the area, a blocking group, a main group, and a command group. (See map.)

With this basic organization in mind, Captain Jones began planning future action against such an attack.

First he must instruct his officers and men in the tactics of an ambush. He had to prepare the men both physically and mentally for correct reactions to this type attack. Control of the men and their fires by ensuring chain of command down to the lowest rank was to be assured. The immediate return of fire to destroy a roadside enemy must be stressed in training. Control and communications problems must be discovered and corrected. Convoy discipline must be stressed. Indirect fire weapons support must be planned and the weapons dispersed so not all would be destroyed in one group. The M-79 grenade launcher would be used more, and rifle grenades of HE (high explosive) and WP (white phosphorous) types would be issued to extend the range of fire. The individual tricks of the infantryman for combat must be reviewed or relearned. He increased bayonet training and surprise target shooting.

Although Captain Jones

wasn't a psychologist, he knew that no matter what he did, the initial shock and surprise of an ambush would be hard on his troops. Only by instilling in them a fierce, aggressive attitude and showing them what they were up against, could he overcome this major obstacle.

An order from division gave him one of his finest weapons against the ambush: an aviation element that would be available to him in the event of future movements of this type. He trained with it in every way he and his subordinates could plan and imagine.

Since the division was responsible for so many areas, the number of aircraft available would be small. Not enough to move the entire company, but enough to lift two squads at a time. In addition, the company could expect two helicopters armed either with rockets or machineguns. The use of these aircraft at night was limited but still effective. In training with the aircraft, a picked platoon worked constantly in an air-transported role and was considered the element to be used in this capacity if the need arose.

In training with march columns, the armed helicopters served as aerial observation posts and vertical attack groups. Extra ammunition and POL for the aircraft were carried with the company, since the aircraft were to remain with the company for the duration of any mission.

The areas of interest to the brigade were studied carefully by Captain Jones. He arranged flights over all routes to these areas for his officers and senior NCOs to acquaint them with terrain problems and characteristics. The brigade aviation officer assisted Captain Jones in his planning.

Six weeks later the company was committed to the relief of a village. Guerrillas had sealed off and were besieging the town of Poksong, and were too strong for any unit of less than company strength to drive off. The local defenders were holding well enough, but they could not contain the guerrillas indefinitely.

The only aircraft available to the relief column were the two armed helicopters and three troop-carrying helicopters, each capable of lifting eight men.

Captain Jones organized his men for combat. He realized that after reaching the flat, rice-paddy area 3 miles from Poksong the sites for ambush by a large group of guerrillas would be almost nonexistent. Only harrassing fire and mines would have to be considered.

The attack area would be near enough to the town to ensure control before the final assault, and objectives around and within the town were assigned. Because of the nature of the attack and the determination of the guerrillas to destroy the town, Captain Jones felt that if tanks could be attached, they would not only aid in the movement to the town but once there, would also serve as a good base of fire for his maneuvering troops.

The organization for the march column was as follows:

Point—two jeeps with three men each with mounted machineguns, one tank, one armored personnel carrier.

Advance Guard—second platoon, one tank, one jeep, three 2½-ton trucks.

Command Group was in an APC between the advance guard and the main group, with an alternate command group in the rear guard.

Main Group—Third Platoon, Weapons Platoon, supply and support vehicles, and commo group.

Rear Guard—First Platoon, elements of first and second squads, alternate command group, and one armored personnel carrier.

The armed helicopters would provide flank security and serve as a vertical fire group. The radios with the advance guard and with both command groups netted with the helicopters. Alternate signals were planned for placing fire on desired targets. No target would be taken under fire until approved by the ground control radios, for Captain Jones wanted to control these aerial fires.

The fire teams assigned to the three helicopters were members of the First Platoon who had trained with these carriers.

Number 1 helicopter—eight men: one section leader (a senior NCO), one squad leader, one fire team of five men, one M-79 grenadier.

Number 2 helicopter—eight men: one squad leader, one fire team of five men, and one M-60 machinegun team of two men.

Number 3 helicopter—eight men: one squad leader (alternate section leader), one fire team of five men, and one M-60 machinegun team of two men.

FM radios to net with the helicopters and relay to the company would be carried by the squad leaders.

This air-transport group would move by bounds from open areas and be airborne during those periods that the march column was passing through close terrain. The section leader would have tactical maps of the area. He was to constantly monitor these areas as he moved in the event he was directed to the area to defend the column. His missions would be by designated area from the company commander.

Captain Jones visualized that

the commitment of this unit to the rear or flanks of an attacking guerrilla band would worry them enough to make their leader either shift some of his troops or fires. This would allow a faster build-up of fire superiority from the ambushed troops and force the guerrillas to evacuate the position for fear of being annihilated. No plan of attack could be concretely formed because only the guerrillas knew the intended area of attack. But with maps of the area, this vertical assault group could move across their avenues of escape and trap them as they moved out of the area; take the guerrillas under fire from the rear or flank, presenting such a threat to their safety that they would move to escape; or physically reduce the ambush elements by assault.

The column was moving to the relief of Poksong at 1325 hours. On the main road leading to the town, about 10 miles away, a guerrilla leader waited and watched. The guerrillas had been assigned this avenue of approach to prevent any roadbound reinforcements from reaching Poksong. "Kill all you can and delay as long as possible" was the order.

This band of guerrillas, numbering 100 men, was the same group that had so successfully engaged Alpha Company 6 weeks earlier. The band had moved into this area the previous night, prepared positions and received instructions for the attack. The band was larger now, due to the success of the last ambush, and they were eagerly awaiting the chance to destroy another American group. Perhaps this time an assault could be made. Then their stomachs would be filled with Yankee food and their pockets with all the valuable items the Americans carried.

The guerrilla leader smiled and pictured himself riding in an American vehicle up to the town of Poksong, acknowledging congratulations and receiving another promotion for his successful defeat of the Americans.

His thoughts were suddenly interrupted when he observed the overhead flight of two helicopters with strange looking pods or boxes protruding from their sides. The lead helicopter suddenly dived at the bridge. A series of staccato eruptions came from the helicopter, raking the brush on both sides of the bridge. The rounds plummeting down the sides of the road zinged and sputtered in the foliage. One man, crouched near the bridge, was spun around and lay dying with a .30 caliber round in his chest. A moment of panic overtook another man hidden nearby. He bolted for the main group. The helicopter did not return, but continued its flight. The guerrillas spent the remaining few minutes in a state of great anxiety.

The guerrilla leader guessed correctly that the helicopter had not discovered his men but had merely used his fire to ensure safety of the bridge. However, this was the first time he had seen an armed helicopter, and he was disturbed by the firepower exhibited.

The helicopter pilot had observed the area and noticed its favorable characteristics for an ambush. He had reported the location and received permission to search by fire for any guerrilla element. He had not noticed anything unusual after the firing, but continued circling the area.

The guerrillas' demo man caught sight of the lead vehicles and almost lost his morning rice when he realized that not only was there a tank with the point,

Column Support b

but also some of the troops were carried in an armored vehicle. This group, the point, would have to be allowed to pass. He thought of the danger coming back on him after he detonated the bridge. He vividly recalled the counterattack by the APC in that last ambush.

When the APC within the advance guard reached the bridge, the demo man pulled the wire. The explosion destroyed the vehicle and signaled the beginning of the attack. The barks and sputters of guerrilla weapons began. Raising himself from his spider hole, the demo man looked out at the burning remains of the APC and smiled. At that moment his head was ripped off by the automatic fire of the armed helicopters making another pass at the bridge and raking the brush with their fire.

"This is it," thought a rifleman, as he leaped from the vehicle and began returning the fire. The roar of the weapons from the road and the whine of high velocity rounds into the hillside make it difficult to use the old "crack-thump" method of locating target, but the sector he covered with M-14 rounds gave him the feeling that he was clearing his area of guerrillas.

If the rifleman could have penetrated the wall of brush, he would have seen one man slump over with a 7.62 round that went from his shoulder to his stomach, and one of his richochets surgically remove the elbow from a guerrilla AT (antitank) man taking aim at the tank in the column. The assistant AT man

Armed Helicopter

might have been able to relieve his gunner and destroy that tank, but after seeing his comrade on the ground bleeding with a shattered arm and hearing the whine and singing of thousands of metal hornets, he lost all his love for combat, panicked and ran. He didn't run far. A WP rifle grenade exploded in a small tree above him, and he died, writhing on the ground.

The helicopters, receiving orders from the company, directed rockets into the hill area and then covered the landing of the three carrier helicopters to the rear of the ambush site.

The area was almost as overgrown with brush and small trees as the hill in front, but two of the helicopters were able to hover several feet above the ground and allow their troops to descend by ropes. The third helicopter landed slightly to the right of the other two and quickly discharged its troops. However, just as takeoff began it was hit by a number of automatic rounds from a guerrilla about 100 meters up the hill. The pilot was wounded but the copilot continued the climbout and several minutes later landed outside the ambush area near the rear of the company. The pilot was given first-aid and a hurried inspection of the helicopter was made. Little damage was noted except for the left front side next to the pilot; the copilot elected to fly the copter back to the last outpost, 20 kilometers away. The pilot and the crewchief waited for evacuation by the remaining helicopters.

When the guerrilla leader saw the helicopters discharging troops, he gave the signal to withdraw. His yellow smoke streamers weren't necessary. Most of his men had already begun to move. Many of them would never move again. The overwhelming fires from the troops on the road prevented their immediate evacuation, but the guerrillas moved whenever they could.

Small arms fire from the road was sporadic now, but troops were moving up the hill and mortar rounds were tearing into trees above the guerrillas. They could feel the closeness of the bayonets and panic was replacing discipline.

The guerrilla leader and several others were on the rearward slope of the site, moving down a trail, when they were ambushed and cut down by one of the squads that had debarked from the helicopters. The terrain allowed some of the guerrillas to escape and hide from the troops, but the survivors were few and their problems were not over. The wounded had to be hidden and cared for, which would increase their security problems and slow down the return to a safe area, and military patrols would be hunting them soon.

Captain Jones recalled the troops to continue the march, reorganized and moved again toward his objective. Wounded were evacuated swiftly by the two remaining troop-carrying helicopters. Ammunition was redistributed and the march continued. The column had been delayed less than an hour. In comparison to the loss that could have been sustained without his preparation, it was a most successful operation.

The point had lost one APC and two men, but had repelled all other attacks and forced the withdrawal of the guerrillas. The loss of vehicles and personnel had been relatively light.

The guerrilla leader at Poksong was having difficulty. The defenders had put up too strong a fight, and he was taking more casualties than he expected. If this fight continued much longer, his unit would begin drifting away; and the failure of the attack would mean his relief, and possibly his execution.

This was a change from guerrilla warfare, and was a type of combat he did not appreciate. But the town had to be destroyed to enable supplies for guerrilla units to continue in this sector, so an all out attack would have to be made, regardless of the casualties.

Luckily, an ambush element was holding the American relief column from reaching the area. He wasn't worried about them. No one could come through that ambush in less than 3 or 4 hours.

The guerrilla units for the assault were in position and ready to move out when Captain Jones' unit roared into the area and launched its own attack. The assault by trained troops, supported by fire from tanks, mortars and armed helicopters, caught the guerrillas in the most vulnerable position possible. The pursuit was a continuation of the assault. With the return of the helicopters that had transported the wounded from the ambush site, Captain Jones was able to place troops astride escape routes and destroy more of the retreating enemy.

That evening as Captain Jones prepared the company for movement, he paused to reflect on the fine job his men had done. In six short weeks Alpha Company had licked its wounds, put its pride back in its pack, and annihilated a highly skilled enemy.

YOU — the idea factory

Richard K. Tierney

ABOVE THE BEST. This is a familiar slogan in Army Aviation circles. It's catchy and in three words reflects both pride and environment. But shortly after being written on a hot summer day in 1953 at Fort Sill, Okla., it was thrown in a wastepaper basket. Its authors (as is often the case) were unaware of its real value.

Fortunately, the slogan was rescued by an "outsider," placed in the proper channels, and later approved by the Department of the Army as the official slogan of the Army Aviation School.

This idea was just one of many good thoughts that hit the waste basket that day—and every day since. Many more good ideas never get as far as the waste basket. They are discarded before even being jotted down. Yet, all improvement begins as a thought in the mind of man. If Army Aviation is to reach its ultimate capabilities, then all ideas with potential must be carefully examined.

Too many of us will not *take the time* to write or sketch out an idea and submit it. Still, we *find the time* to sit around and criticize the Army for not having done this or that. This situation does not necessarily exist because people are lazy, but simply because:

- They do not know *how* to submit their ideas.
- They are apprehensive of criticism of their ideas and/or journalistic efforts.
- They feel they do not have time to write them up.
- They feel that it is not worth it—that the Army thinks troops in the field cannot come up with good ideas because they are either too inexperienced or

not in a position to see the so-called big picture.

SUBMITTING THE IDEA

Your idea *does not* have to be typed in triplicate on an electric typewriter. Nor does it have to be triple spaced on legal-sized paper and consist of not less than 27,000 words with accompanying pen and ink graphs, charts, and illustrations.

It *can* consist of a few pencil written paragraphs on any type of paper available to you (including rough sketches if needed). The only necessity is that you *get your point across.* This can be done easily by following this simple format:

Explain
- WHAT is wanted
- WHY it is needed
- WHAT it will replace (if appropriate)
- HOW it will be used
- HOW it will increase combat effectiveness

A good rule to remember is to discuss each point until *you feel you have told the whole story.* And remember, only you know what you are thinking.

When you have completed a writeup, either submit it through channels or *directly* to the U. S. Army Combat Developments Command Aviation Agency (USACDCAVNA), Fort Rucker, Ala. Your suggestions (and journalistic efforts) no matter how practical or radical will not under any circumstances be criticized or adversely affect your career. *Only* your ideas and their value to the Army are important.

If you are a poor writer, CDCAVNA will decipher your message. But this consumes valuable time, and it is important to make your point as clearly as possible.

How much time does it take to submit an idea? Of course this varies, but in most cases a suggestion can be written in the time we allow for daily coffee breaks.

IT IS WORTH IT!

The Army feels that troops in the field are in one of the best positions to manufacture ideas that increase combat effectiveness. While they may not be seeing the big picture, they are seeing the *important picture* of how equipment and organization functions in simulated or actual combat situations. Even though he may be relatively inexperienced, the man in the field is working in the environment where previously undetected flaws and shortcomings usually come to light. The Army recognizes that all requirements are *user* requirements and that the troops in the field are the best qualified users.

Many feel it is not worthwhile to submit a suggestion because it usually takes many years before an idea is seen as hardware or effected as an important TOE change or tactical maneuver. But if an idea increases the combat effectiveness of the Army today

or 20 years from today, *it is worth it!*

What happens to a suggestion received at CDCAVNA? You can rest assured that it is thoroughly evaluated. When appropriate, it is consolidated with similar ideas to eliminate duplication of effort. If an idea has merit, CDCAVNA recommends a priority and writes up recommendations, justifications, or a formal requirement. It is usually coordinated with aircraft users and then forwarded through the Combined Arms Group at Fort Leavenworth, Kan., to Combat Developments Command (CDC), Fort Belvoir, Va., and the Department of the Army. The idea may be set aside for possible use in the future; it may be included in a study program—or instigate a study program; or it may be placed by Department of the Army in other channels for procurement, production, test and evaluation, and finally incorporation into the inventory.

Indeed, this is a time consuming process. Numerous delays are caused by monetary problems, priorities, and comprehensive tests and evaluations. These delays are built into the system, but they do offer advantages. They allow adequate time to plan and conduct an orderly R&D program to improve the immediate and long range combat effectiveness of the Army. But this system can produce effective results only as long as ideas continue to flow in from the field.

WHAT TO SUBMIT

While most ideas should be sent to CDCAVNA, some routine improvements on standard equipment should be submitted to other agencies in accordance with AR 700-35. For example, such ideas as moving a handle to improve cockpit safety or placing larger wheels on a helicopter to improve ground handling are more expeditiously handled in other channels.

It would be nice if all ideas fell neatly into categories that could be easily routed to the proper agency. But since they don't, if you can't decide where to send your idea, forward it to CDCAVNA and they will place it in the proper channels.

CDCAVNA works on projects that fall into two general categories: those involving material or hardware and those that concern theory, doctrine, tactics, and organization. Many projects fall into the "glamourous" class, such as proposals for an all purpose V/STOL aircraft like the one shown above right or (more seriously) a heavy observation aircraft, or even a complete overhaul of the Army's organization and tactical employment.

Many CDCAVNA projects are definitely not in the glamour class, but are much closer to the average Army Aviator, such as a new flight helmet or a pilot's clipboard. You have probably known of many of these routine needs for years, but have not been

Since a suitable hood does not exist, combat developments thoroughly investigated numerous hood ideas submitted from the field. (See DIGEST, Mar 1960, Sep 1960, Aug 1961.) Study revealed that a hood should be durable, water resistant, collapsible, and weigh 5 ounces or less. It also must be easily removable from the helmet with one hand and suitable for use from the right or left hand seats of Army aircraft equipped for instrument flight.

A desirable feature recommended for the hood is that a portion of top panel be transparent to permit the wearer to see controls mounted on the ceiling of the aircraft with minimum tilting of his head.

aware that CDCAVNA was interested in such nonglamourous ideas. Also many Army Aviators tend to overlook these everyday needs, feeling they are "small potatoes," not worth wasting their time on. (Except of course for delivering occasional verbal tirades against the Army for not doing something about this or that.) Fortunately, there are those who realize that *they are the Army* and *they are doing something* about this or that.

CDCAVNA PROPOSALS

As pointed out, it is sometimes difficult to determine through which channels an idea should be worked. One such project recently completed at CDCAVNA is the proposal for a blind flying hood suitable for attachment to the APH-5 flight helmet. As a training device, this idea could have been submitted through other channels. However, the Army deemed it more expedient to work this project through CDCAVNA.

CDCAVNA's hood recommendations have been forwarded to higher levels for further consideration.

PILOT CLIPBOARDS

You may not have to wait much longer for a standard leg-mounted clipboard to use during flights in Army aircraft. CDCAVNA is recommending a clipboard that can be used during day or night operation by either left or right handed pilots. It would hold checklists, maps, instrument navigation charts, let-down approach plates, and other data required for the conduct of a mission.

After extensive investigation, combat developments has concluded that off-the-shelf clipboards are not suitable for use in all types of Army aircraft. Consequently, procurement of a new item appears to be the only solution.

Specifically, CDCAVNA says the clipboard must weigh 2 pounds or less, be durable, compact, and designed to be firmly (but comfortably) attached to either leg above the knee.

Clips or other holding devices at the bottom and top must be operable with one hand and have a two-position, stay open or stay closed capability.

The clipboard must also include a feature to enable the pilot to quickly change information visible to him to a second page and back again (such as from an en route navigation chart to an instrument approach chart and back to the en route navigation chart).

Among other essential features CDCAVNA is asking that the clipboard contain a battery powered, low profile light which will perform adequately for periods up to 6 hours but not impair night vision of crew personnel. The clipboard must also have a quick disconnect capability, space to store two pencils, and a pencil sharpener.

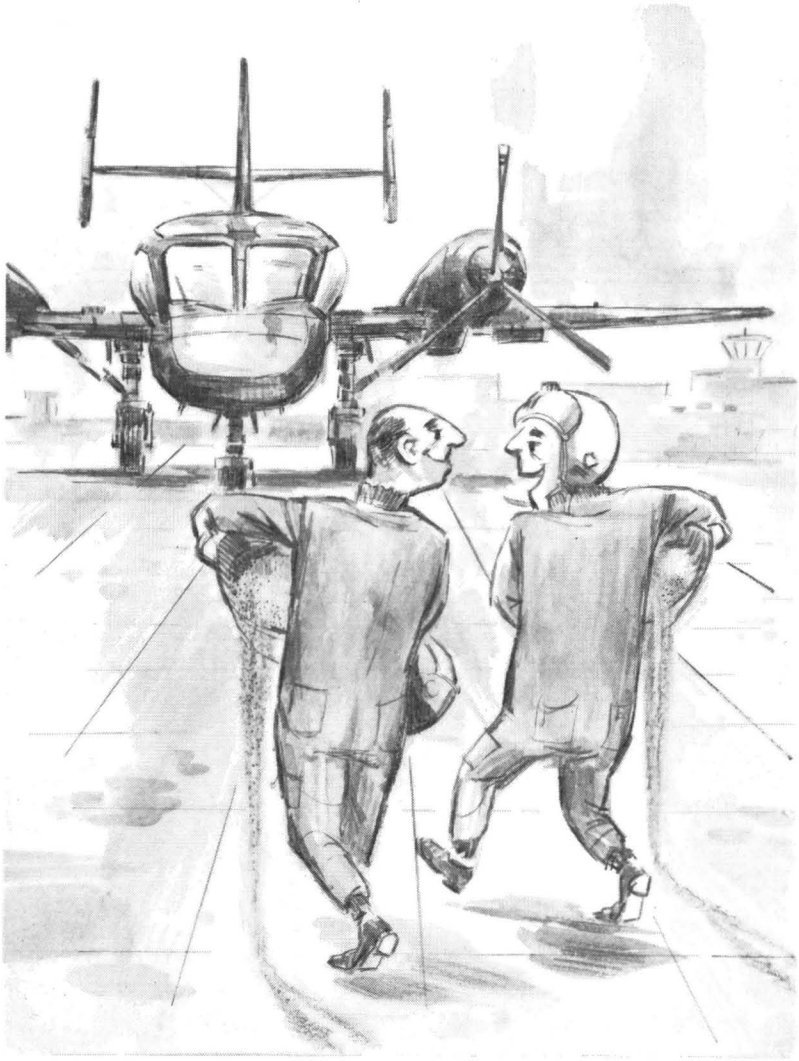
CDCAVNA has forwarded its recommendations to higher headquarters.

PROTECTIVE HEADGEAR

The APH-5 helmet does not fully meet the needs of Army Aviators and crewmen. Consequently, combat developments has worked out characteristics of a proposed new headgear which is scheduled to be developed for use by 1967.

The helmet is to be comfortable and provide increased protection against CB agents and acoustic and ballistic penetration. It should be olive drab in color, weigh not more than 3½ pounds, and be capable of being worn for up to 8 hours without undue discomfort and for 72 hours under stress conditions.

Once donned, the headgear should be easily operable with



one hand and should permit a liquid intake to the wearer while it is furnishing CB protection.

Combat developments is proposing that qualified personnel be required to properly fit the helmet to each aircrewman at the time of issue. It is suggested that the flight surgeon be assigned this responsibility. After initial issue, the helmet should normally be fitted for students at the Army Aviation School, thus eliminating the need for additional flight surgeons and logistical backup at other locations.

The proposal for a new helmet has been forwarded to higher levels.

PROTECTIVE ARMOR

A standard joke about protective aviation armor envisions each Army Aviator being issued a dishpan full of sand before each flight.

On the serious side, combat developments is proposing a system or kit to protect pilots and copilots of Army aircraft from projectiles. The kit (or system) should be fire resistant and not exceed 100 pounds (65 pounds where protection for only one person is required).

Protection would be limited to the torso from projectiles fired from positions below a horizontal plane passing across the shoulders of the pilot and copilot while the aircraft is in straight and level flight. It is essential that the kit protect against multiple hits striking more than 6 inches apart. Equipment design must include quick release or disconnect features to permit rapid exit from the aircraft. Recommendations for such a kit or system have been forwarded to higher headquarters.

In addition to classified high priority projects, CDCAVNA is working on many other more routine projects. An example is the off-the-shelf procurement of lightweight flight gloves. Such gloves should be available through normal supply channels in the near future—thanks to the efforts of combat developments and those in the field who *took the time* to write up their ideas and needs.

Other ideas being worked on at CDCAVNA include a miniature MB-4 computer and self-sealing fuel tanks. Many other projects are under study. If your ideas are not among them, it's *your* fault—not the Army's.

Y-ABC

Captain Farris G. McMicken

WELCOME to the unit, Specialist 4 Gordon. I'm Sergeant Conway, Mohawk line chief."

"I'm glad to be here, Sergeant. I've really been anxious to get to work on these things. The only Mohawk experience I have is school at Rucker. We covered a lot of material in those four weeks. I worked hard and enjoyed the course, but I'm not sure just how much I retained."

"Well, Gordon, that's what they make TMs and sergeants for. Just stick to the books, and I'll always be around to help you out. I've been with these aircraft for a couple of years. It's a good ship, but you really have to know your stuff and keep your head out or you'll kill someone. This ship has safeties on top of safeties, but like they say—a little knowledge can be a dangerous thing. You liked the course back at Rucker, huh?

"Yes, Sergeant." It moves fast and there's a lot of book work. I guess it's about the hardest course I've been through. You sure feel like you've done something when they finish with you. That crew of instructors sure know their stuff! You'd think they made the Mohawk. I guess the best part was the ejection seat and the engine. That electrical system was just too much for me. I have a lot of respect for that seat, but I feel pretty confident working with it."

"Yea, Gordon; it's just like working with any kind of ammo. I used to be with 155s. If you handle it right it's perfectly safe. Guess it's invaluable to the pilots though. They really seem to believe in it. Seems to make the 'ole' Hawk the safest aircraft the Army's got."

"Sergeant, there's so much to that turbine engine. I think I know generally how it works, but there are so many formulas and numbers associated with it.

Capt McMicken is Section Chief, OV-1 Mohawk, Fixed Wing Branch, Advanced Maintenance Division, Department of Maintenance, USAAVNS, Ft Rucker, Ala.

Artwork by Mr. W. Ward, Norfolk, Va.

It seems no one could remember all that."

"Remember the good 'ole' TMs, Gordon! Just settle down; get the rest of your gear squared away and your personal problems out of the way. I'll see you back here at workcall tomorrow. Sergeant Brown will give you the poop on the barracks and help you get squared away."

"See you later, Sergeant Conway. Thanks."

* * *

"Hello there, Specialist Frazee. How's everything?"

"Sergeant Conway! I haven't seen you since Korea! Someone told me they had a hard-nosed sergeant down here with the Mohawks. I guess you've got them all shaped up as usual."

"I don't know who told you that Frazee. These ships down here require good, careful maintenance. It's not like the old L-19. You know I give everyone just what's coming to them, no more and no less."

"Just kidding, Sergeant Conway; I know that you go right by the book. Open it to the chapter and verse and a guy can know just what you want. Any chance of me getting over to these Mohawks?"

"Ever been to Mohawk school, Frazee?"

"No, sergeant, but I've had a lot of experience on a company turbo back home."

"That's no good. The best way for this MOS is to go to school at Rucker. There's no guesswork and little room for error when working on these things. Well, I'd better get on it; I've got work to do."

"So long, Sergeant. I guess I'll be an 0-1 mechanic forever. I should have joined the Coast Guard. Those guys always have it better."

"So long, Frazee."

* * *

Sergeant Conway glanced up at the status board. "Well," he congratulated himself, "we can report a 100 percent flyable to Operations again today. I can't see why other units complain about maintaining these birds. Mechanically the engines are simpler than recips. I think people having trouble just don't follow through on parts requests and supervising these troopers that work on 'em. These troops get good training before we get 'em. They just require a bit of supervision."

The door opened.

"Good morning, Gordon. Did you get all squared away in the billets?"

"Yes I did, Sergeant Conway. The other GIs were very helpful. They sure seem to like this outfit. I saw some of our friends from our old unit—you remember 'Slick,' 'Charlie Brown,' 'Blackie' and 'Ole Crazy.' "

"Yes, 'Flash,' lot of the 'ole' gang are here. Let's take a look around the shop and ramp area. Most of your work will be out here on the ramp. Let's walk down this way. You'll be crewing 770 there on the end. It has been one of our best ships, and I'll expect you to keep it that way. It will take a lot of hours and effort."

"No sweat, Sergeant. I'm anxious to get after it."

"Let's stand here in the shade and make sure we understand each other. There's no change from when you used to work for me—just different equipment. You'll see equipment here that you didn't see in school. You'll remember they had the YOV-1 and a couple of OV-1Cs. That's probably the only "Y" bird that you'll see. Here we have OV-1As, Bs, and Cs.

"Each of these aircraft serves a different primary purpose. You'll soon learn that there is a great difference in Mohawks. Each type not only varies from the others, but Mohawks vary from serial number to serial number. Let's go over here and look at these two A models."

"Gee, Sergeant, how can you tell an A from any other type?"

"You'll soon learn, Gordon. Many differences are obvious, but you'll have to get down and read serial numbers on some components to tell the difference. On these two A models, the difference isn't really so obvious until you try to start 'em. See that button up there on the left eyebrow panel?"

"You mean the one that says 'interrupt crank'?"

"Yes, that's the one. Remember that when starting, you punch that button for 'interrupt crank' in case of a hot start or something."

"Sergeant, that's the same way they were back at Rucker."

"O.K., now let's look at this other A. Look at the same button up there on the left eyebrow panel."

"Well, I'll be—it says 'ignition' over the very same button!"

"That's right, Gordon. The very same button does exactly the opposite thing on each ship. Notice that on the other ship the stores selector switches were there on the pilot's instrument panel."

"This one had bomb racks too, Sergeant. Where's the switch panel?"

"Look up there on the overhead panel."

"Well, I'll be. A person could sure get confused going from cockpit to cockpit on the very same models."

"Gordon, the biggest difference, as far as you are concerned, isn't quite so obvious. Even the engines are different. On these older models the engine life depends a lot upon modifications. MWOs have been performed on some engines that extend the overhaul time."

"It looks like a mechanic like me is going to have a time remembering all of this."

"A few of these things you'll remember because you use the knowledge every day—such as the difference in starting procedures. However, every TM describes which serial numbers the section you are reading pertains to. You'll want to pay careful attention to this."

"Thanks, Sergeant; I'll remember that."

"I don't think you'll have any trouble if you do. Over there at the rear of the ramp is a B model. Can you see any difference from here?"

"The wings look longer."

"They are—3 feet longer. That gives it 6 more feet of wing span. This gives the ship a much higher service ceiling."

"What's that big, long, black thing hanging beneath it?"

"That's SLAR, Side Looking Airborne Radar. SLAR is the main mission of that type ship."

"They use those things on U-8s, too, don't they?"

"Yes, they do. But this is a much more powerful ship and better suited for carrying SLAR equipment. What you can't tell from here is that that ship has more horsepower than these A models. It has the new T53-L7 Lycoming engines."

"We only studied the T53-L3 at school. Is there much difference in the L7?"

"Not too much. Just a few changes which update the L3. It gives the pilot 95 more horsepower. The old L3, you'll remember, put out 1,005 horsepower. This job puts out 1,100. They say that soon the A models over here and all others will have the L7.

"All the rest of our ships are C models. We use those, just as we do the A's, for aerial photography—plus, they have infrared equipment installed. This infrared stuff is pretty well classified. This C model is a bit heavier than the A model. There's not a whole lot of difference as far as you'll be concerned in working on them."

"I always thought that a Mohawk was a Mohawk. I didn't know there was a family of them."

"Yes, Gordon. you've seen the A, B, and C Mohawks, but there's still more."

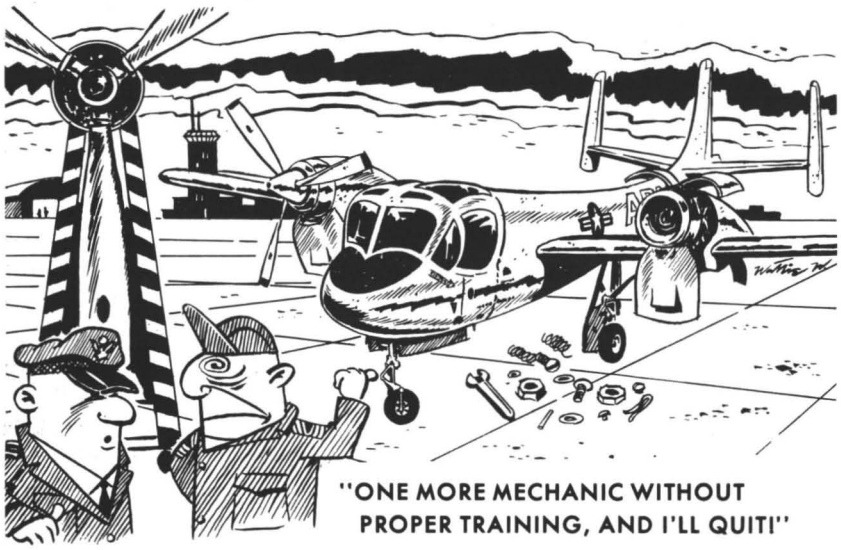
"More types of Mohawks?"

"Yes, you'll remember the YOV-1 back at Rucker. There's still a few of those around."

"Sergeant Conway, I thought I knew all about Mohawk maintenance after having to study so much in school, but, like you said, I'll always have the TMs and your experience to lean on."

"Right, Gordon, I'll see you after chow."

"So long, Sergeant Conway. . . . Let's see, there's the old YOV—used for photography and visual surveillance. The OV-1 is used for the same thing, but is a newer aircraft. Then the OV-1B over there; that one looks a bit different, flies higher, and is used for side looking airborne radar. The OV-1C is the only one used for infrared. Although each has its modifications, they are all good for visual surveillance and are capable of both day and night photography. . . . I think this new assignment is going to be interesting. I like it here."



"ONE MORE MECHANIC WITHOUT PROPER TRAINING, AND I'LL QUIT!"

—what about Aviation's *Future* STAFF OFFICERS?

ANNUAL AWARD
Monthly Winner
CONTEST

Captain T. J. Shaughnessy and Captain Pierce Robertson

ARMY AVIATION has untold wealth in good aviators. The Army on the whole has many good staff officers. But what about the combination—the aviation staff officer?

It is becoming increasingly difficult to find a good aviation staff officer, one who is oriented in the broad spectrum of aviation activities and well founded in tactics employed by the combat ground elements. Any officer can do the job—particularly if the work is rudimentary and not too challenging. But we're talking about the officer who can be assigned to any unit and do a superior job for aviation. The man we need must have a knowledge of the capabilities and limitations of all aircraft in the Army inventory, be cognizant of regulations, be current in supply and logistics procedures, and be aware of maintenance and supply problems. He must also be abreast of changes in tactics pertaining to methods and techniques employed by ground commanders and aviation commanders. Above all, this staff officer must have a cool head, a discriminating eye, and the good judgment gained from professional experience. Where do we go to find the genuine article, this all round, "triple threat" aviation staff officer?

Aviation commanders find themselves faced with this serious and controversial problem created by the unexpected and rapid growth of aviation. The number of experienced officers available is not sufficient to meet the present demand. There just aren't enough to go around. We now have a great influx of newly trained aviators, a few of whom are senior in rank. They

Capt Shaughnessy and Capt Robertson are with the Command and Staff Division, Department of Tactics, USAAVNS, Ft Rucker, Ala.

are needed to fill the staff positions required in the ROAD divisions, the new Air Assault Division, and aviation jobs at higher levels.

Little difficulty will be experienced employing the more senior officers in staff positions. These officers will adapt, but the vast majority of new aviators do not have the professional background or training and are, therefore, scarcely prepared to cope with the problems they will confront as aviation staff officers. Graduates of branch career courses are taught firm concepts in staff procedures but are not exposed to the more involved and more detailed problems related to the specialized area of aviation command decision-making.

We in aviation realize that we have increased the store of aviation knowledge and the theory of its application beyond belief. Yet, we have made it correspondingly difficult for aviation commanders to keep themselves or their staff officers trained and abreast of these new developments. These problems, if not given consideration now, will affect all aviation units, tactical units employing aviation, and every aviator. They will affect the type leadership received now and in the years ahead. This is but one of the ironic side effects caused by Army Aviation's accelerated growth.

The aviation staff problem existing today was expressed by two senior officers overheard discussing their problems after a flight. Their conversation gradually drifted to a more pressing topic of command. We will call them Lt Col Pat O'Foresight and Lt Col Bill McHindsight. Not surprisingly, their conversation reflects the changing attitude and thinking of many of our officers today.

"Colonel O'Foresight, did you get the impression that the people in ATC were rather impatient this morning?"

"Well Colonel, I thought they were attempting to hurry us, and at the same time bring us up-to-date on the proper reporting procedures, SID departures, and changes in the holding patterns."

"What you're saying so politely, Pat, is that ATC was impatient with me, not us. I'm afraid I'll have to admit that my mind was on other matters. The truth is, I haven't given too much thought to flying in the past few months, not since I took over this new aviation battalion. I've had so darn much work getting the battalion organized, and I haven't been able to get an experienced staff together to carry much of the load. All the problems that come up are new ones. It's not like the good old days."

"I understand your situation, Bill, and I can sympathize with you. I've had similar difficulties over in my outfit. It's tough finding time enough to remain current and proficient, even though I've been rated 16 years. However, my staff has performed remarkably well considering the short time they have worked together. They stay on top of problems or potential problem areas. Oh, I'll admit, I had a few anxious days after I was hustled off to take over the new outfit, but things fell in place. It wasn't a spontaneous development at all; my staff required training but I feel they are all officers with an extraordinarily high level of individual aptitude and competence."

"You were fortunate, Pat, to acquire all that ability. How did you luck out, or did you handpick your personnel?"

"Neither, Bill. On one of my trips to Rucker, I heard of the aviation staff officers' course, and, after a little investigating, I realized that this course had real value. I could have kicked myself for not looking through a school catalog first. It would have saved me a considerable amount of time, but then I always do things the hard way. Nevertheless, I took advantage of my discovery and decided to send two of my more experienced officers. These officers were well grounded in aviation and had considerable flying experience, but were not well acquainted with aviation staff matters.

"As a result of their attendance, I was particularly impressed with their performance and completely sold on the value of the staff course. Since then, I have instituted a policy of scheduling my potential staff officers into the course."

"All of what you have told me is great, Pat, but it doesn't solve my predicament. First of all, I don't have the officers to spare; and secondly, the time lost sending them to a long course of instruction wouldn't be practical."

"Bill, I don't think I succeeded in getting my point across very well. When I stumbled onto the idea of sending my officers to the staff course, I didn't have an excess of personnel. I doubt if I had any more officers available than you have now. I could not have spared any of my staff officers for an extended period, and that's what convinced me to try this aviation staff course. It only lasts three weeks. Yet, by an intensive schedule, the students become familiar with current organizations, equipment, characteristics of aviation units, and are given a working knowledge

of employment, staff procedures, and the principles of operation.

"The course also includes an extensive guest speaker program which provides the students with the latest information on concepts and doctrine, supply procedures, command and staff relationship, and some additional considerations involved in aviation maintenance. Probably the most valuable aspect of the course, which is often overlooked, is gained from the students' exchange of new ideas and techniques as they apply their ideas to the test-tube type map exercise.

"Bill, I believe I saved time overall by sending my officers to school for three weeks. They were given an up-to-date liberal education in aviation staff and command functions. I don't know of any other school which would have suited my purpose to a greater degree. The officers I sent are now oriented to aviation staff problems. Where else can you find a concentration of modern Army Aviation thinking, particularly where it is so close to the center of Army Aviation research and technological development?"

"You've sold me, Pat! I was skeptical about sending my officers away to school when we began our conversation, but now I think you have helped solve my problem. Let's finish our coffee and file out so I can get back to my office. I want to check the school quotas, and get several officers in this command and staff course."

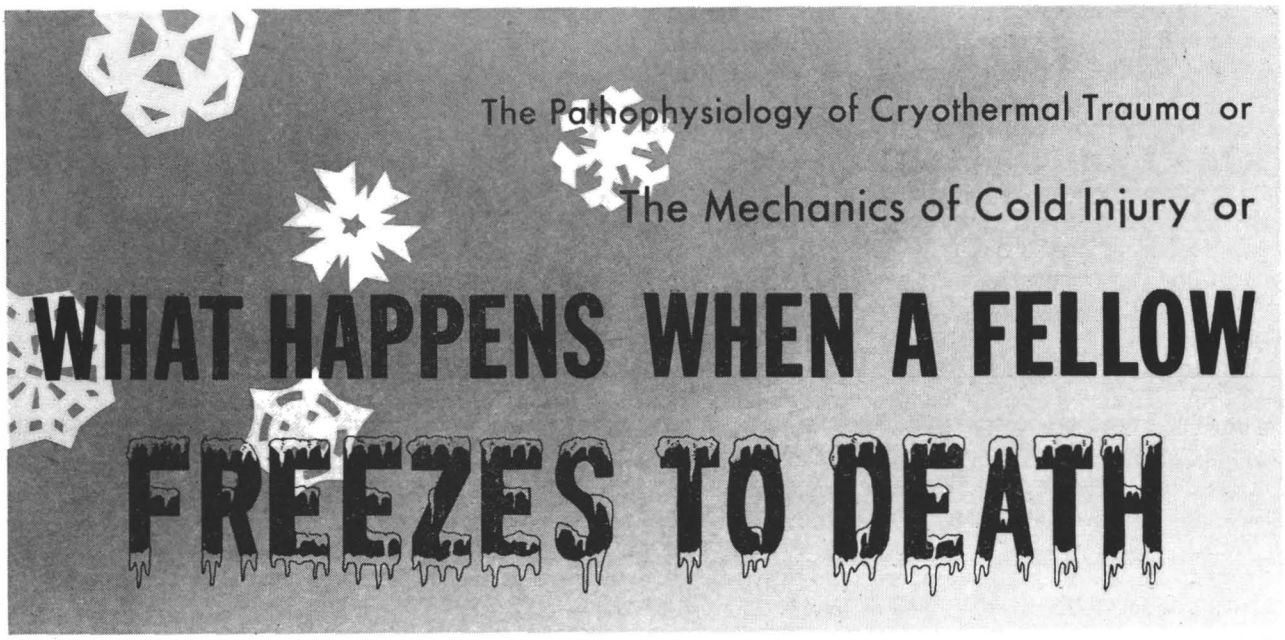
"Good enough, Bill, let's go. I'll check the weather."

* * *

At first sight, it may seem odd that a conversation like the one depicted above could have taken place. Possibly it has been oversimplified. Nevertheless, officers from units similar to that commanded by Colonel McHindsight attend the Army Aviation Command and Staff Officer Course each time it is presented. The instruction they receive is interesting and diversified, and includes subjects such as: Army Air Traffic Regulation and Identification Systems and Organizations, Operation of the Army Aviation Element in the Division Tactical Operation Center, Automatic Data Processing Systems, Concepts Pertaining to the Air Assault Division, and Concepts for Future Organizations. All subjects are intended to emphasize the vast amount of information used today by our aviation staff officers.

Whether all aviation units receive the best possible leadership and management in the years ahead depends in part on the way our new commanders and staff officers face or ignore the staff training problem. Will the young aviators just going into staff positions be prepared to recognize and deal with aviation staff problems as they are trained to recognize and handle difficulties encountered while flying? They will be if allowed to develop their abilities through proper training and schooling. Our potential leaders will meet the challenge created by the rapid expansion of Army Aviation; and they will become the aggressive aviation officers needed to assume positions of responsibility.

In passing, stop a minute and reflect. Could you fill the shoes of an aviation staff officer and do a truly professional job? If your answer is in the negative, why not check with your G3/S3 people about a quota for the next Army Aviation Command and Staff Officer Course at Fort Rucker? The course is open to both active duty and reserve officers. The Army Aviation expansion program dictates a need for more active duty people to attend. The reserve components are always well represented.



Captain William H. King

DEAR TROOPS,

The topic for this month concerns cold weather, and the human body's response to it. Of course, we shiver and get goose bumps, but let's go a little beyond that. First, let's review a few tech orders as to how the body regulates its own temperature, and the methods by which it will react to thermal stress. Then we will see what can go wrong, how to prevent it, and, as a last resort, how to treat it, if necessary.

You will recall that only a short while ago, it seems, we were discussing heat stroke and other summer hazards. But, of course, unless you are flight-planning for Hawaii or Timbuctu, you can lay that information aside until come grass. But hold on to a few of the basic principles for a moment, because they do not change with the season. Let's give them a low-level-short-look again.

The body's thermostat is housed in sort of a command post, deep within the gray interior of the brain. There a few Betz cells lounge around, giving an occasional glance to the TWX messages feeding into it from the peripheral receptors—that is to say the skin scouts, posted out there on the body's defense perimeter to take notes on the time, temperature reading, wind velocity, etc. Generally speaking, these scouts are well-trained specialists, who carry on during all kinds of weather (expecting the occasional weakling who shows up at the hospital about 0400 and drags the MOD out of bed). These scouts' MOSs show them to be specialists in thermal reception, as distinguished from other receptors who may specialize in pain, touch, or body position sensations. They are usually reliable throughout a life span, unless one is befallen by a certain "social" disease, or sugar diabetes, which we will not discuss further at this time.

Meanwhile, back at the ranch, the Betz cells take note of the

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This article is reprinted from the Air Force Flying Safety Officers Kit.

latest info, and if a cold snap or heat wave occurs, they get up off their dendrites and do something about it! They have a sort of "hot line" by which they can dispatch messages to the offensive platoon. Under conditions of extreme heat, you will recall that the reaction will be to increase the blood supply to the skin, thus dissipating body heat by radiation. It will also be lost by sweating and evaporation and, to a minor extent, via respiration and other routes. Under conditions of extreme cold, the reaction is just the opposite. Blood is shunted away from the skin to prevent loss of heat, and also to route it to the more vital organs of the body, from the standpoint of survival, such as the stomach and liver, the heart, and, of course, that command post.

You see, those Betz cells are a rather selfish lot; at least they reason, that if they go, all coordination and chain command would be lost, so they protect themselves and other areas essential to life at all cost. If necessary, this is done at the expense of the less essential, peripheral areas. Now, no one would like to think of his fingers or toes, the tip of his nose, or his ear lobes as nonessential, but if the Betz cells are faced with a survival situation, such areas as these will head the sacrificial list.

Obviously, this is not the whole story and several other factors, both external and internal, should be considered. External factors, other than temperature, include wind and moisture, especially the latter, which make things worse. Internally, anything which interferes with blood supply is going to further jeopardize the safety of those fingertips, already blanched white for the sake of those Betz cells. Certain rare diseases and certain drugs can do this, but neither are likely to be present factors if you have just bailed out over North Dakota. However, nicotine can also constrict blood vessels, and if you're still smoking your two packs a day, perhaps you'd best fly southward like the geese. Of course, external pressure can also cut off blood supply, and, while you are not very likely to be wearing a constrictive tourniquet around your arm or wrist, many people will try to achieve similar results in the lower extremity by stuffing a size 12 foot and several layers of thick socks into a size 10 boot.

It's just no good. Whenever the blood supply to a part of the body is decreased, that part not only suffers from lack of heat, which the warm blood brings, but also from lack of oxygen, those vital O_2 molecules which are hand-carried by the red blood cells floating in the plasma. And, as you all know, without oxygen, the organism simply does not survive. Just as the entire body will not survive a total oxygen lack at high altitudes, just so a member part, such as a cold nose-tip or that cold, aching big toe, will fail to survive if its share of the O_2 fails to arrive on a continuous schedule. What ensues is necrosis—or simply death—of the tissue cells; when precipitated by cold injury, this is commonly known as "frostbite."

Preventive measures are obvious from a consideration of the above. First, strengthen the body defenses. We humans lack the thick skin of a walrus or the polar bear's fur. Therefore, (if for no other reason) we adorn ourselves with other insulating materials, namely clothes. Clothes in themselves are not warm, of course—obviously not while hanging in a cold locker room, but they do serve as insulators of the body's own heat when properly applied. You engineering types can tell us that insulation works best in layers, and that several layers of clothes, or gloves, or socks with air space between each layer will work better than one thick layer. Of course, the quantity of clothing worn is limited by other considerations such as the desire to remain mobile—to ambulate, to respirate, and even to micturate.

And don't forget the blood supply—especially not to those parts which are farthest removed from the mainline of supply, and nearest to the hostile elements. Clothing should not be too tight or constrictive, certainly not about the arms or legs at any point. Remember that moisture is an enemy, and predisposes to frostbite. In a survival situation, not only avoid getting wet, but also avoid working up a sweat, as socks or areas of clothing saturated with perspiration are likely to give rise to painful discolored areas of skin beneath. These are the warning signs of frostbite, and if they do occur, despite all of your careful planning and precautionary measures, treatment should be instituted at once.

Treatment can be quite simple, and probably would have to be, in order to be of any practicality in a survival situation. Dry and warm the cold part. How to do that on a cold night in North Dakota? Place the injured hand inside your jacket, next to your warm abdomen, where those Betz cells have shunted the blood supply, or a foot under your buddy's armpit, after removing those wet socks. Remember that your own body may be the only source of heat available—heat derived from digestive processes and other chemical reactions within the body, and distributed by the blood stream.

If you are fortunate enough to have a campfire, do not—repeat, do not—warm the injured part directly from the fire, as you may further damage it by burning. The injured tissues are very susceptible to further damage, which has been caused in many cases by open-flame heating, or vigorous rubbing both of which are to be avoided. The proper method of utilization of the campfire is to melt some snow or ice in a suitable container and immerse the injured part in tepid water. Whenever gentle warmth is applied in any suitable form, the command post will get the message, relent a little bit, dilate a few blood vessels, and let those O_2-laden cells flow through in greater numbers. Then things are looking up again. Of course, professional medical care should be obtained if your first-aid efforts have been too little or too late. Surgical care is often needed for the treatment of frostbite; even amputation of the part is sometimes necessary. Those fingers and toes may not be essential to life, but we have sort of grown accustomed to having them around, and the above outcome is to be avoided if at all possible.

Well, we're not quite going to make it to the bit about the fellow who freezes to death. Let it suffice to say that the unabridged version has the Betz cells, barricaded in their command post, finally succumbing to the overwhelming forces of fatigue, cold, decreased blood supply, and oxygen starvation, as the curtain descends.

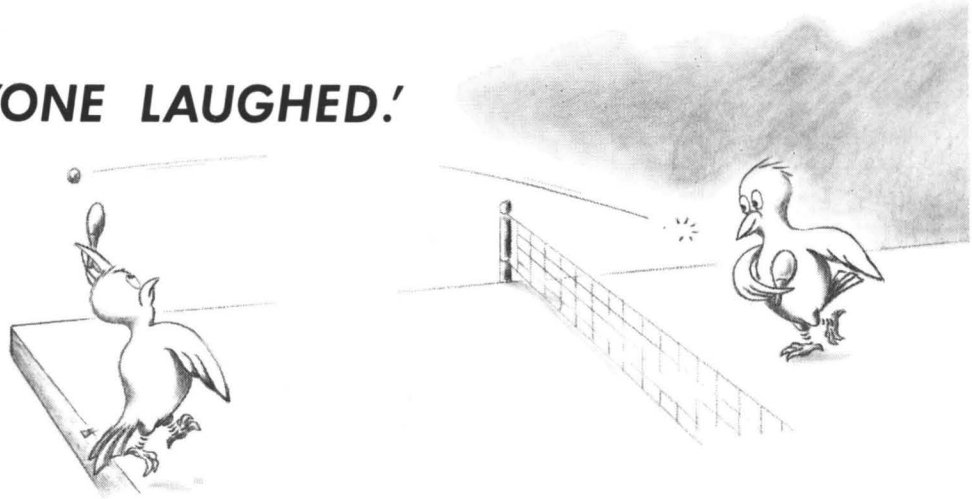
But let's hope that that never happens to any of us. With a little bit of luck, and the knowledge and employment of a few simple principles, it will not.

Wear clothes. Dress for where you are flying, as if you might have to walk back. Wear shoes and gloves. But not too tight. Keep susceptible areas of skin clean and dry, as best you can. Guard your nose and ears. (Cup your hands over your face and breathe the warm air into them; cup your hands over the ears and massage very gently, etc.)

Well, that's it for this month. You've survived beach parties and are firmly launched into fall—so, play it cool man—but, stay warm.

THE PIGEONS PLAYED PING-PONG

AND EVERYONE LAUGHED!



James M. Knight

THE ROOM was dark but the light from the motion picture screen danced on the faces of the students. With a shrug, a cigarette, and a yawn, students in the Methods of Instruction Course settled down for what they anticipated to be a "sleep period."

As the pictures flickered through the light and lens, however, there were small telltale noises of attention, discernible by even the most naive instructor. The students had locked their concentration in on the flutter of pigeon's wings and the measured vocal tones of a behavioral psychologist.

THE EXPERIENCE

The motion picture was called "Learning and Behavior." Through a series of feeding experiments, Dr. B. F. Skinner of Harvard University had pigeons counting, turning, fighting, and, yes, even playing Ping-pong. By giving the birds food only when they behaved as he wanted them to, he shaped and molded their actions. The pigeons learned the desired behavior at different rates, but even the dullest bundle of feathers, placed in a given

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situation and reinforced carefully, would learn what Dr. Skinner wanted it to learn.

As the pigeons played Ping-pong, there was general laughter throughout the classroom. To a casual observer, the ring of merriment would sound natural, a typical response to an incongruous situation. But to any experienced instructor sensitive to student reactions, the laughter would indicate a negative empathy, an "I've got the point only too well" response, and "Even though it's funny, I'm not a bit sure I like it!"

Although Dr. Skinner emphasized that human behavior is more complex than pigeons' behavior, the student was made to wonder just why he walked through a red light occasionally, and why he worked more efficiently when he was rewarded with a raise or even a simple pat on the back from his boss. To the more astute viewers a somewhat more frightening aspect to this "reinforcement theory" penetrated their thinking: the controlled bending of twigs to shape the mental trees. It looked like a basic course in brainwashing! The student knew he was not a pigeon (winged variety anyway), but he was made painfully aware that he was a member of the animal kingdom, homo sapien, with a set of behavioral patterns that could be shaped and molded much like the pigeons'.

With an apprehensive attitude, the students took a 10-minute break in preparation for the second hour in New Developments in Training.

When they reentered the classroom no instructor was in sight. The only movement in the room came from flashing red letters on the large screen which read: GOOD MORNING, GENTLEMEN. THIS IS AN AUTOMATIVE LESSON; PLEASE TAKE YOUR SEATS.

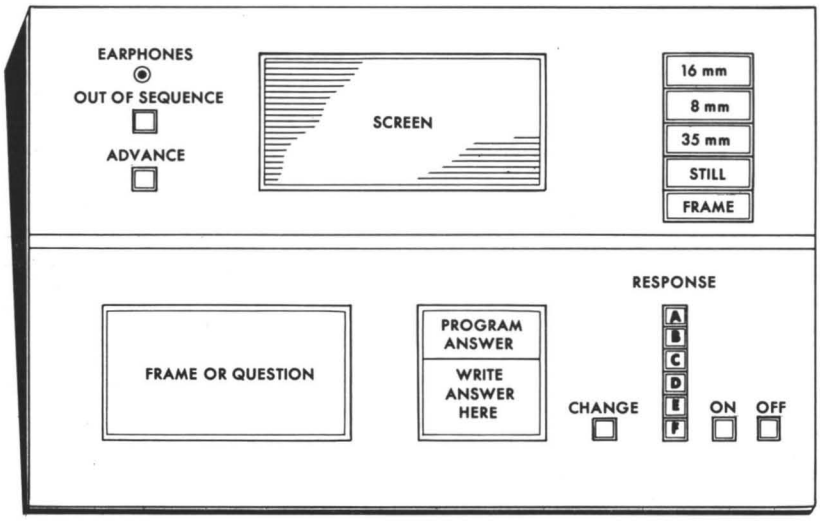
The students obeyed rather quizzically. Just as the class clown was about to make a nervous wisecrack, the flashing stopped and the following directions appeared. *Your lesson this period is on the uses of automation in training. At this time, remove the machine from the rack beneath your desk. Place it directly in front of you. Turn the start button to the "ON" position. The green light above the start button should appear. If it does not, check your floor plug. Carefully read the direction in the screen of the machine and begin.*

The students removed the lightweight plastic machines from their racks and placed them on their desks. The face of the machine appeared to be complex, with a multitude of knobs, dials and openings (see illustration). However, when the start button was turned to ON, the screen on the machine relieved their anxiety by instantly projecting in vivid color a beautiful woman with these words across the screen. *Good day, gentlemen. I'm your visual tutor. Please place your earphones on and punch the 16mm button to the right of the machine. I'm anxious to serve you.*

With a quick adjustment of earphones and a punch of a button, each student received oral and visual directions on using the machine. He learned that in the opening labeled "frame" a question or bit of information would appear. He was to respond by writing his answer on a rolling piece of paper labeled "written answer." When the answer had been written, he was to punch the "change" button and the written answer would move up and under a square of clear plastic. At the same time, the correct machine answer would appear in a space just below the student's answer for comparison.

Directions also indicated that multiple choice questions would appear occasionally on the screen, and responses would not be made by writing the answer,

Teaching Machine



but by punching the response buttons labeled A through F, appearing on the bottom right of the machine. The lovely tutor ended her directions by saying, *Your lesson today is on the fundamentals of automation. Do not worry if you punch the wrong button, I'll be with you throughout your program. Your first frame of information is ready for you. Please begin.* The machine screen darkened, and the students began the program.

The process was relatively simple. Read the question, write the answer, punch the change button, and the machine's answer appeared beneath the written answer. A new question also appeared in the frame opening.

"Hey," a student exclaimed, "I'm not making any mistakes! This is easy material!"

And so it was, for complex materials on critical path analysis and computer design had been "broken down" into small, logical steps and each frame designed to shape the response desired. Each student worked at his own rate, and the programed material was made interesting by the frequent use of motion pictures and slides to support or teach a point in the program.

If a student made a technical mistake, like punching the wrong button, the tutor would appear on the screen and direct him to punch the OUT OF SEQUENCE button. This would return the student to the point in the program where he made his technical error. An ADVANCE button was also provided for those students who felt they knew the material being covered. By punching the ADVANCE button, a test would appear on the screen and the student would use the response buttons to answer the questions.

If all questions were answered correctly, the student would be advanced to a new or more complex area of study. If he failed the test, the lovely tutor would appear on the screen, tell him to place the earphones on and, in quiet, warm tones, give the student a personal message about a valiant try, but nevertheless, send him scurrying back to his point of departure.

As the novelty of this new experience in learning wore away and students began to use the machine routinely, they remembered the flutter of white wings and saw again the pigeons playing Ping-pong. This time, no one laughed. They understood.

THE LOGIC

Before you "write off" the experience you have just read as being a rather poor attempt to penetrate the "twilight zone," let us look at two major facts:

- Thousands of lessons are in existence today that are designed and formulated like that the students received in the related experience. The lessons are called programs and the method is usually referred to as Programed Learning. Two-thirds of the school systems in the United States are using some form of programed learning.
- At least a hundred machines on the market today incorporate all or some of the features of the machine used by the students in the experience. They are commonly referred to as Teaching Machines.

The experience the students had was not based on a projected technology. It is today's science, and fortunately it seems to be just the beginning.

The basis for this revolution in education is Programed Learning, a method evolving from a theory that stresses control over the interaction of the student and the subject to be learned. Some educators feel they must go back to ancient Greece and the Socratic method of teaching to give this new method of learning dignity and precedence. There is a parallel, but for all practical purposes the modern developments date from Dr. S. L. Pressey at Ohio State in the early 1920s. He developed a testing device that is considered a forerunner of teaching machines as we know them today. Dr. Pressey did not

USAAVNS Programed Learning Status

For the past two years the U. S. Army Aviation School has been active in applied development of a new method of instruction called auto-instruction or Programed Learning. The following subjects are being programed by interested faculty personnel and are in various stages of completion: VOR Navigation, Evaluation, Moisture, Weight & Balance, Administration of Tests, and 3-Part Organization. Other services are completing programs that will have value in the Aviation School curriculums and interested departments are evaluating their usefulness for these courses.

A civilian contract has also been drawn to program the academic portion of a complete course. This contract is pending the availability of funds.

The USAAVNS Library has 30 programs, ranging from the fundamentals of spelling to college calculus.

receive support in his ideas, and it was not until 1954, through the efforts of Dr. Skinner at Harvard University, that programed learning received proper recognition.

The basic principle underlying programed learning is reinforcement. With pigeons the reinforcement is food, with human beings it's the self-awareness that he is responding correctly to questions and learning the lesson. A lesson is considered programed when material to be learned is broken down into small logical steps called frames; when students must make an active response, such as writing the answer; when immediate feedback is given, as having the correct answer appear; and when students are allowed to learn at their own rate. Many variations and different approaches to programing materials exist, but these are the major features.

THE FUTURE

Educators, experimental psychologists, and engineers are now sharing a "togetherness" that was unheard of 10 years ago. As these men apply their combined thinking toward education and training, the school of 1980 will be as different from that of today as the modern jet is from its ancestral parent at Kitty Hawk.

Let us, at this point, allow our imagination to soar forward to 1980 and see Fort Rucker as a student might experience it.

To be perfectly frank, we cannot take this imaginary experience through an instructor's eyes, because in 1980 there might be no instructors as we know them today.

The Army Aviation School of the future is a computer based organization. All administrative, training, and personnel functions are handled by central computer. A student comes to Rucker burdened only with a small plastic disc that contains his complete 201 file. He goes to central computer, inserts the disc into a 400-billion position thin-film memory computer and all information necessary, from his housing to his class schedule for the course, is presented to him on a coded card. A cryptographer is not required to read the coded card, for the student since the late '60s had been exposed to the code in every facet of his life—from his bank account to his drug-store purchases.

The small plastic disc is returned along with the coded card, and the disc becomes his identification throughout his stay at the school. This identification is important since the schedule is self-paced, and a student could be anywhere in the school depending on the rate he has set for himself. Central computer can locate him at any time because he is required to insert the disc in a slot provided in the machinerooms and in his quarters.

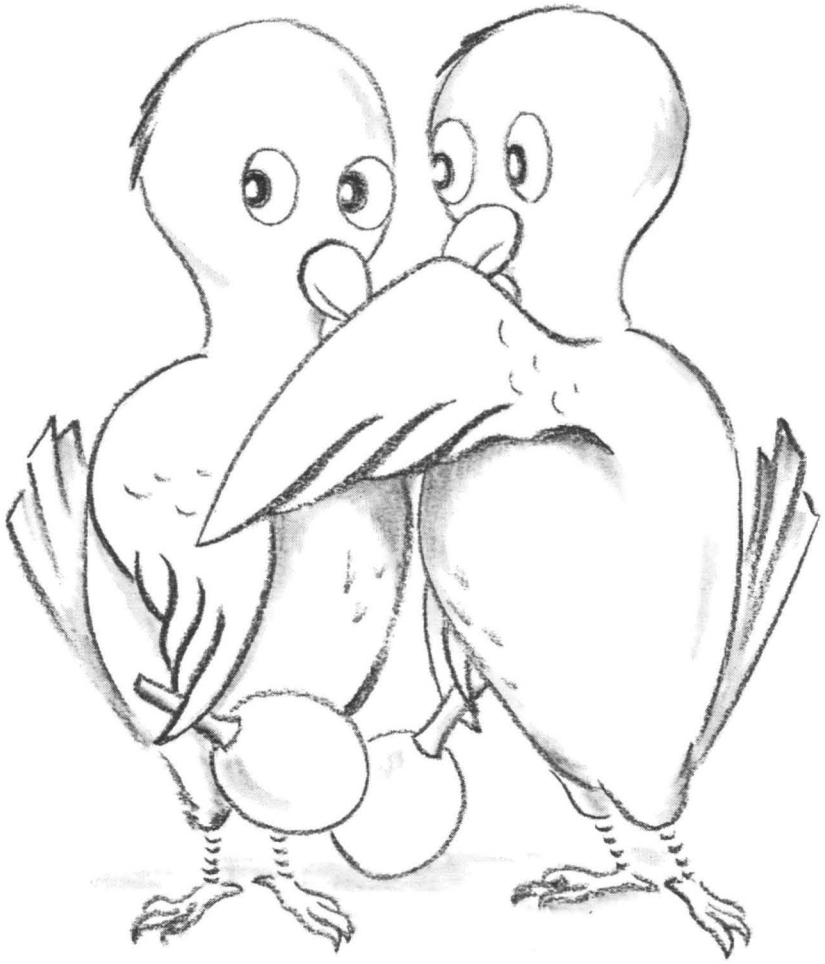
Our student is in a typical flight course. He begins his academics, such as weather, navigation, etc., in machinerooms that have all materials programed for him. The automative devices used are programed from central computer and every variable known has been accounted for to shape the behavior desired in the light of school objectives. If, for instance, a student needs a bit of simple math to work a problem and has forgotten how to do it, this will be apparent in his responses. Immediately, the device will leave the main path of critical knowledge and give the student review in his area of weakness. He is returned to the critical path when his response indicates he is ready.

The student is never bored in this machineroom phase because of the variety of devices and use of audio-visual equipment, the sensitiveness of the programs to prior information the student may possess, and the ability to move in learning as fast as his aptitude for the subject will allow.

After basic academics, the student enters the simulator phase, where he learns to fly. The simulator buildings house controlled environments so realistic that once in the aircraft device, there is absolutely no way of sensing you are bolted firmly to the ground. All sensations and maneuvers in flight can be simulated. The student is programed much as he was in his academic phase, though more use is made of audio-tutoring. A student is reinforced immediately when he exhibits the correct motor skill or judgment, and he is programed until his reactions are second-nature. When he finishes his simulator phase, he simply schedules an aircraft, walks out to the flight line, gets in the aircraft and goes!

For more advanced work, a programed computer device is used in the aircraft. To learn a certain maneuver, the student flicks a switch on his control panel. The flick of this switch is important in that he maintains complete control of his aircraft only if he responds correctly to the programed maneuver. The student listens through his earphones to a programed explanation of the maneuver. He responds orally and is immediately reinforced orally. When the device is satisfied the student has an oral understanding, it may have the pilot execute a few coordination exercises to check motor response. Satisfied, the computer device tells the pilot to execute the maneuver.

If the maneuver was perfectly executed, the device reinforces the behavior orally and has the student do it again and again until it becomes automatic. If on the other hand, the student has difficulty, the computer device takes the controls and returns the student to his original attitude. His mistakes are presented orally by the device and the student is allowed to try it again. If it's executed correctly, reinforcement is used and the student learns the maneuver. The pilot does not get the controls back until he executes the maneuver correctly.



"Quiet, Gertrude, the doctor says we're being reinforced."

On a bad day, it becomes embarrassing to return to the airfield and have the computer device indicate in crisp objective tones to the tower that an automatic landing will be executed. It would be something like going out to sea in a sailboat, becoming becalmed, and having a motorboat bring you back to shore.

The year 1980 will see a new technical society, and though these predictions and one or two exaggerations concerning the future may seem ridiculous, it would be well to remember that programed learning and automotive teaching machines are a reality today!

Where There's

I WAS INSTRUCTOR pilot for an instrument training flight on a typical winter morning in central Europe. The entire continent was shrouded by a dense overcast, but we were able to get a legitimate alternate in western France. The nearest area that would permit a visual approach was in the north of Ireland, well beyond our maximum cruise range. But the weather for our expected time of return was forecast to improve to ILS minimums.

We taxied out, received our clearance, and the pilot made a fine ITO. The ceiling was less than 100 feet and visibility was about a quarter of a mile in fog. As we entered the clouds, climbing to an assigned altitude of 5,000 feet, I smelled the unmistakable fumes from an electrical short. I glanced around the cockpit but there was no visible smoke. I looked at the pilot, but he was completely occupied with flying and seemed unaware of the fumes.

We were cleared to leave approach control frequency, and the pilot called Munich Control to give them an estimate for Schwabish Hall. I planned to have him spend about an hour in the holding pattern there before returning to Stuttgart.

We reached our cruise altitude and the fumes grew stronger. This worried me, but I had flown many aircraft with similar odors.

As the fumes grew still stronger, I thought about requesting a clearance back to Stuttgart. But the idea of an approach in such miserable weather didn't appeal to me.

As we continued, I thought about other courses of action, but none seemed appropriate. Slowly, I became aware of a steady decline in the volume of the UHF receiver. I called Munich, explained that we were having electrical difficulties, and requested clearance back to Stuttgart as soon as possible. Munich instructed us to climb to 6,500 feet and reported that no delay was expected after we reached Schwabish Hall. I thought about declaring an emergency, but we were only a couple of minutes away from Schwabish Hall.

We arrived over Schwabish Hall just as the pilot leveled off at 6,500 feet. He made his position report to Munich and received clearance to proceed on course. He also got permission to switch to the Stuttgart frequency. Stuttgart acknowledged our ETA and reported their weather as 200 feet overcast, ceiling ragged, and visibility averaging ½ mile in fog. They also said our transmissions were very weak.

I explained our problem to Stuttgart and requested an expected approach time. The time they gave me was the same as our ETA. I told them we were shutting down all radios and

Smoke

would attempt to contact them two minutes before ETA.

We were now navigating strictly by dead reckoning, trusting that the 7° of drift correction we had established at 5,000 feet would hold reasonably valid for 6,500 feet as well.

The fumes, now mixed with smoke, became dense and acrid. I opened my side window and gulped cold, fresh air. To my dismay, I saw that we were accumulating a moderate load of ice. I glanced at the pilot. He was coughing and tears were running down his cheeks. "Open your window and take a break," I told him. "I have the controls."

Five minutes before our ETA, the airspeed indicator showed we were losing approximately 25 percent of normal airspeed despite increased power settings. I mentally tacked an additional 3 minutes to our original ETA.

At the expiration of our original ETA, we turned our electrical switches back on, but could hear nothing from our radios. The ADF, VOR, and ILS would be of no use. The true state of our predicament now dawned on me. Turning off our radios to conserve battery power had accomplished nothing. The electrical short had apparently drained our battery and we had neither communication nor navigation radios.

I thought about flying an emergency triangular pattern, but I knew we couldn't afford to remain at our altitude much longer. A climb to on-top conditions was impossible with the ice load we were carrying. Even if we had been able to climb, sooner or later we would have needed oxygen which we didn't have. A descent would put us below the ice accumulation levels, but this might put us too low to be spotted on distant military radar scopes. I had no idea how an intercept aircraft could hope to locate and lead us in if they didn't know our altitude.

I was worried about the possibility of fire, but every course I could think of meant continued flight and more time for fire to break out. Bailout appeared inevitable and I felt a sense of futility. The idea of jumping certainly didn't appeal to me, and it seemed a horrible waste to abandon a good aircraft.

I was almost resigned to the idea of jumping when my thoughts were interrupted by a flickering light—a continuous series of dashes. I had never heard of a marker beacon approach, much less made one. But why not? There was no time to think about it.

I retarded the throttle and turned outbound. I could hope to receive the signal again when we were inbound, but I dared not depend on it. Time became a precious commodity, to be measured to the second. I considered our position to be beacon inbound exactly 60 seconds after completing the procedure turn. Meanwhile, I had to lose 4,000 feet of altitude in less than 3 minutes.

To my surprise, the marker beacon light flashed again on final. I accelerated the descent, hoping to break out of the overcast well before we reached the field. I leveled off at 200 feet and let the airspeed dissipate to 85 knots. As I was thinking about going lower, we broke out of the clouds long enough to catch a glimpse of the autobahn. I dived the aircraft into contact conditions, followed the autobahn to the corner of the airfield, and made a short dogleg to the runway.

After landing, the fog was so thick that we were unable to see the control tower from the runway. We taxied near the tower so they could see us, and the tower acknowledged with a green light. Then we taxied onto the parking ramp and shut down. It took maintenance personnel only a few minutes to determine that the suppressor cable had burned out.

Fifteen minutes later, the weather socked in and the field went below minimums. It stayed that way for hours.

This article was written by a member of the Communicative Skills Class of the Aviation Safety Course, University of Southern California.

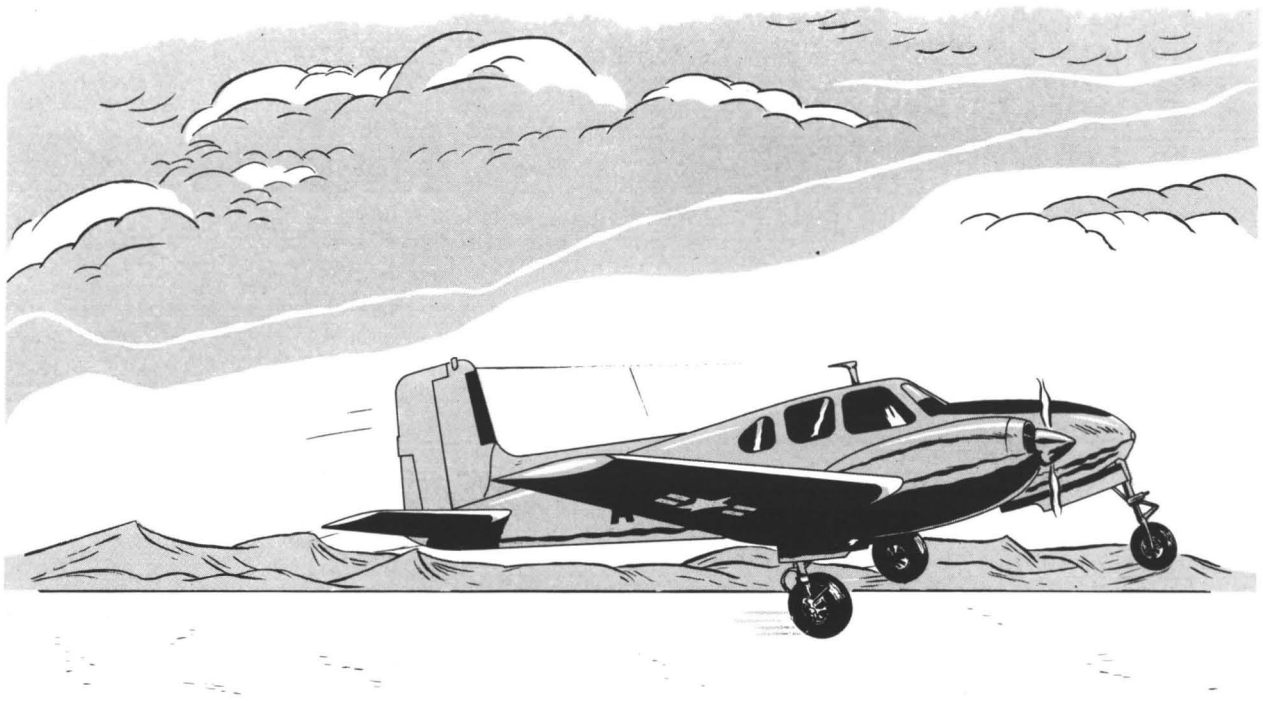
U-8 Landing Gear

Ted Kontos

ON A DRAB JANUARY morning a veteran pilot and his copilot climbed aboard a U-8D aircraft, fired up the engines, and taxied out to the runway. Above them, the early morning sky was overcast with a 2,000-foot ceiling. This was to be an actual instrument proficiency flight conducted in the local area. The flight was scheduled to be a short one. It was. A few minutes later, the aircraft was back on the ground—completely destroyed. Both aviators were killed.

What caused this accident? The direct cause was listed as engine failure. A contributing factor was failure of the gear to retract. From the evidence collected, this is how the investigation board pieced it together:

After the aircraft had become airborne, the pilot was unable to retract the gear. Instead of aborting the mission and returning to the field, he elected to continue his climb, perhaps in the belief that he might somehow manage to get the gear up. At this point, the left engine began to lose power. Unable to continue this engine in operation, he shut it down and feathered the propeller. With only one engine running and with the gear extended, the aircraft would not maintain altitude. While flying at a dangerously



low airspeed, the pilot maneuvered to avoid a hill and the aircraft stalled, fell off on one wing, and crashed.

Fortunately this accident is not representative of the 37 U-8 accidents recorded as a result of gear failure. But it vividly demonstrates how easily a difficulty arising in one system can combine with a failure in another to transform an emergency into a tragedy.

Excluding the above aircraft which was totally demolished, the cost for repairs ranged from a minimum of $12 to a high of $30,000. If we consider the length of time some of these aircraft remained out of commission awaiting repairs, plus the fact that two lives were lost, we can readily see that we are paying too great a price for situations which never should have arisen in the first place.

The landing gear found on U-8 type aircraft has evolved from a conventional, fixed gear design to one which is modern, tricycle, and retractable. We have sacrificed simplicity for better visibility, easier ground handling, less drag, longer range, and greater safety from noseovers and groundloops. A good swap.

To accept these benefits, we must also be prepared to accept the responsibilities a more complicated system demands. One logical solution is for us to thoroughly understand this gear, so that we may properly operate it, prevent failures, and cope with any emergencies which might arise. Now is a good time for us to refresh our memories. Since a U-8D just happens to be available, let's walk over and take a look at it.

Starting at the right main gear, we notice that the bright chrome piston extends approximately 3 inches from the strut cylinder, and that a smooth, red band surrounds the lower portion of the piston. Has this strut been properly serviced? In all probability, yes; but not necessarily. Since this unit requires servicing with both air and hydraulic fluid, it could be that we have an excessive amount of air and an insufficient supply of fluid. Should this be the case, the U-8 would be able to land about as smoothly as a kangaroo on a trampoline. Furthermore, the strut pistons would be more apt to bottom within the strut cylinders, especially from a hard landing. This action may damage not only the gear units, but also the wing attaching fittings and engine mount support areas.

What can we do about it? We can check the strut assemblies for condition, cleanliness, proper extension, and hydraulic leaks. Keep in mind that a thin film of oil around the exposed portion of the piston is normal and desirable. We will be able to determine more about the condition of the struts while taxiing and applying the brakes prior to takeoff.

This focuses our attention on the red band around the strut piston which serves as a safety indicator. As long as it is not crushed, we know that the aircraft did not make an excessively hard landing during the previous flight. If it had, the band would have been replaced only after a special inspection.

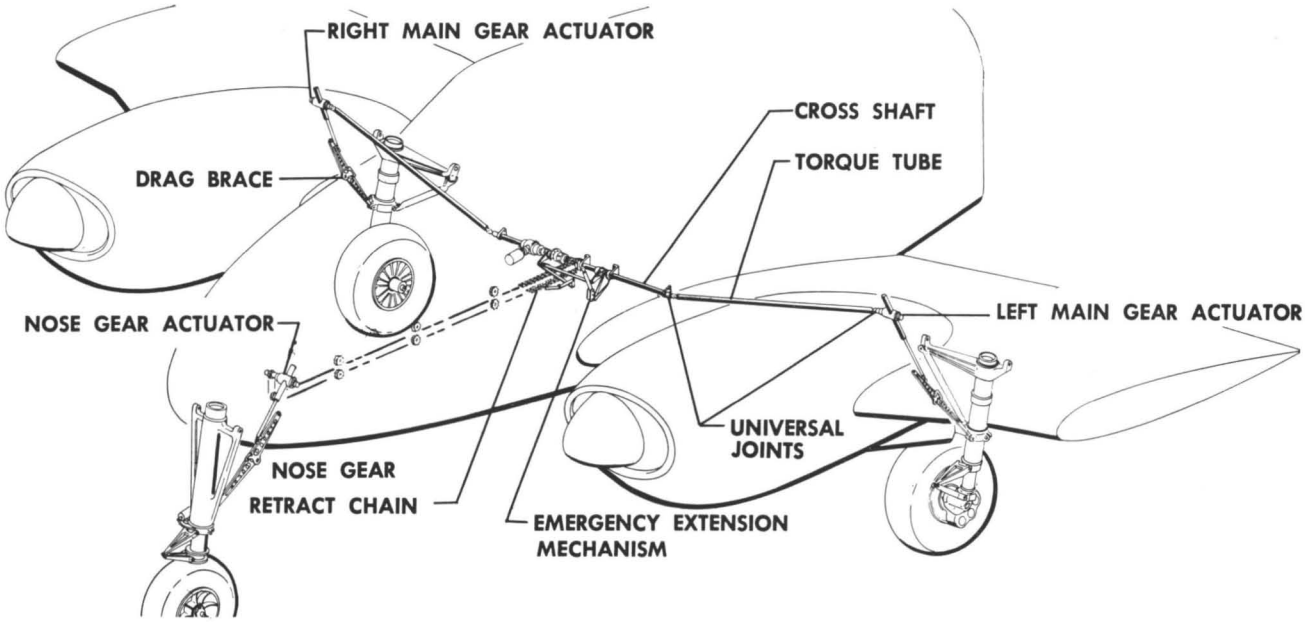
As we continue with our inspection, we notice a square metal box strapped to the strut cylinder. This is our safety switch unit which houses two switches. One prevents the gear from retracting as long as the plane is on the ground, while the other prohibits the assist step from extending during flight.

A word of caution—we should never intentionally place the gear handle in the up position while the aircraft is on the ground. Even though the safety switch should prevent retraction, it could fail. Let's stick to the book.

Moving on to the drag brace, we notice that it consists of an upper and lower link connected to each other. It serves to support the gear as well as to retract and extend it. Our main point of interest lies at the joint where the two links connect. It is here that the drag brace is mechanically locked by a hook on either side of the joint, and this locking action can take place only after the strut has fully extended. Although these two hooks work simultaneously, they are independent, and one can fail without hampering the operation of its mate. Either can effectively lock the drag brace.

To let us know when the gear is locked and to warn us if it is unsafe, the manufacturer has attached a microswitch to each drag brace hook. These switches are actuated by the hook movement, and they control three separate and independent circuits: the green indicator light for each gear, the red handle light, and the landing gear warning horn. One hook controls both the green light and the red handle light circuits, while the other operates the gear warning horn. Since the two hooks may operate independently, it is equally possible for one switch to function without the other.

Attached to the upper drag brace link, we find a jackscrew actuator. This is a mechanically operated unit which extends and retracts the gear. It also serves to support it in the retracted position. Because of this, we cannot free-fall this gear.



U-8D landing gear retract system

With the exception of the safety switch unit, the left strut is identical to its counterpart. Only one safety switch is used on this assembly, and it functions as a warning device. If the landing gear selector is inadvertently placed in the retract position while the aircraft is on the ground, this switch will energize both the warning horn and the red handle light circuits. Bear in mind that the safety switch on the right strut would prevent gear retraction under these circumstances.

Although different in design, the nose gear functions in a manner similar to that of the main gear. It differs primarily in the fact that it can be steered. Because of its mechanical design, the nose wheel will automatically center during retraction, and cannot be steered once it has retracted. On the ground, the nose gear strut piston should extend approximately 5 inches from the cylinder instead of 3, as on the main gear struts. There is no safety switch attached to this assembly.

All gear doors operate by mechanical linkage which is positioned by the respective strut assemblies. When inspecting the doors, we should make sure that all the turnbuckles are safetied, and should be especially careful to note that none of these connecting link rods are bent. A bent rod could allow the door to close early, with the possibility that the gear might strike it and create a binding condition. Should this occur, we may find that we cannot extend the gear by either normal or emergency means.

When the gear retracts, we find that the wheels do not become completely enclosed within the well area. Instead, they extend through the gear doors. If a gear-up landing becomes inevitable, the strut assemblies will contact a set of stops within each wheel well. This permits the struts to support the weight of the aircraft without collapsing. Landing in this configuration, the wheels will rotate and the brakes can be applied. There will be a clearance of approximately 3 inches between the fuselage of the aircraft and level ground.

Let's pause and elaborate on some of the units which we treated lightly during our discussion. Specifically, the three green indicator lights, the red handle light, and the landing gear warning horn.

The three green lights represent our indicators; they tell us if each wheel is down and locked. Since each green light is energized by its own circuit, all three will not necessarily illuminate or extinguish at the same time.

The red handle light serves as our primary gear warning device. Its purpose is to let us know whether or not we have an unsafe gear condition. Consequently, any time an unsafe gear condition exists, for which a warning can be given, the red handle light should be on. It also serves as an indicator by extinguishing when all three wheels have fully retracted.

During flight, if any wheel should not be down and locked, the landing gear warning horn should sound when either throttle is retarded to or below the specified throttle warning horn microswitch setting. In contrast to the red handle light, the warning horn is primarily a warning device to remind us during flight that we may be considering landing and that we have not yet extended our gear. Bear in mind the warning horn will sound on the ground, regardless of throttle position, should the gear handle be in the up position, even with the gear extended and locked.

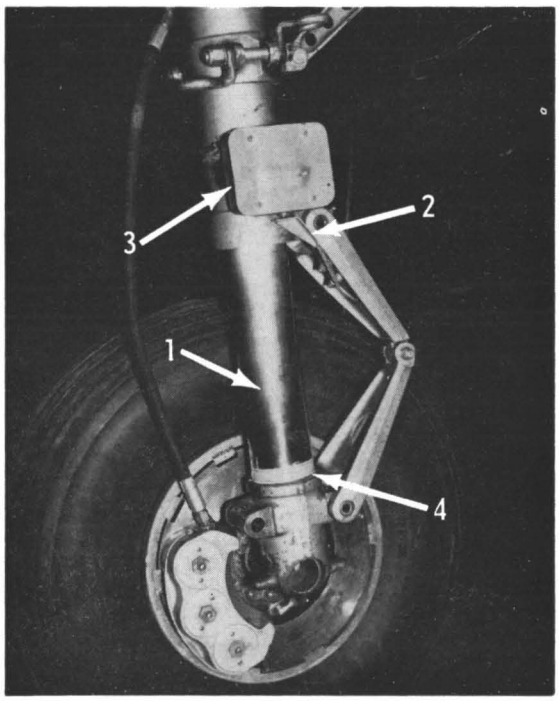
The landing gear warning horn is located behind the instrument panel forward of the pilot. It operates intermittently to distinguish it from the stall warning horn which has a steady sound as well as a different tone. A horn silencing switch is located on the center of the instrument panel. Depressing this switch momentarily, when the gear warning horn is operating during flight, will energize a holding relay which breaks the horn circuit. This relay is automatically reset when the gear is extended, or when the throttles are advanced.

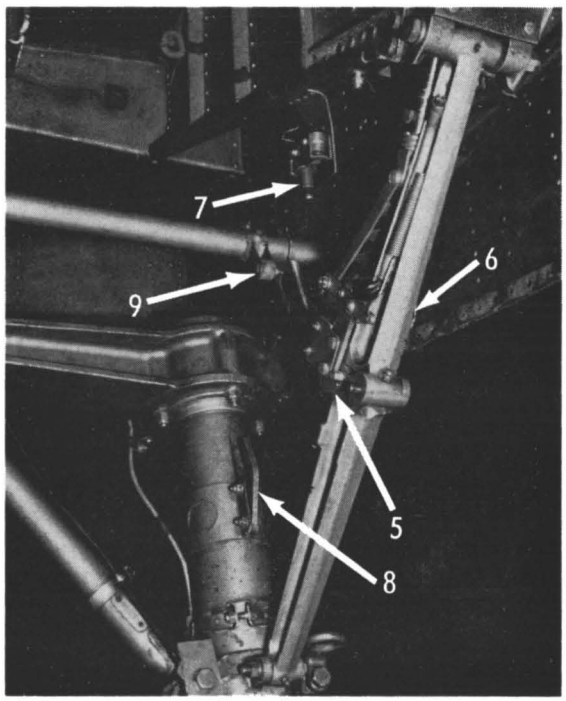
The three green lights are of the standard press-to-test type. By depressing each one, we can check the condition of its bulb. In order to check the bulb in the gear handle, we must press the test switch located on the instrument panel adjacent to the horn silencing switch. Remember, in each case, that we are testing the bulbs —not the warning or indicating circuits.

All of this discussion may be fine. But what we really need is to take a flight and check the gear units during actual operation. Let's board the aircraft and do just that.

On the floor, adjacent to the generator circuit breakers, we find a 50-ampere circuit breaker which is flush with the floor. This unit protects our motor circuit, and is of a type that may be reset. It cannot be manually tripped. Therefore, it is important for us to be familiar with the location and purpose of a second circuit breaker in the gear system. This one is a 3-ampere circuit breaker which is located in the extreme left subpanel. It functions to protect the two relay circuits through which we may indirectly energize the motor. Short of eliminating all aircraft electrical power, this is the only means we have of positively breaking or preventing a completed circuit to the landing gear motor.

With aircraft in air, strut piston (1) fully extends. Bracket (2) actuates safety switch plunger (3). Note location of red band (4). Hooks (5) on each side of joint lock drag brace links. Warning horn, indicator and handle light switches attached to hooks (6). Up-lock switch (7) can be seen high in well area attached to structure. Bracket (8) strapped to strut positions torque tube by roller (9) for door operation.





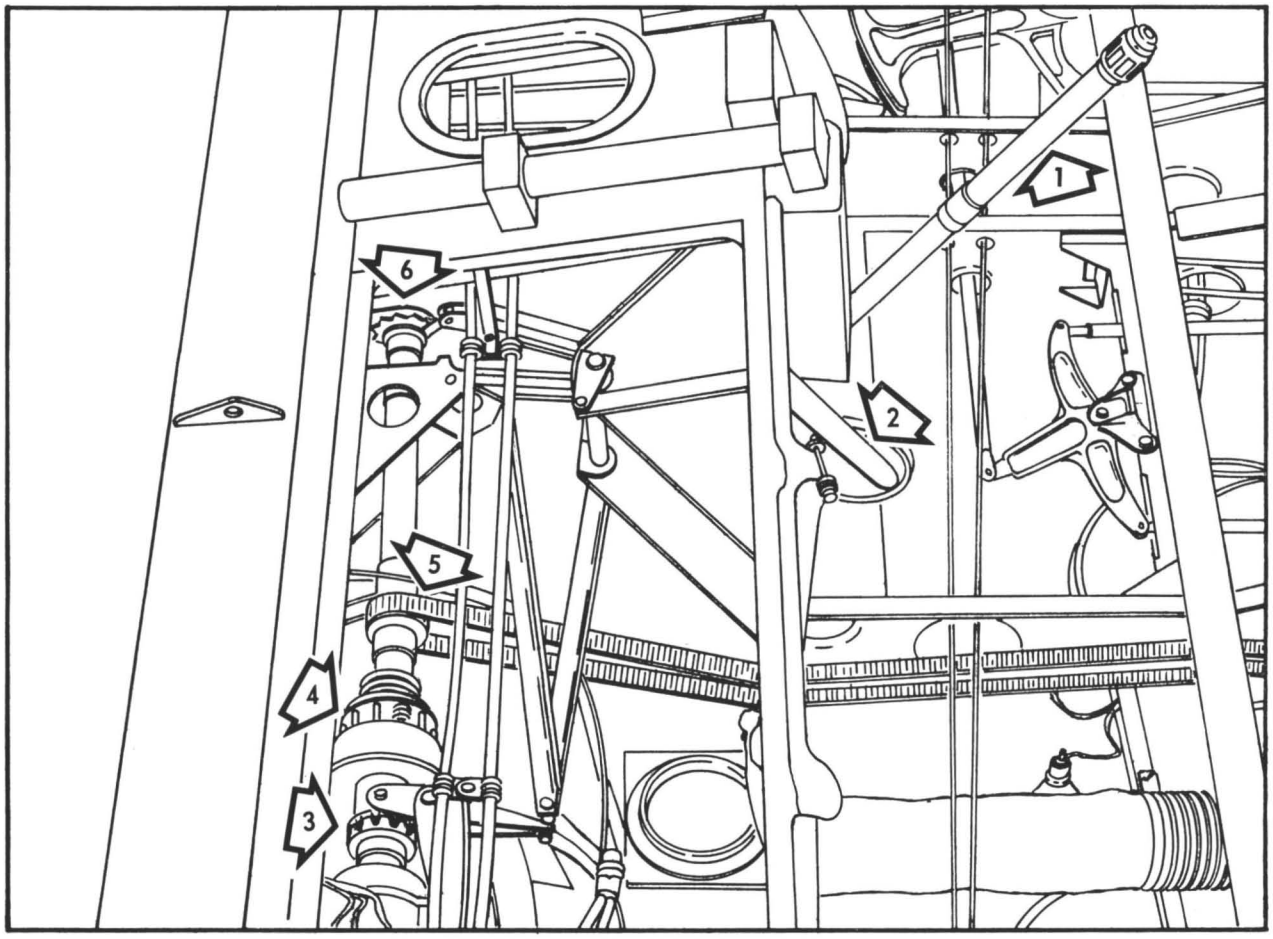
At the center of the front seat panel, obscured by the seat cushion, we find a clutch disengage lever. It should be positioned as far as possible toward the left. In this position, the gear motor is engaged to the landing gear units through a clutch.

It is of the utmost importance for us to ensure that both the 3-ampere and 50-ampere circuit breakers, as well as the clutch disengage lever, are in their normal positions prior to flight. Otherwise, the gear will not retract. Depending upon any variables which might exist at the time, this condition might cause a serious emergency. Further, if we should find the 50-ampere circuit breaker tripped during our cockpit check, our suspicions should immediately become aroused. Since we cannot manually trip this unit, it is evident that this circuit either was temporarily overloaded or that it is defective.

The controlling unit in our gear system is the landing gear handle, which is simply a two-position switch. This switch controls a reversible motor which in turn operates the gear. When we make a gear selection, the motor drives a cross shaft or torque tube. It does this through a gear box and an overload clutch. The overload clutch will slip if a binding condition should develop, thus preventing damage to gear components.

The cross shaft is attached directly to each main gear actuator and, by a long bicycle type chain, to the nose gear actuator. Consequently, whenever the cross shaft is rotating, all three gear actuators should be in motion.

With front seat and floor panels removed, major gear units can be seen. Overload clutch disengage lever positioned for manual extension of gear (2). Gear extension handle (1). Double acting ratchet (6). Bicycle type chain connected to cross shaft (5). Overload clutch housing shown (4) disengaged from motor driven gear box (3).



During retraction, when the gear reaches the full up position, a limit switch breaks the motor circuit and halts further gear movement. At approximately the same instant, each gear strut actuates a microswitch in its respective wheel well which stops current flow to the red handle light. If the gear handle were now to be placed in the down position, the reverse would take place.

Let's simulate failure of the overload clutch and extend the gear by emergency means. What procedure will the pilot follow? First of all, he pulls the 3-ampere circuit breaker. This ensures that the gear motor cannot be energized. If the motor, which is series wound, were to operate under a no-load condition, it would overheat as well as overspeed, damaging both the motor and gear box.

His next step is to place the gear handle in the down or extend position. On the surface, this step seems unnecessary. We know the gear handle is merely a switch. Since the pilot has just pulled the circuit breaker and no power is available to it, why should he bother to position the handle? For two very good reasons. If aircraft electrical power has not been lost, the gear handle light will properly function to indicate when all three wheels have extended and locked. The second reason has nothing to do with gear operation, but concerns the heater system. On U-8D type aircraft, the gear handle also mechanically positions a switch that turns on the heater blower. If the heater were in operation, it would not receive any air supply once the plane landed and lost airspeed. This could result in an overtemp condition within the heater. Therefore, we want the handle to be in the same position it would occupy if the gear were being extended by normal means.

Having accomplished the first two steps, the pilot moves the clutch disengage lever all the way to the right. He is now disengaging the overload clutch and connecting the cross shaft directly to a double acting ratchet. His final step is to extend the emergency extension handle and to pump it fore and aft. Since the ratchet wheel is double acting, it rotates in one direction with every fore and aft stroke the extension handle makes. From the full up position, it will require approximately 150 strokes in each direction to completely extend and lock the gear.

The pilot must use extreme caution as extension nears completion. He should stop the pumping action as soon as he has made certain that all the gear is down and locked. Further pumping action will result in damage to gear

Push-to-test green indicator lights and landing gear handle is seen in upper photo. Location of 3-ampere landing gear circuit breaker is shown in lower one.

components. If aircraft electrical power is available, he will have the normal indication of a safe gear condition: three green lights, no red handle light, and the warning horn will not sound when either throttle is retarded. But what if electrical power were not available? How can he tell when the gear has extended so that he will not inflict any damage due to overpumping of the extension handle?

On the floor, between the copilot's rudder pedals, is a square window through which appears the word "up." As he pumps the gear down, he watches this window. When he reaches a point where he feels an increase in handle pressure, and the tab in the window reads "down," he stops pumping. This tab is mechanically linked and operated from the nose gear only. He must assume, if the nose gear is extended, that all wheels are down and locked as they are all interconnected.

Can the pilot retract the gear manually? As its name implies, the gear extension handle will only extend the gear. Any attempt to retract the gear by this means can cause serious damage to gear units. What the pilot wants to do is to reverse the procedure he followed during extension. It is of prime importance that the clutch disengage lever be placed in its original position, all the way to the left. If he fails to do this, he

will have the motor operating without a load and this may cause failure of the motor and gear box. Should this occur, there would be no means left to retract the gear. With the clutch lever properly positioned, the pilot resets the circuit breaker, and places the handle into the retract position. Normal gear retraction now occurs.

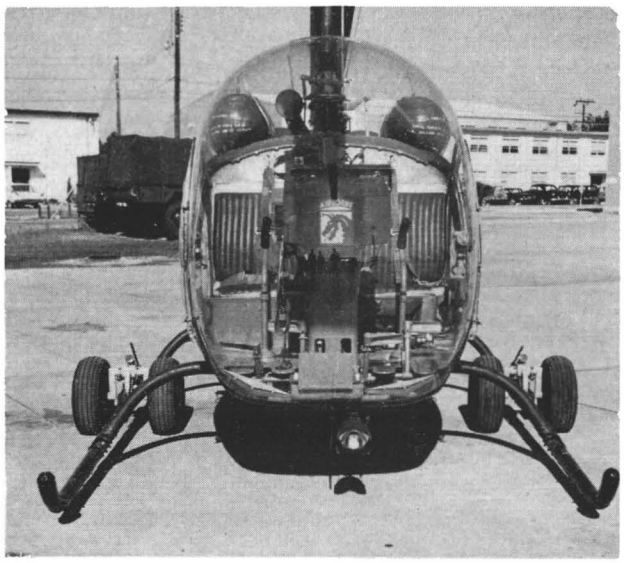
It appears our pilot is ready to call it a day, and has placed the gear handle down. The throttles are retarded. As the gear extends, we watch three green lights come on, while the red handle light and warning horn go off. On the floor, the mechanically operated tab reads "down." As far as the gear is concerned, we're ready to land.

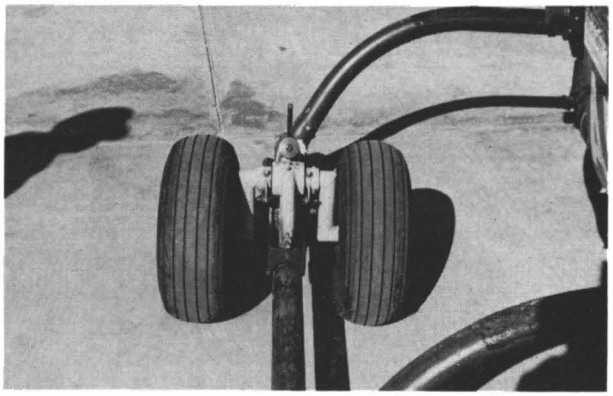
The flight is over, and we should now be experts in the operation of the U-8D landing gear system. But what about the F model? The U-8F uses a gear system which is almost identical to that of the D. In place of green lights to denote gear position, the F model is equipped with Selsyn indicators which show both the up and down gear positions, as well as unsafe gear configurations. Positioning of the gear handle does not affect the heater blower. The blower circuit is automatically energized when the aircraft is on the ground. When the gear retracts, the nose wheel is completely enclosed within the well area. In the event of a wheels-up landing, the aircraft will settle on the main gear wheels and fuselage.

Huey Wheels Improve Ground Handling of Sioux

GROUND HANDLING of the OH-13 can be extremely difficult over unimproved surfaces, but members of the XVIII Airborne Corps, Ft Bragg, N. C., have solved this problem by attaching UH-1B wheels to the Sioux (see fig.).

Because of the lack of flotation inherent in the narrow width of the standard ground handling wheels, moving the OH-13 over rough terrain usually requires a tow truck.





The UH-1B's wider wheels permit four men to move the Sioux without difficulty. The flotation problem is completely solved. The wheels are attached to the OH-13 with steel adapters and require no modification of the aircraft. The adapters can be attached or removed by a trained crew in about 40 seconds.

Units interested in this adapter can obtain construction details from the XVIII Airborne Corps or the U. S. ARMY AVIATION DIGEST.

MANY SO-CALLED experts would have you believe that mid-air collisions are a function of mathematics; the greater the number of aircraft in a given airspace at any one time, and the greater their speed, the greater the chances of collision. Up to this point, we can follow them. It makes good sense. But when they start taking

out their slide rules and computers to fill blackboards with complex formulas, they leave us.

The fact is that no expert can predict human behavior with any degree of consistent accuracy. Any human behavior is the one element that determines whether a mathematical probability becomes a collision, a near accident, or a detour. In short, when two aircraft are on collision courses, they will collide unless one pilot sees the other or both pilots see each other in time to take evasive action.

crash sense

PREPARED BY THE U. S. ARMY BOARD FOR AVIATION ACCIDENT RESEARCH

Other experts are hipped on the subject of cockpit visibility, and no one can say this isn't important. Many manhours of study have gone into cockpit design to assure good visibility. Improvements can be measured from Lindbergh's "Spirit of St. Louis," with only a periscope and side windows, to the current fleet of Army aircraft with optimum lateral and forward visibility. But those who flew the LC-126 will remember craning their necks and looking around much more simply because that aircraft *did not* have good visibility.

Again, the problem comes right back to human behavior and the pilot. Visibility, like polio vaccine, only works when it's used. Complete and unrestricted visibility will not prevent collisions without comprehensive sight and action.

If sight were a mechanical function and did not rely on human interpretation, the problem would remain simple. We could set it to function like a prop governor. But sight, to be effective, must be conscious sight. We not only must look, we must be conscious of looking and what we're looking for.

Fledgling aviators are taught the mechanics of looking around from their first day in the air: "Look to the left. Come on; turn your head!

"Bend your neck—up—down—level. Swing slowly back to the front.

"Check your panel. Now take the right side."

"Keep that head moving!"

What do they see? Very little. They look because their instructors tell them to look. But they learn the mechanics of looking and, gradually, as they build experience, they begin to see and recognize other aircraft. They build and store mental images of other types and sizes of aircraft as they appear from various distances, from below or above, closing in or going farther away. They learn what to look for and how to see from the air. This is where the problem becomes complicated.

If you are reading this with concentration, you are at this moment unaware of what is taking place around you. For in your conscious effort to absorb these words, you have excluded all else—unless you're one of those rare geniuses with a simultaneous multichannel brain. Most of us, through an unkind quirk of nature, come

equipped with a standard issue single-channel attention transmitter and receiver. We have to consciously tune in what we're receiving, either orally or visually, for it to be transmitted to our brains for action.

To further complicate matters, the brain also acts as a censor. Picture a freshman psychology class made up of both sexes. The instructor flashes a common word on a screen in a fraction of a second and each member of the class writes it down. Other common words are flashed on the screen at shorter and shorter intervals until no one can read them. The instructor then substitutes four-letter indecent words and begins to increase the time interval each word is shown.

When he reaches the same time interval at which the *whole* class was able to easily recognize the first series of words, not a single person can read the indecent words. Although the students see the words, they can't believe what they are seeing. Though our eyes may focus on an object, we will not consciously see it if it fails to pass the censorship of our minds.

Human visual perception has been compared to reading a large newspaper by the narrow beam from a pencil flashlight. Though our eyes are capable of taking in the whole newspaper, our minds limit what we can see and perceive. Our area of conscious attention is not nearly so large as the area our eyes can see. But the smaller area of conscious attention determines what we can see with perception and understanding.

What has all this to do with mid-air collisions? Simply this: a pilot *must* be able to divide his attention between flying the aircraft, planning ahead, and remaining alert for other aircraft. He must make his single-channel receiver juggle these three items every second he is in the air. The faster his aircraft, the more crowded the air, the faster this mental juggling must be.

One of the best examples of the necessity for division of attention comes with the beginning of strip work for student pilots. Here, ground observation during reconnaissance must be juggled with aircraft control and alertness for other aircraft. All B-phase flight instructors can cite instances in which coordination and alertness were completely tuned out while student pilots concentrated on planning an approach. This is why most B-phase instructors ride on thick cushions. It's also why these cushions often need recovering.

The need for alertness is always there in flight. And this need is doubled for the instrument instructor or the pilot flying as observer while another practices hood flying. Instrument facilities are crowded with aircraft, not only with arriving and departing commercial traffic, but with other instrument trainers, with business aircraft, and private aircraft. While radar and traffic control help, the burden of responsibility for avoiding other aircraft in VFR conditions still rests squarely on the pilot. The only way to avoid other aircraft is to LOOK, to LOOK constantly, and to LOOK with an open-channel mind.

To illustrate what happens when the three-ball juggle of ALERTNESS, FLYING, and PLANNING fails, here are three recent accidents:

ALERTNESS

A U-8F was practicing low freq and ADF approaches to a civilian airport. Aboard were two highly experienced Army Aviators, one with more than 6,000 hours and the other with more than 3,000 hours.

A civilian light aircraft took off a few minutes before the U-8F was cleared for a straight-in,

low approach from a low frequency radio fix. The pilot of this aircraft had just received his private flying license and had logged only a little more than 50 hours of flying time.

Twelve minutes after the civilian aircraft took off, the U-8F reported over the outer marker outbound. Five minutes later, the two aircraft collided almost head on at an altitude estimated at 2,000 feet.

Both aircraft disintegrated and crashed, killing all three occupants.

FLYING

Two O-1s took off early one morning to simulate strafing and bombing attacks on nearby troops and equipment. A pilot and observer were in each aircraft.

After making simulated runs for approximately 10 minutes and dropping all his flour sacks, one pilot informed the other that he was returning to the post. The other answered, "I'll be there in a minute. I see a jeep I want to get," or words to that effect.

The remaining aircraft then performed a maneuver, variously described as a wingover, crop-duster turn, or half of a lazy-eight by witnesses. The attitude of the aircraft was extremely nose low during the last descending portion of this maneuver, and this attitude changed very little until the aircraft struck the ground in a clearing, headed in the general direction of the intended jeep target. Both occupants were killed at impact and the aircraft burned.

PLANNING

A UH-1 pilot filed a local flight plan for a short three-legged, cross-country flight. He did not request en route weather, but did get his first destination weather. The aircraft took off at 1600 hours with the pilot and a crewchief aboard. Twenty minutes later a severe weather warning was issued.

At 1900 hours, the operations officer of the pilot's unit received a call that the aircraft was missing. Due to the weather, a search could not be initiated until the following morning. The wreckage was found in a wooded area. Both pilot and crewchief were killed. From the pilot's watch and aircraft clock, the time of the accident was established as between 1645 and 1650 hours. Wreckage was distributed over an area 1,800 feet long and 200 feet wide. There was evidence of inflight fire prior to impact.

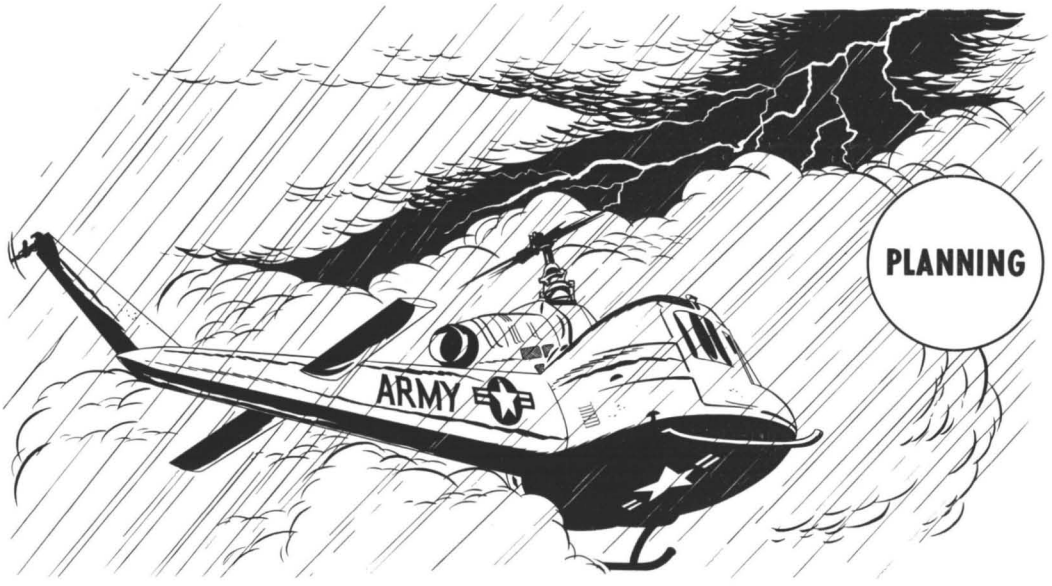
The most cause of this accident is that the aircraft entered severe weather and became inverted or near inverted in flight. This attitude resulted in severe rotor flapping and subsequently caused mast separation.

Witnesses in the area described the weather at the time of the crash as the worst storm they had seen for 30 years. Lightning, heavy winds and rain, and hail were seen.

An 11-year-old boy saw an aircraft through his dining room window sometime between 1630 and 1700. He could not determine the type of aircraft but saw the rotating light. There was

heavy rainfall and severe lightning and the boy reported seeing lightning hit what appeared to be the aircraft, then saw a ball of fire as the aircraft disappeared from his view. Due to the severe thunderstorm and short period the aircraft was seen, it was not possible to determine whether a lightning strike had caused inflight fire. Investigators found no evidence of high voltage overload in the radio equipment.

Regardless of whether this accident was caused by turbulence, an unusual attitude, or lightning strike, it is known that the pilot flew into an area of severe weather which he could have avoided.



TWO RECENT Mohawk accidents proved beyond all doubt the lifesaving value of the Martin-Baker ejection seat. On both occasions, the aircraft were making night photographic runs, firing photo flash cartridges.

Flying at 2,200 feet, the pilot of the first aircraft had just salvoed his remaining flares when the aircraft entered a steep dive and would not respond to control movement. The pilot told the copilot to eject and then ejected himself. His seat worked perfectly, and after two oscillations he landed in brush with only a minor injury to one hand.

The pilot of the second aircraft was flying at approximately 1,000 feet. When he ejected his flares, he saw a white flash very close to him, followed by a bright red flame which shot out ahead of the aircraft. At this time, he felt a severe jolt and momentarily lost consciousness. He came to, found he had no control, and pulled his face curtain. The pilot reported a very easy ejection but he sustained a compression fracture of his back.

For unknown reasons, the copilot of the first aircraft and the observer in the second aircraft failed to eject and were killed in the crashes. Also unknown are the causes of the two accidents. At this writing, the investigations are still underway.

Two lives saved from what would have meant certain death prove the value of ejection seats. They also prove these seats *must* be maintained by thoroughly trained, competent personnel. For once the ejection sequence has started, it must work perfectly or fail. One discrepancy can render the entire system inoperative.

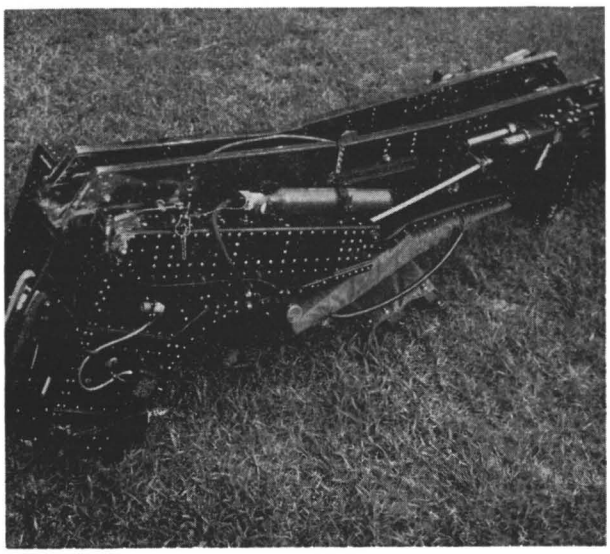
To further emphasize the need for quality control, here are some maintenance boners found in OV-1 ejection seats during the past few months:

1. *Incorrect cotter keys in drogue guns.*
2. *Withdrawal lines routed wrong.*
3. *Excessive slack in firing cables.*
4. *Spacer missing on drogue gun bullet.*
5. *Bungee cords needed replacing.*
6. *Wrong type nut and bolt on drogue gun bullet.*
7. *Safety wire missing from time release.* (Not shown on illustration.)
8. *Drogue flap withdrawal pins not safetied.*
9. *Main gun sear bent.*
10. *Face blind and personnel retainer straps rigged backwards.*
11. *Link lines rigged improperly over tops of shackles.*
12. *Drogue pack safety pin out of packet and seal broken.*
13. *Harness clips broken.*

Small items? Not to the pilot whose life may be at stake!

PROOF POSITIVE

COL. ROBERT M. HAMILTON
Director, USABAAR



These make it clearly evident that some personnel responsible for ejection seat maintenance aren't doing their jobs. Whether it's through carelessness, lack of knowledge, weak supervision, or a combination of all three is unknown.

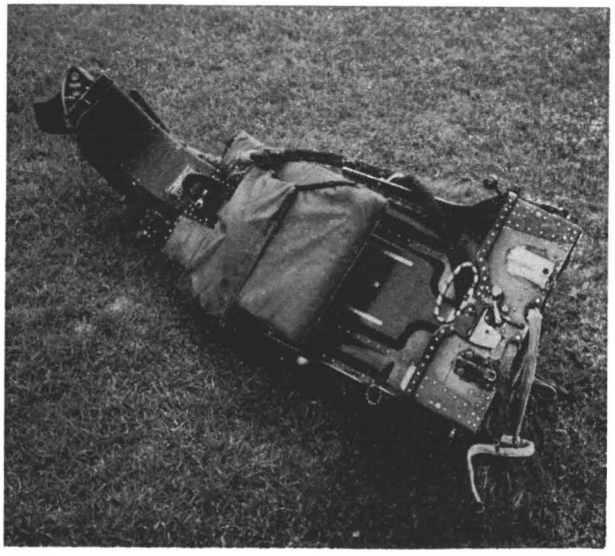
Even though the above discrepancies have been discovered, we should note that there has never been a known instance, in the Army, where this seat has failed during an actual ejection attempt. On the contrary, it once successfully ejected an instructor pilot quite inadvertently, leaving the aircraft in the hands of a student who safely landed it.

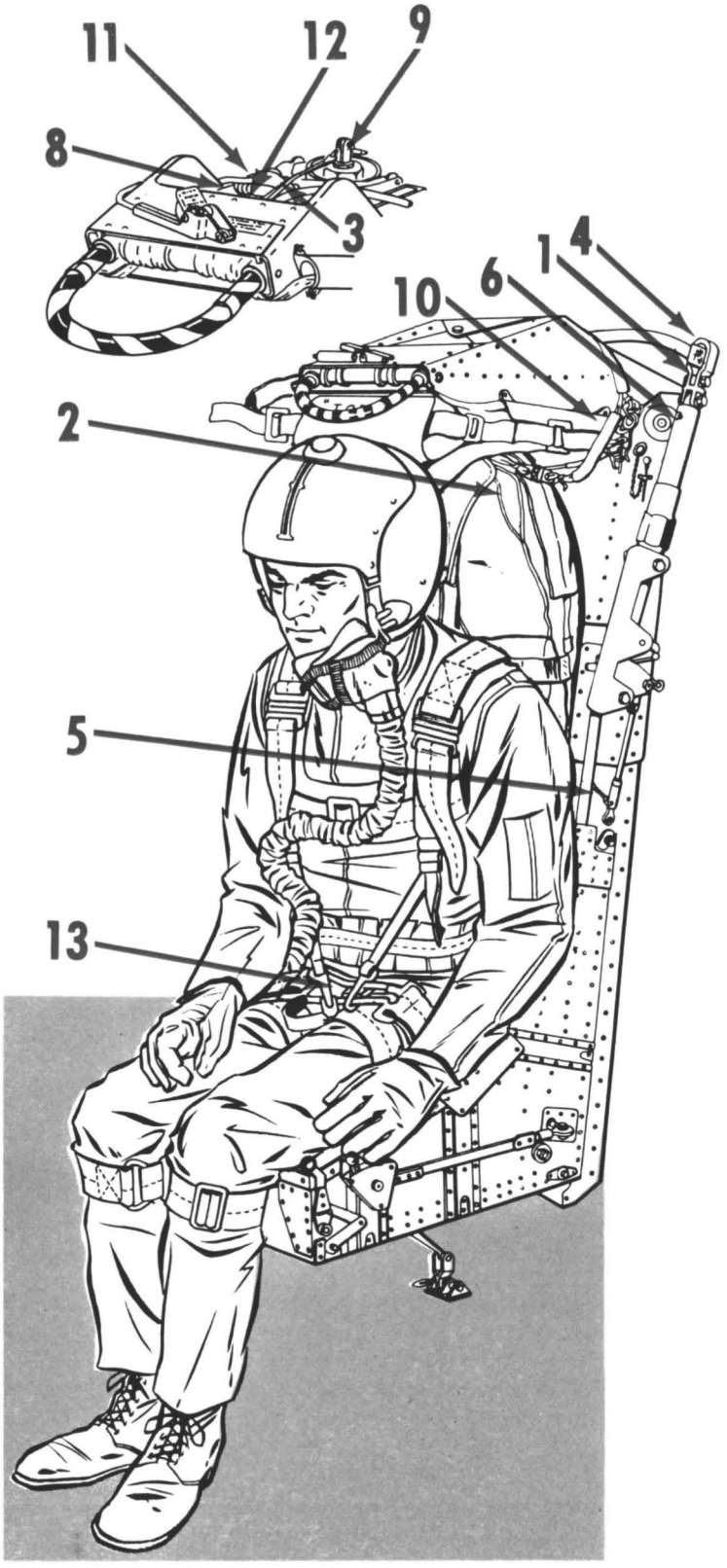
The point is this: The egress system is engineered to work. It is ready to work. It will work. But, you must give it the command. Should the need arise, don't hesitate. Trust it, and reach for that handle.

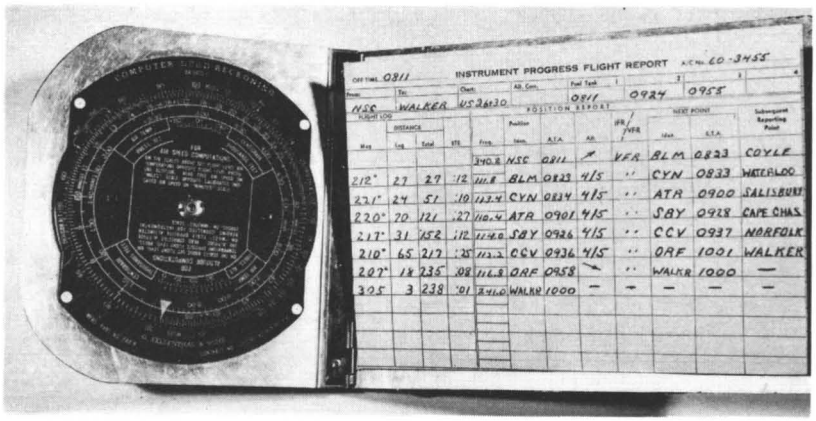
Although expensive, the aircraft can be replaced. You are not that dispensable to your country, your family, your children, or your community.

What is necessary to effect a cure? The cure demands thorough TRAINING, strict SUPERVISION, and absolute ADHERENCE TO APPROPRIATE MANUALS. Now is the time to check the seats in YOUR Mohawks to see how YOU stack up in these areas.

Opposite page: Seat used by first Mohawk pilot.
Below: Seat used by second Mohawk pilot.







Continued from page 1

trip to an FAA station fixed that.

Next, to solve that business of more than one clearance. Have you ever failed to make contact on a newly assigned frequency and had to thumb through the manual for another to reestablish contact because you forgot the last one? We can always use some *remarks* space for the telephone numbers overheard in operations.

Now for the meat of the thing: the flight planning and progress section. Some prefer the position report group on the left and the flight log on the right. Since I start with planning and read from left to right, I chose to organize my card that way. The cumulative times and mileage columns are handy for fuel control. The only solution I could find for low freq and VHF (navigation only) was to split the frequency spaces in half, sort of like upper case and lower case.

The above accomplished, I had to have a card heading with certain stable information, such as aircraft number, off time, tank switch time, and the Jep chart numbers to be used, not to mention that sneaky altimeter Korrektor. Notice that there are four tank switch time spaces—takes care of most everything including the U-8 torso tanks.

The card is designed to be folded in half with a flap on the left side and a flap on the top so it can be grabbed by a clipboard such as I have designed, or a standard long style top grabber that the copilot can use. The 175 sequence section that is used first is on the bottom. Flip the flight planning and position report section down and the ATC clearance groups are exposed. You are ready to copy.

Initially, I tried this on a salmon colored card with black printing, but found after a few night flights with no carrots that this was no dice. I went to the white card with blue printing. Decided to leave out the morse code, phonetic alphabet and IFR shorthand, leaving it up to the individual aviators to learn these things.

What to do with this mousetrap now that it was finished? Send it to DA through Army Headquarters, sit smuggly and await my pat on the back. I did! Sent it to Hq ___ Army, which was as far as it went. A brief note came back and I quote: "Professional aviators do not need a crutch, and besides the one we have is good enough." That didn't stop me. After brooding for 3 years and considering the Chief of Staff's suggestion month, I sent it to the ARMY AVIATION DIGEST.

John L. Briggs
Lt Col, Arty
Avn Div, USA Sec
MAAG, Vietnam

• *See "You—the Idea Factory," page 12.—Editor*

Sir:

Enclosed . . . photograph of an Army Aviation "First," the XV-1 McDonnell Convertiplane [world's first successful convertiplane].

Two of these aircraft are in existence and have recently been prepared for display and shipment. One will go to the Smithsonian and the other to the Army Aviation Museum. I expect that they will be shipped within a few days.

If we may be of further assistance, please let me know.

Edwin Kalbfleish, Jr.
Information Officer
USAVSCOM
St. Louis, Mo.

• *The convertiplane arrived at the museum in August.—Editor*

Fort Rucker, Alabama
15 September 1963

Dear Bill,

You certainly are doing the right thing by coming into Army Aviation maintenance. Army Aviation is growing rapidly, and you are getting in on the ground floor of a program that has an unlimited future. I can think of two main reasons you will want to make a career out of aviation maintenance. First, it offers plenty of opportunity and, second, it provides a source of personal satisfaction.

As you know, I've been in the Army a little over three years now and most of my time has been in aviation maintenance. Last month I was promoted to Staff Sergeant. Judging from the way things are shaping up, I'll be able to go all the way in this business as an enlisted man or a commissioned officer. Next week I'm being sent to an advanced course on the CH-47A Chinook, the Army's newest and largest transport helicopter.

That brings up another point. Just as important as money, rank, or position is the personal satisfaction a man gets when he's given responsibility -- when he's trusted -- when he knows that people are depending on him.

Bill, when I finish the CH-47A course I'll become a crewchief on a Chinook. I'll be one of the people directly responsible for a million dollar aircraft and also for the lives of all those who fly in it. Think of that, Bill! That's quite a responsibility, and it's rewarding to know that the Army has this kind of faith in me.

Let me give you just one word of caution: It will not be an easy road to travel. As an apprentice, you will be given a lot of menial tasks and insignificant jobs that will make you feel you're wasting your time. But your attitude is being noticed. If you're not a quitter, if you'll do your insignificant job to the best of your ability, you'll be rewarded.

The training you'll receive at Fort Rucker is the best in the world. Here you'll be assigned to the Enlisted Student Company, which now has over 1,000 men. You will live and eat in modern buildings. Instructors are the best available. You will have the benefits of modern training aides, well stocked libraries, and air conditioned study halls. The facilities are the best. The rest is up to you.

When you report to Fort Rucker you will be enrolled in a basic aircraft maintenance course, which will familiarize you with Army Aircraft. Eventually you will become a specialist in one type of aircraft, rather than a novice who knows a little about all of them. This is the best system, since pilots will depend on you for technical advice pertaining to your aircraft.

As you can guess, Bill, I like my job. I think any air-minded person should jump at an opportunity to become a part of the Army Aviation program. And if he sticks with it through thick and thin, he will find that the sky is the limit. I feel I play a very important role in this program, for without mechanics and crewchiefs the pilot and aircraft would never get off the ground.

Sincerely,

Harry

Written by Captain Max B. Hoyt, Executive Officer, Enlisted Student Company, USAAVNS, Ft Rucker, Ala.

New Commandant U. S. Army Aviation School

It is an honor and privilege to be assigned as Commandant of the United States Army Aviation School. There is no single activity in the Army more responsible for true modernization of our combat forces. The task is great, and I call on all members of this command to assist me in the utilization of wisdom, initiative, and enthusiasm in successfully meeting the challenge.

Maj Gen Clifton F. von Kann

ON 23 AUGUST, Maj Gen Clifton F. von Kann assumed command of the U. S. Army Aviation Center and became Commandant of the U. S. Army Aviation School. He succeeds Brig Gen Robert R. Williams, who has been assigned as Commander of Training Evaluation and Control Group, Fort Benning, Ga.

A former Director of Army Aviation, General von Kann comes to Fort Rucker from his assignment as Commanding General, 1st Cavalry Division.

His Army service began as a second lieutenant shortly after graduation cum laude from Harvard College, Cambridge, Mass., in 1937. He was a captain in the 77th Field Artillery when the Japanese bombed Pearl Harbor.

General von Kann remained with the 77th Field Artillery Regiment, primarily its second battalion (later redesignated the 631st Field Artillery Battalion), through the greater part of World War II. He was awarded the Silver Star for gallantry in action near Cassino and later the Legion of Merit for his work with the battalion.

After V-E day, General von Kann was assigned to the War Department General Staff. In 1946 he entered Harvard Graduate School of Business Administration, receiving his Master of Business Administration degree in 1948. This was followed by a long period of staff work in Washington.

Following his graduation from the Armed Forces Staff College in 1953, General von Kann served two years in the Far East. He returned to Washington to attend the National War College, where he graduated in 1957.

General von Kann's next assignment was with the 82d Airborne Division at Fort Bragg, N. C. During his two-year tour, he made 46 parachute jumps and qualified as a senior parachutist. He also became interested in Army Aviation. This resulted in his rotary wing pilot rating at Fort Rucker in August 1958. He returns to the Army Aviation Center as a dual-rated Army Aviator.